CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	A mixed method study to explore the impact of nurse prescribing in clinical practice
Authors	Creedon, Rena
Publication date	2016
Original Citation	Creedon, R. 2016. A mixed method study to explore the impact of nurse prescribing in clinical practice. PhD Thesis, University College Cork.
Type of publication	Doctoral thesis
Rights	© 2016, Rena Creedon. - http://creativecommons.org/licenses/by-nc-nd/3.0/
Download date	2024-03-29 06:30:22
Item downloaded from	https://hdl.handle.net/10468/3518

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

A Mixed Methods Study to Explore the Impact of Nurse Prescribing in Clinical Practice.

Rena Creedon RGN CELTA ICN BSC MSc

Student number – 110221406

A Thesis submitted to University College Cork for the degree of Doctor of Philosophy in the School of Pharmacy, College of Medicine and Health.

Supervisors

Professor Stephen Byrne

Professor Julia Kennedy

Dr. Suzanne McCarthy

Declaration

I declare that this Thesis has not been submitted as an exercise for a degree at this or any other University. The work, upon which this Thesis is based, was carried out in collaboration with a team of researchers and supervisors who are duly acknowledged in the text of the Thesis. The Library may lend or copy this Thesis upon request.

_____ _____

Rena Creedon Date

Acknowledgments

Attainment of this doctoral Thesis was possible with the support from several people. I would sincerely like to thank them all for their help along the way.

Foremost, I would like to express my sincere gratitude to my three supervisors, Professor Stephen Byrne, Professor Julia Kennedy and Dr. Suzanne McCarthy. By possessing different scientific and personal skills, you have formed a high quality supervising team that has guided me professionally from start to finish of my PhD.

Stephen, thank you so much for your support and guidance throughout this PhD. I am very grateful that you accepted to supervise me thank you very much for your supervision, inspiring advice and constant support. Julia, thank you for the sincere and valuable guidance and encouragement extended to me from New Zealand and taking the time to meet with me when you were in this part of the world. Suzanne, you have been a tremendous mentor for me. Your continued support and advice on both research and structure of the Thesis was invaluable. You have oriented and supported me with promptness and care, and have always been patient and encouraging in times when I found progress difficult. You have always made time out of your busy schedule to assist me in all possible ways, your guidance and persistent were motivating and made this Thesis possible.

To Caroline O' Connor and Caroline Brady Nevin, I am forever grateful for your friendship. Thank you for all the pep-talks and sympathetic ear when I needed it. You always assume that I would do fine, and this helped me more than you both know.

Finally, thanks to my family. Words cannot express how grateful I am for all of the sacrifices that you have made on my behalf. Your constant

inspiration and unwavering belief kept me focused and motivated. I thank you so much for your love, support and significant influence in my life.

Peer Reviewed Publications

Creedon, R., O'Connell, E., McCarthy, G. & Lehane, B. (2009) 'An evaluation of nurse prescribing. Part 1: a literature review'. *British Journal of Nursing,* 18 (21):22-27.

O'Connell, E., **Creedon, R.,** McCarthy, G. & Lehane, B.; (2009) 'An evaluation of nurse prescribing. Part 2: a literature review'. *British Journal of Nursing,* 18 (22):98-102.

Creedon, R. & O'Connell, E. (2009) 'Introducing nurse prescribing: an Irish perspective'. *Nurse Prescribing,* 7 (11):507-511.

Creedon, R. (2010) 'Nurse prescribing and the need for CPD: an Irish perspective'. *Nurse Prescribing,* 8 (9):445-448.

Creedon R., McCarthy S. & Kennedy J. (2014) Nurse prescribers' experiences of recording prescribing data to the Minimum Data Set in Ireland. *British Journal of Community Nursing*, 19(12) 594-600.

Creedon, R., Byrne S., Kennedy, J. & McCarthy, S. (2015) the impact of nurse prescribing on the clinical setting. *British Journal of Nursing*. 24(17) 878-885

Creedon, R., Byrne, S. & McCarthy, S. (2015) Understanding the parallels between nurse prescribers in Ireland and the United Kingdom using a survey study design. Accepted by the International Journal of Nursing Studies pending revisions.

Creedon, R., Byrne, Kennedy, J. &S. McCarthy, S. (2015) Analysis of Quantitative STOPP/START Data. Submitted to the British Journal of Clinical Pharmacology.

Creedon, R., Byrne, S. Kennedy, J. & McCarthy, S. (2015) Analysis of Nurse prescribers Qualitative STOPP/START Findings, Submitted to the British Journal of Clinical Pharmacology.

Creedon, R., Byrne, S., Kennedy, J., Sketris, I. & McCarthy, S. (2015) Title: Nova Scotia Nurse Practitioners Understanding of Inappropriate Prescribing and using a Prescribing Evaluation Tool: A Pilot Study. Journal of Nursing Education and Practice, **6**(4) 1-11

Conference Presentations and Posters

Creedon, R. Introducing Nurse Prescribing to Ireland: challenges and solutions. *Prescribing for Success - Expansion and Evolution Conference*, Manchester, UK 8th and 9th February 2010. Invited Oral Presentation

Creedon, R. & McCarthy S. PhD Annual Presentation, School of Pharmacy, UCC, 2011- Oral Presentation.

Creedon, R. Nurse Prescribing: clinical issues in practice. *The Inaugural National Conference of Nurse and Midwife Prescribing* , School of Medicine and Health, University College Cork, Ireland, 09th September 2011. – Oral Presentation.

Creedon, R. The Experience and Challenges of Nurse Prescribing in Ireland. *Launch of the Nurse Prescribing Education Programme, Finland.* 14th to 18th February 2011 Oral Presentation.

Creedon R, Kennedy J, & McCarthy S. The Impact the Minimum data Set has on the Nurse Prescribing Process Poster presentation. All Ireland School of Pharmacy 34th Research Seminar. 2012 – Poster presentation.

Creedon R, Byrne, S. & McCarthy, S. The application of the STOPP/START medication tool to nurse prescribers' prescriptions (Quantitative findings) HSRPP Conference, 4th April 2014, Aberdeen, Scotland. Oral Presentation.

Creedon R, Byrne, S. & McCarthy, S. The application of the STOPP/START medication tool to nurse prescribers' prescriptions (Qualitative findings) PRIMM conference London January 2015 – Poster Presentation.

Creedon R, Byrne, S. & McCarthy, S. The application of the STOPP/START medication tool to nurse prescribers' prescriptions (Quantitative findings) Dalhousie University, Halifax, Nova Scotia, Canada. May 2015. Oral Presentation.

Creedon R, Byrne, S. & McCarthy, S. The application of the STOPP/START medication tool to nurse prescribers' prescriptions (Quantitative and qualitative findings) Nursing Governing Body, Nova Scotia, Canada, May 2015 – Oral presentation.

Creedon R, Byrne, S. & McCarthy, S. The application of the STOPP/START medication tool to nurse prescribers' prescriptions (Quantitative and Qualitative findings) Drug Evaluation Alliance of Nova Scotia (DEANS) Department of Health and Wellness Nova. May 2015, Oral presentation.

Glossary of Terms

Term	Definition
Advanced Nurse Practitioner	This is an umbrella term used to encompass the specific roles of nurses who practice at a more advanced level than that of traditional nurses
Adverse event	An incident that results in harm to a patient
Adverse drug event	An adverse drug event refers to any injury occurring at the time a drug is used, whether or not it is identified as a cause of the injury.
An Bord Altranais	A Bord Altranais is the regulatory body for the nursing profession in Ireland. Following the signing of Commencement Order S.I. No. 385 in 2012, the name of An Bord Altranais changed to Nursing and Midwifery Board of Ireland (NMBI) in 2011.
Audit	An independent, objective assurance and consulting activity designed to add value and improve an organisation's operations. It helps an organisation to accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes.
Collaborative Practice Agreement	Written agreement between the Registered Nurse prescriber and specific Consultant medical practitioner(s), agreeing the prescription of medicinal products by the registered nurse or midwife within their scope of practice at their place of employment. The medicinal product listing is approved by the Drugs and Therapeutics Committee and authorised by the director of nursing/midwifery/public health or relevant nurse and midwife manager on behalf of the health service provider.
Competence	The ability of the registered nurse or midwife to practice safely and effectively, fulfilling his or her professional responsibility within his/her scope of practice.

Department of Health and Children	The Department of Health and Children Ireland is our shared framework for improving the health and wellbeing through the harmonisation of policy and provision across Government and with a wide range of stakeholders to improve outcomes for children, young people and families.
Descriptive research	Research studies that have as their main objective the accurate portrayal of the characteristics of persons, situations, or group, and/or the frequency with which certain phenomena occur.
Drug and Therapeutics Committee	This is a multidisciplinary advisory committee which is a subcommittee of the Medical Board. Terms of reference include advising hospital staff on all matters pertaining to the use of drugs and medicines and ensuring that prescribing and administration of drugs is carried out in a safe and effective manner.
Health Service Executive	The Health Service Executive is responsible for the provision of health and personal social services with public funds for everyone living in Ireland.
Health Service Provider	The Health Service Executive, a hospital, a nursing home, a clinic or person whose sole or principal activity or business is the provision of health services or a class of health services, to the public.
Higher Education Authority	The Higher Education Authority is the statutory planning and policy development body for higher education and research in Ireland.
Inappropriate prescribing	Inappropriate prescribing is defined as a situation where risk from the adverse effects of a prescribed medication outweighs the desired clinical benefits of treating a particular condition
Mentor	A consultant medical practitioner or general practitioner who has committed to act as a mentor and provide instruction and supervision within the specific clinical practice area for the duration of the education programme
Midwife	A person whose name is entered in the midwife division of the Nursing Register.

Minimum Data Set	In Ireland, monitoring of nurse prescribing is achieved through inputting data directly to a database managed by the Health Service Executive. The official title of the database is the National Nurse and Midwife Prescribing Minimum.
Nursing and Midwifery Board of Ireland	The regulatory body for the nursing and midwifery profession in Ireland.
Nurse	A woman or man whose name is entered into the Nursing Register and includes a midwife or a nurse.
Over the Counter medications (OTC)	Medicinal products which are exempt from prescription control under SI 540-the medicinal products ((Prescription and Control of Supply) Regulations 2003)
Paradigm	A way of looking at natural phenomena which encompasses a set of philosophical assumptions and which guides one's approach to enquiry.
Prescribe	To authorise in writing the dispensing, supply and administration of a named medicinal product (typically a prescription-only medicine, but may include over the counter medicines) for a specific patient.
Prescription	A prescription issued by a registered medical practitioner for the medical treatment of an individual, by a registered dentist for the dental treatment of an individual, or by a registered veterinary surgeon for the purpose of animal treatment or a registered nurse for the medical treatment of an individual subject to article 3A of the Regulations *(Misuse of Drugs (Amendment) Regulations 2007).*
Prescribing Site Coordinator	The person nominated by the Director of Nursing on behalf of the health service provider to be the prescribing link. This person takes responsibility for the initiative locally, liaises with the education provider and the other offices of the Nursing Services Director.
Qualitative research	The investigation of phenomena, typically in an in-depth and holistic fashion, through the collection of rich narrative material using a flexible research design.

Qualitative descriptive research	Qualitative descriptive research design is a scientific method which involves observing and describing the behaviour of a subject without influencing it in any way.
Quantitative Research	The investigation of phenomena that lends itself to precise measurement and quantification, often involving rigorous and controlled design.
Registered Nurse Prescriber	A nurse/midwife who is registered in the division of the Register of Nurse Prescribers of An Bord Altranais.
Resource and Implementation Group	Acted as an advisory resource to the Department of Health and Children to develop and implement a plan for the roll out of nurse and midwife prescribing nationally.
Scope of practice	The range of roles, functions, responsibilities and activities which a registered nurse/midwife is educated, competent and has authority to perform.
Workarounds	Locally constructed paper based alternatives to documentation that meet the clinical needs and goals more efficiently.

Glossary of Abbreviations

Abbreviation	Definition
ABA	An Bord Altranais
ACT	Anatomical Therapeutic Chemical
ADE	Adverse drug event
ANP	Advanced Nurse Practitioner
APRN	Advanced Practice Registered Nurses
CDSS	Clinical Decision Support System
CNS	Central Nervous System
CPA	Collaborative Practice Agreement
CPD	Continuing Professional Development
CREC	Clinical Research Ethics Committee
DoH	Department of Health
DoHC	Department of Health and Children
HCP	Healthcare professionals
HEI	Higher Education Institutes
HIQA	Health Information Quality Authority
HIT	Health Information Technology
HSE	Health Service Executive
HSP	Health Service Provider
ICD	International Classification of Diseases
IQR	Interquartile Range
MAI	Medication Appropriate Index
MDS	Minimum Data Set
MRN	Medical Record Number
NMBI	Nursing and Midwifery Board of Ireland
NP	Nurse Prescriber
OTC	Over the counter

PA	Physician Assistants
PIM	Potential Inappropriate Medications
PIP	Potential Inappropriate Prescriptions
PPO	Potential Prescribing Omissions
PRN	*Pro re nata (as required)*
RCSI	Royal College of Surgeons in Ireland
RIG	Resource and Implementation Group
RNP	Registered Nurse Prescriber
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
START	Screening Tool to Alert doctors to Right Prescriptions
STOPP	Screening Tool of Older Persons Prescriptions
UCC	University College Cork
UK	United Kingdom
USA	United States of America

Table of Contents

Peer Reviewed Publications v
Conference Presentations and Posters vi
Glossary of Terms vii
Glossary of Abbreviations xi
Table of Contents xiii
Table of Tables xix
Table of Figures xxi
CHAPTER 1 INTRODUCTION, BACKGROUND AND OVERVIEW OF METHODS USED IN THIS THESIS 1
1.1 Introduction 2
1.2 International perspective of nurse prescribing 3
1.3 The introduction of nurse prescribing in Ireland 6
1.3.1 National perspective 6
1.3.2 Overview of legislation framework 10
1.4 Education programme 11
1.5 The role of the Health Service Executive 13
1.6 The Role of An Bord Altranais (ABA) 17
1.7 Conclusion 21
CHAPTER 2 OVERVIEW OF METHODOLOGIES USED IN THIS THESIS 22
2.1 Introduction 23
2.2 Research Paradigm 25
2.3 Research Design 28
2.3.1 Convergent design procedure 30
2.3.2 Triangulation 32
2.3.2.1 Methodological triangulation 33
2.3.2.2 Data triangulation 33
2.3.3.3 Unit of analysis triangulation 35
2.4 Method 35
2.4.1 Quantitative method 35
2.4.2 Survey Objective 35
2.4.2.1 Survey Research 35
2.4.2.2 Outcome research 36
2.4.3 Qualitative method 36
2.5 Integration of qualitative and quantitative method 37
2.6 Ethics Approval 37
2.6.1 Voluntary participation and consent 38

2.6.2 Privacy and confidentiality 39
2.6.3 Risk of harm 39
2.6.4 Security of data 40
2.7 Conclusion 41
CHAPTER 3 SYSTEMATIC SEARCH AND NARRATIVE REVIEW OF THE LITERATURE 42
3.1 Introduction 43
3.2 Aim 44
3.3 Method 44
3.3.1 Methodological design 45
3.3.2 Search method 46
3.3.3 Inclusion criteria 46
3.3.4 Exclusion criteria 46
3.4 Results 47
3.4.1 Data extraction and synthesis 49
3.4.2 Quality of studies 49
3.5 Findings 59
3.5.1 Prescribing in practice 59
3.5.2 Workforce planning 60
3.5.3 Continuing Professional Development (CPD) 61
3.5.4 Jurisdiction 62
3.5.5 Prescribing arrangements and treatment protocols 63
3.5.6 Financial incentive 63
3.5.7 Factors relating to the patient 64
3.5.8 Factors relating to the healthcare professional 65
3.5.9 Factors relating to the organisation 66
3.6 Discussion 67
3.6.1 The impact of nurse prescribing on the patient 68
3.6.2 The impact of nurse prescribing on healthcare professionals 69
3.6.3 The impact of nurse prescribing on the organisation 70
3.7 Conclusion 71
CHAPTER 4 QUALITATIVE INVESTIGATION OF NURSE PRESCRIBERS' EXPERIENCE OF THE MINIMUM DATA SET IN CLINICAL PRACTICE 73
4.1 Introduction 74
4.2 Aim 77
4.3 Method 78
4.3.1 Design 78
4.3.2 Inclusion exclusion criteria 80
4.3.3 Ethics considerations 81
4.3.4 Participants 81

4.3.5 Data collection 81
4.3.5.1 Interviews 82
4.3.5.2 Pilot interviews 83
4.3.6 Data analysis 85
4.3.7 Rigour 94
4.4 Results 94
4.4.1 Theme 1 - Communication 95
4.3.2 Theme 2 - Workload and time 98
4.4.3 Theme 3 – Attitude and behaviour 101
4.5 Discussion 105
4.6 Conclusion 108
Acknowledgment 109
CHAPTER 5 IRISH/UK QUESTIONNAIRE: UNDERSTANDING THE PARALLELS BETWEEN NURSE PRESCRIBERS IN IRELAND AND THE UNITED KINGDOM USING A SURVEY STUDY DESIGN 110
5.1 Introduction 111
5.2 Aim 113
5.3 Method 113
5.3.1 Design 114
5.3.2 Ethics approval 116
5.3.3 Participants 116
5.3.4 Data analysis 117
5.4 Results 118
5.4.1 Nurse prescribers' profile and service provision 118
5.4.2 Prescribing independence 120
5.4.3 Workload within the prescribing process 121
5.4.4 Satisfaction and autonomy 126
5.4.5 Continuing professional development and support 129
5.5 Discussion 131
5.5.1 Nurse prescriber's profile 132
5.5.2 Role Independence 132
5.5.3 Workload 133
5.5.4 Competence and confidence 134
5.5.5 Continuing Professional Development (CPD) 135
5.6 Conclusion 137
Acknowledgment 137
CHAPTER 6 APPLICATION OF THE STOPP/START EVALUATION TOOL QUANTITATIVE AND QUALITATIVE ELEMENTS 139
6.1 Introduction 140
6.1.1 Screening tool 144

STOPP/START Quantitative Study –Stage 1 146
6.2 Aim 147
6.3 Method 147
6.3.1 Participants 147
6.3.2 Research sites 148
6.3.3 Ethics approval 149
6.3.4 Data collection 150
6.3.4.1 Chart review 150
6.3.5 Data analysis 151
6.4 Results 152
6.4.1 Demographics 152
6.4.2 STOPP criteria 154
6.4.3 START criteria 157
6.4.4 Investigation of factors associated with potentially inappropriate medicines 159
6.4.5 Investigation of factors associated with potentially prescribing omissions (at least one PPO) 161
6.4.6 Combining START/STOPP 162
6.5 Discussion 162
6.7 Conclusion 166
STOPP/START Qualitative Study – Stage 2 168
6.8 Introduction 169
6.9 Aim 169
6.10 Method 169
6.10.1 Participants 170
6.10.2 Interviews 170
6.10.3 Ethics approval 175
6.10.4 Data collection 175
6.10.5 Data analysis 176
6.11 Results 176
6.11.1 Nurse prescribers' perceptions of inappropriate prescribing 177
6.11.2 Changing a PIP 180
6.11.3 Utilisation of STOPP/START feedback 182
6.12 Discussion 185
6.13 Conclusion 189
Acknowledgments 189
CHAPTER 7 CANADIAN NURSE PRACTITIONERS UNDERSTANDING OF INAPPROPRIATE PRESCRIBING AND USING A PRESCRIBING EVALUATION TOOL 191
7.1 Introduction 192

7.2 Aim 195
7.3 Method 195
7.3.1 Participants 195
7.3.2 Interviews 196
7.3.3 Data collection 196
7.3.4 Ethics considerations 197
7.3.5 Data analysis 197
7.4 Results 198
7.4.1 Confidence and competence 199
7.4.2 Understanding and consequences of inappropriate prescribing 201
7.4.3 The role screening tools play in prescribing for older people. 206
7.5 Discussion 208
7.6 Conclusion 213
Acknowledgments 214
CHAPTER 8 DISCUSSION 215
8.1 Discussion 216
8.2 Core findings 218
8.3 The impact of nurse prescribing in practice 219
8.4 Prescriptive process 228
8.4.1 Potentially inappropriate prescribing 229
8.4.2 Potential prescribing omissions 230
8.4.3 E-Pharm Assist CDSS System 231
8.5 Reflection on using a mixed method design using the SPEC guidelines 232
8.6 Limitations 235
8.6 Conclusion 237
8.7 Further research 240
REFERENCES 241
APPENDICES 268
Appendix 1 - Introduction to Nurse Prescribing Publication (Chapter 1) 269
Appendix 2 - Explanation and application of Caldwell's Framework including numerical value 262
Appendix 3 - Literature Review Publication (Chapter 3) 270
Appendix 4 - Ethics approval for the Minimum Data Set Study 279
Appendix 5 - Interview question guide for the Minimum Data Set Study 281
Appendix 6 - Minimum Data Set Interview Consent Form 283
Appendix 7 - Minimum Data Set Publication (Chapter 4) 294
Appendix 8 - Irish Questionnaire 295
Appendix 9 - UK Questionnaire 314
Appendix 10 - Information sheet relating to the questionnaire 330

Appendix 11 - General Ethics Approval for the Research 315
Appendix 12 - STOPP/START Screening Tool 330
Appendix 13 - STOPP/START Ethics Approval 342
Appendix 14 - Feedback Letter Generated by STOPP/START 344
Appendix 15 - E-Pharm-Assist-CDSS System 346
Appendix 16 - Question Set for STOPP/START interviews 353
Appendix 17 - Ethics Approval for Canadian Research Study 359
Appendix 18 - Canadian Research Publication (Chapter 7) 361

Table of Tables

Table 2-1 Educational, registration and assessment criteria for Ireland, UK and Canada 24
Table 2-2 Methodology flow diagram 25
Table 3-1 Summary of Studies included in the Review 50
Table 4-1 Items contained in the MDS 75
Table 4-2 Benefits of the MDS identified by the HSE 76
Table 4-3 Colaizzi's Framework 86
Table 4-4 Sample of Written Descriptors and Themes 91
Table 5-1 Demographic profile of study participants 119
Table 5-2 Prescribing independence 121
Table 5-3 Time dedicated to prescribing each week. 122
Table 5-4 Consultations undertaken per week for prescribing/amendment of mediation 124
Table 5-5 Prescribers' perception of their role 127
Table 5-6 NPs' CPD requirements in relation to prescribing 129
Table 5-7 Other questions asked 130
Table 5-8 Use of the MDS in practice 131
Table 6-1 Clinical characteristics of patients, overall and by gender 153
Table 6-2 Frequency of medications prescribed for patients, overall and by gender 154
Table 6-3 Most frequently encountered potential inappropriate prescribing (PIP) according to STOPP criteria 155
Table 6-4 Patients with PIP overall and by gender 157
Table 6-5 Most frequently encountered potential prescribing omissions (PPO) according to START criteria 158
Table 6-6 Total NUMBERS of potentially inappropriate prescriptions (PIP) and potential prescribing omissions (PPOs) 159
Table 6-7 Univariate and multivariate logistic regression results for having 160
Table 6-8 Univariate and multivariate logistic regression results for having at least one PPO 161
Table 6-9 STOPP at least one medication * START at least one medication Cross tabulation 162
Table 6-10 Telephone interview protocol 172
Table 6-11 Understanding of the term PIP (potential Inappropriate Prescribing). 177
Table 7-1 Description of inappropriate prescribing 201
Table 8-1 Matrix to reflect the story of the thesis 217

Table 8-2 SPEC guidelines for mixed method research..... 232

Table of Figures

Figure 1.1 New Prescribing Input Screen 16
Figure 2.1 Diagram of the Research Process 31
Figure 3.1 Diagram of Studies Identified 48
Figure 4.1 Overview of Colaizzi's Process 87
Figure 5.1Number of Prescriptions written per week 122
Figure 5.2 Length of Consultations 125
Figure 5.3 Participants perceptions of increased workloads 126

CHAPTER 1 INTRODUCTION, BACKGROUND AND OVERVIEW OF METHODS USED IN THIS THESIS

Chapter 1 introduces the reader to the research area of nurse prescribing which outlines the background and introduction of nurse prescribing to the Irish and international setting. The Chapter also gives an overview of the legislation and educational framework together with the involvement of the Health Services Executive and An Bord Altranais in nurse prescribing.

[1] 'Introducing nurse prescribing: an Irish perspective'. Creedon, R. & O'Connell, E. (2009) Nurse Prescribing, 7 (11):507-511.

[2] Introducing Nurse Prescribing to Ireland: challenges and solutions. Creedon, R. & O'Connell, E. Prescribing for Success - Expansion and Evolution

1.1 Introduction

Nurse and midwife prescribing is one of a number of significant changes to the Irish nurses' professional role over the past 10 years. Prescriptive authority for nurses was introduced as a direct response to patients' needs that were identified through The Commission on Nursing - A Blueprint for the Future (Department of Health and Children, 1998b). It is a significant change to the nursing role because it substantially expands the traditional function of nurses and, as a result, considerably extends the horizons for the future of the nursing profession in Ireland. Although nurse prescribers entered the Irish health service in 2008 it continues to expand and challenges professional boundaries that are already being redefined with nursing roles having an ever increasing responsibility (Creedon, 2010b). Nurse prescribers are now seen as more approachable by patients, and doctors are no longer engaged in the risky practice of signing off prescriptions for patients they have not recently seen (Robinson, 2009). Research regarding nurse prescribing to date acknowledges the role expansion but, more importantly, identifies the relationship between the nurse and the patient in providing reassurance, continuity of care, information, provision of health promotion, and being approachable as the most positive aspects of nurse prescribing (Naughton et al., 2012). The nurse's ability to identify barriers when offering lifestyle advice because of their holistic approach to patient care enables them to consider the social context of patients' lives and the impact it may have on the management of each individual patients' medication regime (Bradley et al., 2005). This mirrors the findings of international research where nurse prescribers have been identified as safe and effective practitioners resulting in increased patient satisfaction (Shum et al., 2000, Pritchard and Kendrick, 2001, Haidar, 2007) and a more cost-effective service. However, in 2011 Irish nurse prescribers began to contest nurse prescribing structures as somewhat restrictive and needing review or change if they were to continue assisting

the advancement of the initiative. Therefore, this thesis was undertaken to explore and identify nurse prescriber's issues and concerns in clinical practice.

1.2 International perspective of nurse prescribing

Internationally, several healthcare systems now include some form of prescribing by non-medical healthcare professionals, offering potential benefits in terms of increasing patients' continuity of care and access to medicines, better utilisation of economic and human resources, reduction in patient waiting times and less fragmented care (Emmerton, 2005, Cooper et al., 2008). Prescribing medications has traditionally been the domain of doctors, but nurse prescribing has been introduced in response to changing service needs and the increasing specialisation of nurses and midwives as they expand and advance their scope of practice. However, international differences between legislative procedures and the professional bodies responsible for the regulation of nursing practice has resulted in the implementation of several models of prescribing worldwide (An Bord Altranais and NMPDU, 2005). The different approaches to the development of nurse prescribing in other countries have arisen from the differing needs of health services. In the developed world, advances in technology, a desire by medical providers to reduce costs and increase services, and the demands of service users, have influenced the evolution of nurse prescribing. Within the context of these changes and advances in nursing and midwifery practice, prescriptive authority has become an essential component of nursing in many countries (Buchan & Calman, 2004).

In the United States of America (USA), Advanced Practice Registered Nurses (APRNs) have had prescriptive privileges since 1969, although the level of prescriptive authority varies from State to State in terms of the degree of independence given and the ability to prescribe controlled drugs (Phillips, 2008). Even though APRN prescribing has been authorised in the USA for over

30 years, there are limited data regarding the evolution of the APRN prescriber role. Two types of non-physician clinicians write prescriptions in order to fill a growing demand for medications: physician assistants (PAs) and nurse practitioners. This fragmentation of prescribing practice is due to opposition from the medical profession and the diverse registration regulations in different States of the USA (Plonczynski, 2003). In addition, the limited data regarding the evolution of the APRN prescriber role has resulted in the USA lacking evidence-based guidelines that can be used by educators and regulators. Other issues that have been identified as barriers to prescribing in the USA include restrictive formularies imposed by the medical insurance companies, lack of support from health providers and the refusal of pharmacists to recognise prescriptions administered by the APRN (Plonczynski, 2003). The study also identified the lack of uniformity in 'language, laws and regulations' among States that limited effective professional practice and mobility for the nurse prescriber (NP), causing confusion for the public. The introduction of prescribing competencies could serve as a basis for national guidelines (standards) in the USA that could be used to support autonomous prescribing in all States, thereby addressing the variations in prescriptive authority that continues to exists between States today (Ross, 2012).

Nurse prescribing in the United Kingdom (UK) has been developing significantly since it was first referred to in the Cumberledge Report (Department of Health and Social Security, 1986). In The NHS Plan (Department of Health and Children, 2000) the modernisation agenda for the health service was set out, and clearly stated that the key to the success of the plan rested on changing health worker/professional roles (Pontin and & Jones, 2007). Since the introduction of nurse prescribing to the UK in 1992, extended prescribing and supplementary prescribing have been reviewed and extended to all registered nurses, midwives, pharmacists and other healthcare professionals (HCP) following appropriate training and examination (Berry *et al*., 2006). A dual system continues to be employed.

Independent prescribers, since 2006, are fully autonomous and wholly accountable for the medications they prescribe whereas supplementary prescribers have the authority to prescribe certain medications that are agreed upon following collaboration with a medical practitioner (Health Service Executive, 2008b).

In a review undertaken by An Bord Altranais (ABA) in 2005, it was identified that legislative developments in a number of other countries (e.g. Sweden, Canada, Australia, USA and Finland) allow nurses to prescribe medicines but are not as progressive as the UK in extended prescribing rights for nurses. Nurse prescribing has been developed as part of nurse practitioner roles in Canada, New Zealand and Australia, while in Sweden, prescriptive authority has been limited to health care settings outside of hospitals (An Bord Altranais and NMPDU, 2005). Similarly, in Finland, nurse prescribing, has been introduced because of doctor shortages in remote areas experienced over the past 10 years, and developed through the Primary Health Care Services (Government Act 433/2010, (Ministry of Social Affairs and Health Finland, 2010p. 10-12)).

The international experience of nurse prescribing has demonstrated benefits in terms of increased patient satisfaction and concordance with medication regimes (Drennan *et al*., 2011). The role of the NP also continues to expand in the healthcare setting as it increases in prominence and significance (Cipher *et al*., 2006). International research has increasingly put the role of the non-medical prescriber at the centre of health policies to meet the increasing demand for access to care.

1.3 The introduction of nurse prescribing in Ireland[3]

For decades, prescribing medications was the doctor's prerogative. It signified knowledge, authority, and the exercise of a power sanctioned by social and professional consent (An Bord Altranais and NMPDU, 2005). The introduction of nurse prescribing to Ireland in 2007 was in response to changing service needs and the increasing specialisation of nurses and midwives as they expanded and advanced their scope of practice (Department of Health and Children, 1998b). It was expected that the introduction of nurse prescribing would lead to better integrated care for patients, improved delivery in the acute sector, and earlier intervention in the community and primary care settings. This significant initiative in the Irish Health Service had implications not only for nurses and midwives, but for the health system as a whole, and patients and service users in particular. As mentioned in section 1.1. the international differences between legislative procedures and the professional bodies responsible for the regulation of nursing practice worldwide has given the governing bodies considerable information to draw on in order to develop the most appropriate nurse prescribing model for the Irish Health Service (An Bord Altranais and NMPDU, 2005).

1.3.1 National perspective

The present focus of nurse prescribing in Ireland emerged from two documents; (1) the Report of the Commission on Nursing – A Blueprint for the Future (Department of Health and Children, 1998a) and (2) the Review of Scope of Practice for Nursing and Midwifery: Final Report (An Bord Altranais, 2000). During the consultative process employed for both of

[3] Following the signing of Commencement Order S.I. No. 385 of 2012, the name of An Bord Altranais changed to Nursing and Midwifery Board of Ireland (NMBI). This change of name reflects the recognition of midwifery as a separate and distinct profession to that of nursing.

these reports, it emerged that *'nurses or midwives might need to administer non-prescribed drugs or medicated dressings in the interest of the patient, but in the absence of medical support'* (Department of Health and Children, 1998b, p. 58). In addition, The Commission of Nursing (1998a) also highlighted that nurses and midwives experienced challenges in their current roles concerning medication management and the impact it had on the delivery of care. The rationale for these recommendations stemmed from a view within the profession that an inability to prescribe was resulting in the delivery of fragmented care that was negatively impacting on the quality of care delivered to patients. Therefore, in 2001, Ireland commenced a review of the role of the nurses and midwives regarding prescribing and administration of medicinal products which highlighted that involvement of nurses and midwives in medication management would improve patient care delivery (An Bord Altranais and NMPDU, 2005). In response, ABA and the National Council for the Professional Development of Nursing and Midwifery jointly established 'The Review of Nurses and Midwives in the Prescribing & Administration of Medicinal Products Project' in September 2001 to examine expansion of practice by nurses and midwives specifically in relation to prescribing and medication management. The Steering Committee of this project comprised of representatives from ABA, the National Council[4] for the Professional Development of Nursing and Midwifery, and the Department of Health and Children. Other areas of nursing and midwifery were represented, as were patient and service-user groups, the medical and pharmacy professions, and various agencies and nursing unions (National Council for the Professional Development of Nursing Midwifery, 2003). Their overriding consideration for the extension of prescribing rights to nurses and midwives was to improve services to patients and deploy the education and expertise of nurses and midwives more efficiently. The initiative also addressed

[4] National Council for the Professional Development of Nursing Midwifery was dissolved in 2011 with the responsibility for nursing role development transferred to An Bord Altranais

changes in configuration and delivery of care which were identified by the Department of Health and Children (2001) and the European Working Time Directive for non-consultant hospital doctors (Department of Health and Children, 2003). While obtaining value for money for the Governments increased spending on nurse education and training, it was hoped that nurse prescribing would lead to better integrated care for patients, improved delivery in the acute sector, and earlier intervention in the community settings (Health Service Executive, 2008a).

In October 2005, the Minister for Health and Children identified the introduction of nurse prescribing as a priority that became a reality in 2007 (An Bord Altranais, 2007b). To support the introduction of nurse prescribing, the Health Service Executive (HSE) established the Office of the Nursing Services Director in September 2006. This support acknowledged the vital role of nurses and midwives in the delivery of health services and demonstrated its commitment to the future development of these professions. In addition, to guide the introduction of nurse prescribing, the Resource and Implementation Group (RIG) was established in November 2006 was charged with the task of drafting the necessary regulatory changes and overseeing in two phases the implementation of the initiative nationally. Phase one, consisted of advising on the Regulations to be drafted, and phase two, was to oversee the roll-out of the initiative on a national basis (Health Service Executive, 2008b). Prescriptive authority for nurses and midwives had the ability to impact directly on all services to enhance and improve the health service infrastructure and capability to provide and support innovative, responsive and appropriate service delivery (An Bord Altranais, 2009). Therefore, the Office of the Nursing Services Director and RIG had five key focus areas:

1. practice development
2. education and training
3. governance
4. quality and standards
5. capacity building and leadership

(Health Service Executive, 2008b)

International models were reviewed by ABA to inform the development of prescriptive authority in the Irish setting. However, drawing on evidence–based practice internationally was somewhat challenging as different legislative procedures resulted in the implementation of several models of prescribing worldwide (An Bord Altranais and NMPDU, 2005). These reviews did, however, inform the regulatory, legislative and implementation structures for the development of nurse/midwife prescribing in Ireland and identified the benefits for patients and service users as:

- Appropriate and safe prescribing
- Patient satisfaction
- Convenience and greater accessibility for patients
- Nurses as providers of information
- Patients having improved compliance with their medications
- Fewer pharmacological interventions considered
- Appropriate clinical decision making
- Cost effectiveness

Subsequently, a committee for prescriptive authority was established within ABA in February 2007. Its main aim was to advise the Board on its regulatory functions within the proposed draft Regulations with regard to prescribing authority for nurses and midwives.

1.3.2 Overview of legislation framework

To facilitate nurse prescribing, changes to the legislation were required. The Minister for Health and Children was instrumental in introducing primary legislation to allow prescriptive authority for nurses and midwives in the form of the Irish Medicines Board (Miscellaneous Provisions) Act, 2006 (Department of Health and Children, 2006). The Minister's rationale for the extension of prescriptive authority to nurses and midwives was to improve services to patients. This was supported by strong international evidence from the USA and the UK. Subsequently, on the 1st of May 2007, the Minister for Health and Children signed into law the following Orders/Regulations:

- The Irish Medicines Board (Miscellaneous Provisions) Act 2006 (Commencement) Order 2007.
- The Medicinal Products (Prescription and Control of supply) (Amendment) Regulations 2007.
- The Misuse of Drugs (Amendment) Regulations 2007.
- Nurses Rules, 2007.

This regulatory framework for prescriptive authority provided for in the legislation covered four main parameters; 1) education, 2) registration, 3) clinical competence and 4) clinical governance. Furthermore, the Regulations state information that must be contained on a prescription by the prescriber including the name and registration number assigned to the registered nurse prescriber (An Bord Altranais, 2007d).

The Misuse of Drugs (Amended) Regulations (2007) was introduced specifically to identify the drugs and route of administration for which Schedule 2 or Schedule 3 drugs could be prescribed by a Nurse Prescriber (NP). The Schedule is divided into three parts. Part 1 includes morphine sulphate and codeine phosphate for pain relief in hospitals and includes pain

associated with a probable myocardial infarction, and pain following trauma or post-operative pain. Part 2 includes morphine sulphate, hydromorphine, oxycodone, buprenorphine, fentanyl, methylphenidate, and codeine phosphate for use in palliative care. Part 3 includes the use of pethidine in midwifery, and morphine sulphate and fentanyl for neonatal care in hospitals (Drennan *et al*., 2009).

The Nurse Rules 2007 (An Bord Altranais, 2007a) created a separated division of the Register for NPs and allows the prescriber to practice as an RNP. The Rules also stated that the education programme for nurses and midwives should be in accordance with a curriculum approved by ABA.

1.4 Education programme

A pilot education programme for nurse prescribing commenced in the Royal College of Surgeons in Ireland (RCSI) at the end of March 2003 and concluded in September 2003. However, whilst the pilot educational programme was successful, empowering legislation and clinical areas were not sufficiently developed for the full implementation of nurse/midwife prescribing at this time. It was not until April 2007 that the present nurse prescribing education programme commenced. In its development and delivery, the education programme built on the established regulatory documents from ABA, the National Council for the Professional Development of Nursing and Midwifery and relevant current legislation pertaining to medicinal products. It was initially offered as a stand-alone programme by the School of Nursing, RCSI, Dublin and the School of Nursing and Midwifery, University College Cork. It is now delivered by several additional colleges around the country in response to the needs of the health service provider. The purpose of this education programme for prescriptive authority is to ensure that, upon successful completion, the nurse/midwife is equipped with the knowledge, skills and competence to prescribe safely and effectively. The

education programme was designed in response to a direct request from ABA which changed in 2012 also at the request of the HSE as a result of a tendering process. This may change again in the future, depending on best practice and requirements that are determined by the Irish governing body ABA and the HSE.

The programme originally consisted of 26 days of theory on three core modules (An Bord Altranais, 2007b) with an additional 12 days of practical training. In 2012 the theory component was reduced to eleven days at the request of the HSE. The twelve-day (96 hour) practical clinical element of the programme has not changed and is supervised in clinical practice by a medical mentor/practitioner. This practitioner is a Consultant in the nurse or midwives' area of clinical practice or a General Practitioner who will have previously entered into a collaborative practice agreement (CPA) with the nurse and their health service provider (An Bord Altranais, 2007d). In response to the needs of service providers, the programme has developed to include blended learning strategies that facilitate the delivery at regional sites. A more flexible approach to the educational programme delivery has emerged in some colleges to facilitate candidates (Adams *et al*., 2010) by reducing the requirement of face to face teaching at a central site.

Within the requirements and standards, the education programme must enable the nurse/midwife to (An Bord Altranais, 2007b):

1. Demonstrate a systemic understanding of the regulatory framework associated with prescribing, including the legislation and professional guidelines supporting nurse prescribing.
2. Critically utilise evidence-based knowledge and skill of patient/client assessment and consultation to achieve a holistic approach to patient/client care in the prescribing of medicinal products.
3. Apply expert skills in clinical decision-making in relation to prescribing medicinal products.

4. Demonstrate a critical understanding of the pharmacotherapeutics, pharmacodynamics and pharmacokinetics.
5. Demonstrate knowledge of the role of the multidisciplinary team and effective communication process involved in safe medication management.

The aim of the competency framework is to ensure that the participants acquire skills of critical analysis, problem-solving, decision-making and reflective skills. To complement these professional standards, five domains of competencies are assessed in clinical practice by the medical mentor/practitioner. These are:

1. Professional/ethical practice
2. Holistic approach and integration of knowledge
3. Interpersonal skills
4. Organisation and management of care
5. Personal and professional development

(An Bord Altranais, 2009)

Support is provided by the educational institution through a lecturer who visits the student's area of practice where the clinical practicum is undertaken.

1.5 The role of the Health Service Executive

The introduction of the nurse prescribing initiative to Ireland had at its core the potential to contribute to the change required under the HSE six transformation policies which were:

1. Develop integrated services across all stages of the care journey
2. Configure primary community and continuing services so that they deliver optimal and cost effective results
3. Configure hospital services to deliver optimal and cost effective results
4. Implement a model for the prevention and management of chronic illness
5. Implement standards based on performance measurement and management throughout the HSE
6. Ensure all staff enable in transforming health and social care in Ireland

(Health Service Executive, 2008b)

Following the introduction of legislation to allow prescriptive authority for nurses and midwives in May 2007, there were nine core principles for the implementation of nurse prescribing; 1) accountability, 2) collaboration, 3) consistency, 4) governance, 5) maximising benefits to patients and service users, 6) patient-centeredness, 7) quality, 8) safety, and 9) sustainability. In addition to the guidance provided by the Resource and Implementation group (RIG), a Director and four Assistant Directors of Nurse Prescribing were appointed within the HSE in 2007-08 to oversee the implementation of the prescribing initiative within the four health service divisions nationally. With guidance provided by RIG, four key objectives underlined the implementation of the prescribing initiative by the HSE were identified:

- Development and implementation of a plan to roll out nurse and midwife prescribing.
- Identification of clinical governance structures to support appropriate and safe nurse and midwife prescribing.

- Development of a mechanism for the evaluation of nurse and midwife prescribing.
- The development of an inclusive communication strategy.

(Health Service Executive, 2008b)

Essential criteria were identified which had to be met by all health service providers (HSP) in order to participate in the prescribing initiative. Participating HSPs are required to have organisational policies which support the safe management of nurse prescribing and access to a Drugs and Therapeutics Committee. They are also required to develop robust CPA with a named medical practitioner as well as a mechanism to audit and evaluate nurse prescribing practices which is considered *'essential in order to support best practice'* (Health Service Executive, 2008b p. 59)

The RIG identified the need for a standardised approach to monitoring the implementation of nurse prescribing. To facilitate this, the HSE introduced the National Prescribing Minimum Dataset (MDS) in 2008 to record and monitor the prescribing activities of the each nurse/midwife prescriber. This database allows prescribers to enter details of each prescription issued which can then be collated and accessed by directors of nursing/midwifery/public health, prescribing site coordinators and nurse/midwife prescribers. The system contains 12 distinct pieces of information (see screen shot in Figure 1.1):

1. The prescriber's clinical site and area of practice
2. Personal identification number
3. Clinical Area
4. Date
5. Shift on which the prescription was prescribed
6. The patient's medical record number (MRN)

7. The mode of prescription (medication record, prescription pad or electronic)
8. Clinical Indication (prophylaxis, diagnosis, treatment)
9. The medication prescribed
10. Medication dose
11. Medication frequency
12. Route of administration of the medication prescribed

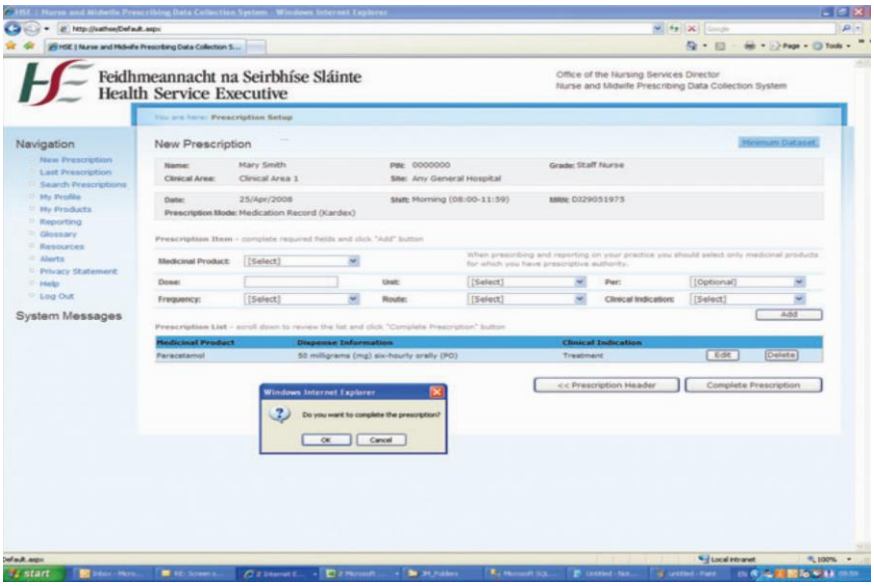


FIGURE 0.1 NEW PRESCRIBING INPUT SCREEN

In November 2008, the office of the Nursing Services Director, HSE published a '*Guiding Framework for the Implementation of Nurse and Midwife Prescribing in Ireland.*' This document sourced its data from the National Nurse and Midwife Prescribing MDS and provided comprehensive information on the on-going development of the prescribing initiative for the health service providers on a two-monthly basis initially and more recently has extended to bi-annually.

Additional requirements for the nurses' and midwives' place of employment include confirmation of an organisational policy for nurse

prescribing, appropriate risk management systems, access to a Drugs and Therapeutics Committee and a commitment by the employer to the facilitation of continuing education for the Registered Nurse Prescriber (Health Service Executive, 2008b). More recently, continuing professional development (CPD) has been included in the Nurses Act of 2011 and is the responsibility of the professional to provide proof of same if required. Originally, the initiative was restricted to nurses and midwives working within the health service however, in 2009 prescriptive authority was extended to nurse and midwives in the private sector (Health Service Executive, 2009).

1.6 The Role of An Bord Altranais (ABA)

ABA is the regulatory body for the nursing profession in Ireland and has played a key role in the regulation, education, clinical governance and professional guidance in the area of prescriptive authority for nurses and midwives. In 2007, ABA established a new division of the Register for nurse and midwife prescribers. It also provided approval of Higher Education Institutes (HEI) and HSPs to collaboratively deliver education programmes to prepare nurse prescribers for their expanded role (An Bord Altranais, 2007b). The development of the Decision-Making Framework for Nurse and Midwife Prescriptive Authority (An Bord Altranais, 2007c) provided guidance for HSPs with regard to the context and appropriateness of prescribing for their service needs. The decision-making processes within the framework included references to the readiness of local policies supporting nurse/midwife prescribing, and the development of a collaborative practice agreement (CPA). A decision on whether the prescribing was within the nurses/midwives' scope of practice and an assessment on whether there is a need to prescribe was also outlined. The decision-making framework provided a basis for determining the extent to which the nurse/midwife has sufficient information to determine the treatment plan for a patient, and the extent to which they

can make a decision on the need to initiate pharmacological treatment. Finally, the discussion and implementation of the treatment in consultation with the patient and their families was defined.

Practice Standards for Nurses and Midwives with Prescriptive Authority (An Bord Altranais, 2007b), on the other hand, gave nine directives on professional guidance for prescriptive authority and medication management. However, in 2010, ABA revised the practice standards to include an extra two directives (An Bord Altranais, 2010a). The *Practice Standards* include:

1. Clinical decision-making process - A systematic clinical decision-making process should inform the decision to prescribe and is underpinned by the *Decision-Making Framework for Nurse and Midwife Prescribing (An Bord* Altranais*, 2007c)*

2. Communication and history taking - The responsibility of prescriptive authority requires the NP to effectively and efficiently communicate with the patient/service-user and to complete an accurate and comprehensive medication history.

3. Documentation - All episodes of nurse and midwife prescribing should normally be recorded in the patient's/service-user's case notes. The rationale for this is to ensure that there is clear communication regarding treatment with medical and other healthcare professionals.

4. Prescription writing - Specific standards for prescription writing must be adhered to as required by legislation and the health service provider/employer (including Drugs and Therapeutics committee) policy. This also pertains to the safe keeping and accountability associated with prescription pads.

5. Prescribing for self, family and significant others - Prescribing must take place in the context of providing nursing/midwifery care to an identified patient/service user requiring the services of the health service provider. The medicines regulations - *Medicinal Products*

(Prescription and Control of Supply) (Amendment) Regulations, 2007 and *Misuse of Drugs (Amendment) Regulations, 2007* - provide specific requirements for nurses to issue a prescription which must be adhered to in the provision of health care. A RNP prescribing for self, family and significant others is in violation of these Regulations.

6. Repeat prescribing - There should be regular review and appropriate clinical assessment of the patient's/service-user's condition for continuing a specific medication in accordance with the overall treatment plan.

7. Prescribing of unauthorised and off-label medications - The prescribing of unauthorised medications by the RNP is not provided for in the current medicines regulations.

8. Prescribing by means of verbal/telephone, email or fax - The Medicines Regulations of 2007 for both prescription and MDA drugs do not authorise the RNP to prescribe medications employing means of communication other than in writing. ABA does not support the use of verbal, telephone, email or fax medication orders as routine medication management practice for communication of an individual patient/service-user prescription.

9. Separation of responsibilities in the medication management cycle - Distinct separation of responsibilities and activities in the medication management cycle provides for greater patient/service-user safety and error prevention.

10. Influence of outside interests (relationships with pharmaceutical representation or similar organisations) - The RNP should prescribe in an appropriate, ethical manner, based on the best interests of the patient/service user only. She or he should not be influenced by factors such as financial support by pharmaceutical and/or health care interests.

> 11. Continuing professional development and continued competency - The RNP accepts personal responsibility for professional development and the maintenance of professional competence. This is achieved by engaging in CPD, audit of practice, and peer review.
>
> (An Bord Altranais, 2010a)

Finally, a guideline for the development of a CPA was provided for with the publication of the 'CPA for Nurses and Midwives with Prescriptive Authority' (An Bord Altranais, 2007d and, An Bord Altranais, 2007e). The CPA guides the clinical supervision of nurses and midwives in relation to prescriptive authority and outlines the parameters of the nurses and midwives prescribing functions and agreements of their role with the employer/organisation. The CPA must be signed by the registrant, collaborating medical practitioner and HSP, which provides ABA with evidence that clinical governance and communication structures are in place to support the nurse prescriber. The introduction of this document by ABA has restricted prescribing in Ireland from what was initially described as an open formulary to that of a limited formulary, one which is controlled by the Drugs and Therapeutics Committee within each clinical organisation. However, it is not as restrictive as the supplementary prescribing that was initially introduced in the UK in the late 1990s. The function of the CPA is to outline the specific medications that the nurse can prescribe and the health care setting in which prescribing is to take place within their scope of practice. A copy of the CPA is initially submitted to ABA within five days of the nurse/midwife commencing prescribing. The responsibility for this document has now been transferred to the nurse prescriber's organisation and it becomes null and void if the prescriber changes clinical area or type of employment for a period of one year. The document may be revisited as necessary to include or remove medication depending on the service

requirements or changes in the clinical area in which the nurse prescriber is employed (An Bord Altranais, 2007e).

1.7 Conclusion

This Chapter gives an overview of nurse prescribing from an international perspective and how nurse prescribing was introduced to Ireland including the legislative changes required. The Chapter also discussed the education programme, together with the role of the HSE and ABA in the initiative.

Publication for this chapter can be viewed in appendix 1.

CHAPTER 2 OVERVIEW OF METHODOLOGIES USED IN THIS THESIS

Chapter 2 gives an overview of the mixed methodologies utilised in this Thesis, including the research design which guided the researcher's decision-making on sampling, data collection and data analysis.

2.1 Introduction

The term methodology refers to the methods of obtaining, organising or analysing data (Polit and Beck, 2012). The methods used in this Thesis were influenced by current thought on evaluation theory and the move to use both quantitative and qualitative approaches in evaluating initiatives. All researchers have different beliefs and ways of viewing and interacting with their surroundings resulting in a variety of ways that studies are undertaken. However, there are certain principles available to guide a researcher's actions and beliefs. Such values or principles can be referred to as a paradigm and can be viewed as a lens that helps to sharpen our focus on a phenomenon of interest (Weaver and Olson, 2006). The studies were conducted across three countries Ireland, UK and Canada an overview of which can be viewed in Table 2.1. Stage 1, 3, and 4 were conducted in Ireland and explored different issues specifically relating to clinical practice. Stage 2 was conducted in Ireland and the UK to gain an understanding of how Irish nurse prescribers compared with their counterparts in the UK. Stage 5 of the research was undertaken in Canada to understand how nurse prescribing evolved and if there were comparisons or differences to the Irish setting. All three countries had similar educational, registration and assessment criteria for their nurse prescribing programmes.

TABLE 0-1 EDUCATIONAL, REGISTRATION AND ASSESSMENT CRITERIA FOR IRELAND, UK AND CANADA

Jurisdiction	Educational requirements	Registration method	Assessment criteria to become a nurse prescriber
Ireland	Bachelors level degree or equivalent	Yearly Registerable qualification with the Nursing and Midwifery Board of Ireland	Written assignment Observed structured long examination record Observed Structured Long Examination (OSLER) Pharmacy Presentation and Multiple Choice Questions (MCQ) examination Clinical placement logbooks and practicum advancement records
United Kingdom	Prescribing courses are taught at undergraduate and postgraduate levels	In the UK, the Nursing and Midwifery Council (NMC) together with the National Prescribing Centre (NPC), have defined the standards of proficiency that underpin principles of prescribing practice	A portfolio or learning log that demonstrates application of theory to practice Objective Structured Clinical Examination (OSCE) Satisfactory completion of the period of practice experience, including sign off by the designated medical practitioner A written final pharmacology examination, Students must achieve a minimum 80% pass Numerical assessment within the context of prescribing practice. Students must achieve a 100% pass
Canada	Masters level degree	Registration is required with the national regulatory nursing bodies of the region within which the nurse prescriber is employed	Class participation Weekly assignments Cases/discussions and presentations Critical appraisal paper Final examination

To gain a better understanding of why and how the researcher chose a mixed method approach in this Thesis, an overview of the research is set out in detail, with the underpinning methods for each stage of the research discussed separately within individual chapter. However, individual methods can only make sense if they are anchored to their methodological and epistemological frameworks (Staller, 2013). In order to describe the variety of

research activities undertaken during this study, the data collection activities and associated analysis methods an overview can be viewed in Table 2.2

TABLE 0-2 METHODOLOGY FLOW DIAGRAM

	Stage 1	***Stage 2***	***Stage 3***	***Stage 4***	***Stage 5***
Study Objectives	**Qualitative** Investigation of the Minimum Data Set to understand the nurse prescribers experiences of using the data collecting system	**Quantitative** Investigation to understand the parallels of competence and confidence between nurse prescribers in Ireland and the UK.	**Quantitative** Investigation of the STOPP/START criteria as applied to nurse prescribers' prescriptions using a specifically constructed data base E-Pharm-Assist database System.	**Qualitative** Investigation of the STOPP/START feedback given in stage 3 of the study	**Qualitative** Investigation of Canadian nurse practitioners understanding of appropriate and inappropriate medications.
Methods used	Interviews conducted and transcribed	Questionnaire development Pilot/Implementation	Database populated Data transfer and cleaning	Interviews conducted and transcribed	Interviews conducted and transcribed
Data Analysis	Data analysis using Colaizzi's framework	Data analysis using descriptive statistics	Data analysis using descriptive statistics	Data analysis using Colaizzi's framework	Data analysis using Colaizzi's framework
Data Interpretation using triangulation					

2.2 Research Paradigm

Guba and Lincoln (1994, p. 105) define paradigms as '*the basic belief system or worldview*' which influence the researcher's choice of epistemology, ontology, and methodology of the research. These choices

provides a way of looking at a natural phenomenon '*that incorporates a set of philosophical assumptions that guides one's approach to enquiry'* (Polit & Beck, 2012, p. 761). Additionally, the Weaver and Olson's (2006, p. 460) definition of a paradigm reveals how research can be affected and directed by a specific paradigm by stating, *'paradigms are patterns of beliefs and practices that regulate inquiry within a discipline by providing lenses, frames and processes through which investigation is accomplished*'. Therefore, to clarify the researcher's structure of inquiry and methodological choices, an exploration of the inclusive mixed methods approach adopted for this study was discussed in advance of any discussion about the specific methods utilised in the individual studies.

Utilising a mixed method research approach permits the researchers to view problems from multiple perspectives to enhance and enrich the meaning of a singular perspective (Michel, 2008). Therefore, a mixed method was undertaken to encompass the different aspects of nurse prescribing relative to patient care and practice. This allowed the researcher the ability to statistically analyse the scientific data whilst also recognizing the complex psychosocial and emotional factors that influence nurse prescribing. In particular, this Thesis utilised a triangulation of surveys, semi-structured interviews and document analysis to better understand the research question. Triangulation also facilitated comparison of quantitative and qualitative data sets to produce well-validated conclusions that tested the consistency of findings obtained though different instruments used (Migiro and Magangi, 2011).

There are a number of theoretical perspectives from which all research stem, including positivism, post positivism, interpretivism, critical enquiry, feminism, postmodernism and post-structuralism (Crotty, 1998). Adhering to only one paradigm or its associated theories limits the understanding of a phenomenon because contextual factors and influences may not be explored as widely (Leddy, 2000). The proposed mixed methods approach to this Thesis was underpinned by the pragmatic paradigm which recognised the diverse,

yet equally valid opinions of research participants. This perspective evaluates an idea not by the criterion 'is it true?' but rather by the question 'what difference does it make?' (Warms and Schroeder, 2012). This is an important concept because the issues experienced by nurse prescribers are so diverse that multiple approaches to problem-solving are necessary (Monti and Tingen, 1999). Furthermore the pragmatic paradigm is also informed by the 'Complexity Theory' that attempts to explain complex phenomenon not explainable by traditional theories and provides a theoretical base for the nurse prescriber who functions in a dynamic healthcare system intertwined within other complex systems. Science flows into art as the nurse prescriber draws on a broad knowledge base, interpersonal abilities, communication, competencies, hands-on skills, and the numerous other components that are imbedded in the practice of nursing (Hidalgo-Kehoe, 2012). With complexity theory, nurse prescribing is recognized as a process, a state of becoming that is never repeated (Gleick, 1987). The researchers are not occupied with an objective pursuit of truth, but rather working towards finding suitable strategies for dealing with complex phenomena.

Designing a mixed methods study involves a similar structure to those taken in traditional research methods but requires three additional steps. These include, 1) deciding whether to use an explicit theoretical lens, 2) identifying the data collection procedures together with the data analysis and 3) integration procedures (Tashakkori and Teddlie, 1998, Morgan, 1998, Creswell, 1999, Greene and Caracelli, 1993). Those steps occur more or less sequentially in mixed method research, with one informing and influencing the other (Migiro and Magangi, 2011). Therefore, to clarify the researcher's structure of inquiry the methodological choices will be further discussed under research design.

2.3 Research Design

In this Thesis, both quantitative and qualitative research methods were used where quantitative methods included the collection, analysis and interpretation of data in numerical forms and qualitative methods consisted of the collection, analysis and interpretation of narrative forms of data (Polit and Beck, 2010). These terms perhaps oversimplify what are rich and complex traditions, ideas, approaches, and techniques of research. However, the terms are utilised globally to indicate that the research emanates from a single perspective or set of related techniques (Dellinger and Leech, 2007).

Pragmatism has gained considerable support as a carriage for mixed methods research (Morgan, 2007, Feilzer, 2010) because of its orientation toward 'solving practical problems in the 'real world' (Feilzer, 2010, p. 8) rather than on assumption about the nature of knowledge. It is derived from the writings of Pierce, Dewey and James in the 19th and 20th centuries together with Rorty and Davidson in the late 20th century. Pragmatism as a philosophy includes the use of induction, deduction and abduction: induction (or discovery of patterns or gaining an understanding of the meanings humans attach to events, a closer understanding of the research context, and collection of qualitative data), deduction (moving from theory to data, the collection of quantitative data, testing of theories and hypotheses, explanation of causal relationships between variables, application of controls to ensure validity of data and the selection of sufficient sample sizes in order to generalise conclusions), and abduction (uncovering and relying on the best of a set of explanations for understanding one's result) (de Waal, 2004). Varied opinions are held regarding the most appropriate paradigm to underpin mixed methods research; to deal with this problem, a range of alternative approaches have been developed (Teddlie and Tashakkori, 2003, Creswell and Plano Clark, 2007). These approaches can be classified into three basic categories: a-paradigmatic stance, multiple paradigm approach and the single paradigm approach. The first of these simply ignores paradigmatic

issues altogether; the second asserts that alternative paradigms are not incompatible and can be used in the one research project and the third claims that both quantitative and qualitative research can be accommodated under a single paradigm (Hall, 2011). The latter claim and approach followed in this research is also supported by Teddlie and Tashakkori (2009) and Migiro and Magangi (2011). However, one must be cognisant that the study research questions are considered central to the research and it is important that the appropriate methods are used to answer them, including the philosophical views underlying each method (Maxcy, 2003). The researcher is encouraged to expand their thinking to acknowledge the even broader patterns that affect people and communities such as the environment, the economy, and the political system. Nevertheless, Morgan (2007) observed that *'the pragmatic approach reminds us that our values and our politics are always a part of who we are and how we act'* (p. 69-70) rejecting any crude notion of pragmatism that simply claims the ends justify the means.

The convergent design was utilised in this Thesis and involved collecting, analysing, and merging quantitative and qualitative data and results at one time; this can raise issues regarding the philosophical assumptions behind the research. Instead of trying to 'mix' different paradigms, *'it is recommended that researchers who use this design work from a paradigm such as pragmatism to provide an 'umbrella' paradigm for the research study'* (Creswell and Plano Clark, 2007p. 78). The assumptions of pragmatism are well suited for guiding the work of merging qualitative and quantitative approaches into a larger understanding drawing on '*what works*,' thereby, giving primacy to the importance of the research problem and question, and valuing both objective and subjective knowledge (Morgan, 2007). As a philosophical movement, pragmatism maintains that the claims about the truth of one view or another must be connected to the practical consequences of accepting that view.

2.3.1 Convergent design procedure

There are four major steps in the convergent design; these steps can be viewed in Figure 2.1. Firstly, the researcher collects both quantitative data and qualitative data about the topic of interest. These two types of data collection are concurrent but separate—that is, one does not depend on the results of the other. They also typically have equal importance for addressing the study's research questions. Secondly, the researcher analyses the two data sets independently of each other using typical quantitative and qualitative analytic procedures. Once the two sets of initial results are in hand, the researcher reaches the point of interface and works to merge the results of the two data sets in the third step. This merging step may include directly comparing the separate results or transforming results to facilitate relating the two data types during additional analysis. In the final step, the researcher interprets to what extent and in what ways the two sets of results converge, diverge from each other, relate to each other, and/or combine to create a better understanding in response to the study's overall purpose. The findings are integrated during the interpretation/discussion phase of the study with equal priority given to both types of research.

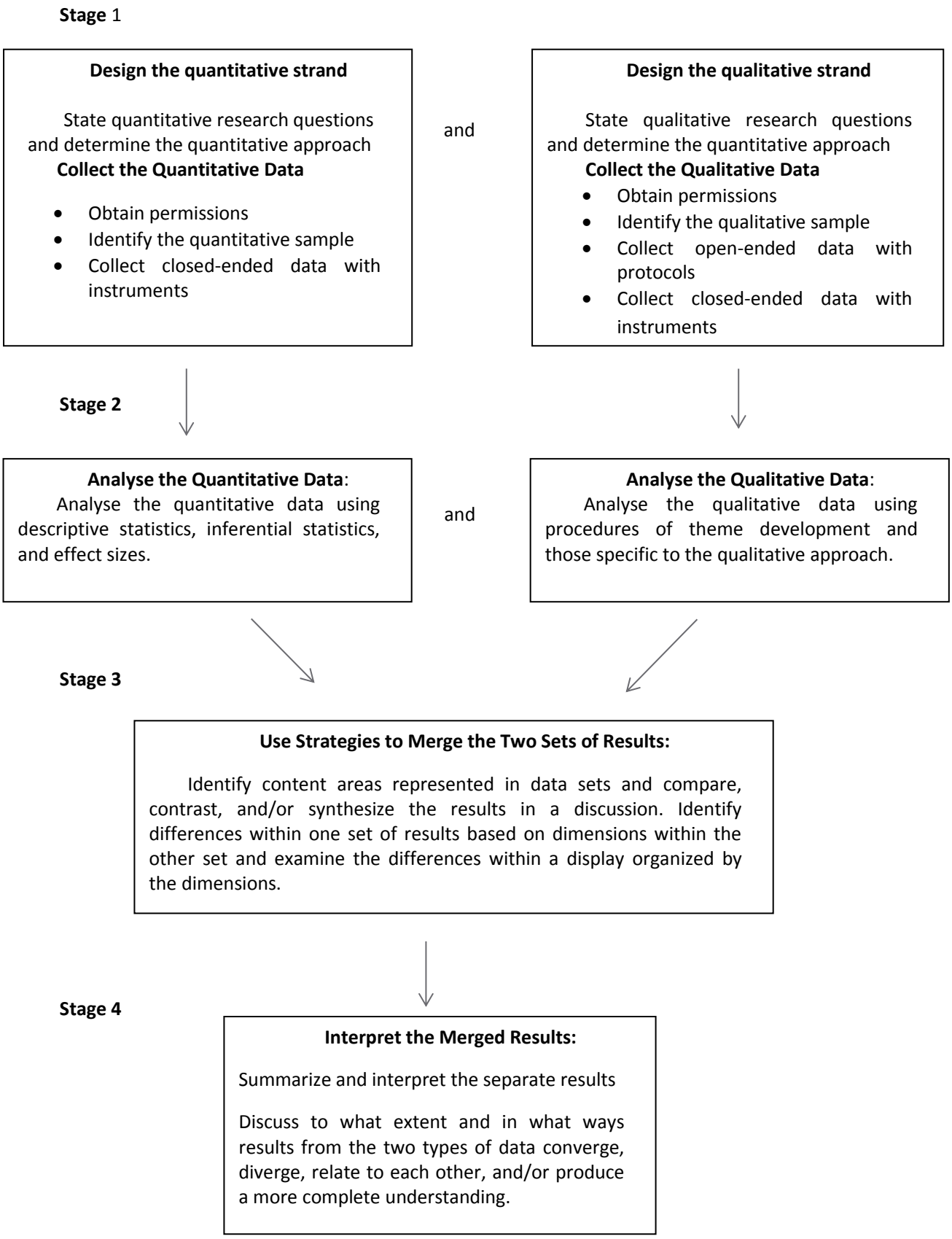


FIGURE 0.1 DIAGRAM OF THE RESEARCH PROCESS

(Hall and Howard, 2008)

The purpose of the convergent design is '*to obtain different but complementary data on the same topic'* (Morse, 1991 p. 122), to gain a more complete understanding of the research topic or phenomenon and to cross-validate or corroborate findings (Curry *et al*., 2009). The intent in using this design is to bring together the differing strengths and non-overlapping weaknesses of quantitative methods (large sample size, trends, generalization) with those of qualitative methods (small sample, details, in depth) (Patton, 1990) to synthesis and strengthen complementary quantitative and qualitative results. Qualitative and quantitative data collection techniques include; questionnaire, semi-structured interviews, chart/medication reviews, application of an evaluation tool, researcher's field notes of personal observations and conversations. As the understanding of issues is multifaceted a triangulation research method was employed.

2.3.2 Triangulation

Triangulation was utilised in this research, the aim being to enhance the process of empirical research by using a combination of multiple methods in a study of the same object or event to depict more accurately the phenomenon being investigated (Watson *et al*., 2008). In addition, Polit and Beck (2012) present a more embracing description of triangulation as the use of multiple sources of data to draw conclusions about what constitutes the truth, so to converge on an accurate representation of reality.

There are four common types of triangulation discussed within the literature including: 1) data triangulation that involves time, space, and persons; 2) investigator triangulation which uses more than one researcher to collect and analyse data; 3) theory triangulation that uses more than one theoretical perspective to interpret the study phenomenon; and 4)

methodological triangulation that involves the combination of approaches from the same research tradition/paradigm in the same study to measure the same variable(s) (Watson *et al*., 2008). In terms of validity and interpretation, Silverman (2004) suggests that drawing data from different contexts allows a true state of affairs to emerge increasing the studies validity and in addition, the depth and quality of the results, has the capacity to provide valuable understanding for the NPs' practice. Therefore, a survey study, interviews and chart reviews were utilised to reveal the phenomenon of nurse prescribing in practice.

2.3.2.1 Methodological triangulation

Methodological triangulation, according to Perlesz and Lindsay (2001) involves the use of more than one research method in one study, which occurs at the level of design or data collection technique and is an approach commonly utilised in nursing studies. One of the main strengths of methodological triangulation is to serve as a means of overcoming the methodological divide between quantitative and qualitative paradigms. In this study, data from the implementation of a prescribing evaluation tool involving chart reviews was complemented with data from interviews to explore the many dimensions of the complex concepts contained therein. Revealing the phenomena and facilitating an understanding at its different levels will make a more valid contribution to the theory and knowledge of nurse prescribing.

2.3.2.2 Data triangulation

Data triangulation according to Watson *et al.* (2008) involves the collection of data from multiple sources for analysis in the same study with each source focused upon the phenomenon of interest. For example in this

study data were collected from multiple sources; questionnaire, interviews, field notes, chart reviews, and application of a prescribing evaluation tool. These multiple data sources help validate the findings by viewing the phenomena under investigation from different perspectives that are divided into categories of time, space and person.

Time triangulation represents the collection of data on the same phenomena at different points in time e.g. hours, days or weeks with the purpose of validating the occurrence of the phenomena across time. In this study the goal was not to compare participants' knowledge or experiences at different points in time. Therefore, for this study, only two types of data triangulation were utilised: space and person.

Space triangulation is the collection of data on the same phenomenon at different sites (two or more settings) to test multiple site consistency and rule out site variations.

Person triangulation implies that data were collected from more than one level of person, or collectives. Given the broad range of individual backgrounds, experience and the importance of varied data sources by persons, the socialisation process and experiences and interactions of these individuals have been highlighted in the literature (Knafl and Breitmayer, 1991). The use of various levels of nurse prescribers provided greater insight into a variety of issues including: competence, support, professional development requirements, workload issues, financial concerns, level of appropriate and inappropriate prescribing, and inputting data to the national monitoring system. These data were utilised to support, supplement, and validate the information gained from published material on the topic as well as the research data.

2.3.3.3 Unit of analysis triangulation

Kimcbi *et al.* (1991) cited in Begley (1996 p. 125) describe unit of analysis triangulation as *'the use of two or more approaches to the analysis of the same set of data for the purpose of validation'*. This study incorporated more than one level of analysis by ensuring different grades of nurse prescribers in different clinical sites participated in the study, thereby, facilitating the diverse levels within the unit of NPs.

2.4 Method

2.4.1 Quantitative method

Two overarching quantitative research methods were used in this study; a) that of survey research that utilised a questionnaire and b) outcome research that was supported by the application of a prescribing evaluation tool.

2.4.2 Survey Objective

The objective of the survey was to discover if there were differences or similarities in the prescribing process undertaken by Irish and UK nurse prescribers.

2.4.2.1 Survey Research

A questionnaire survey was used to obtain information about the prevalence, distribution and interrelations of variables within the nurse

prescribing population. The surveys obtained information from NPs by means of a self-reporting questionnaire. In this study the questionnaire was divided into three distinct sections: a) demographics, b) information relating to prescribing and competence and c) advancement of nurse prescribing and requirements.

2.4.2.2 Outcome research

Outcomes research has been defined as '*the study of the end results of health services that takes patients' experiences, preferences, and values into account—is intended to provide scientific evidence relating to decisions made by all who participate in health care.*' (Clancy and Eisenberg, 1998, p.245). Therefore, outcomes research focuses on the end results of patient care. In order to explain the end result, the researcher must also understand the processes used to provide patient care. In this Thesis descriptive statistics were utilised.

2.4.3 Qualitative method

Qualitative descriptive research using Colaizzi's framework for guidance was the qualitative research method of choice because it facilitated the best understanding of NPs' experiences in practice and how they interpret those experiences (Todres and Holloway, 2006). The objective of this method was the direct investigation and description of the phenomenon as consciously experienced in a natural rather than experimental setting while emphasising the experiences, attitudes and views of the participants rather than providing quantified answers to a question (Nieswiadomy, 2008). This gave an additional perspective to the research from evidence that emerged through the data, in conjunction with structured statistical data.

2.5 Integration of qualitative and quantitative methods

Capitalising on the strengths of mixed methods, the data from the qualitative and quantitative methods were analysed to determine whether the results were convergent, complimentary or contradictory (Erzberger and Kelle, 2003). The aim in the analysis of a study using a triangulation model is to determine the extent to which the findings from the different methods used in the study either support or contradict each other. When the findings from the method used in the study lead to the same conclusion, the findings are said to be convergent: this is the classic definition of triangulation. Findings that do not necessarily lead to the same conclusion but rather augment and supplement the understanding advanced in the study are complementary. It is based on an assumption that different methods uncover different aspects of the phenomenon under investigation. Contradictory results stand in opposition but divergent findings are not necessarily indicative of a problem with the method used. Rather, contradictory results may provide new insight into the focus of the enquiry.

2.6 Ethics Approval

Ethics refers to the correct rules of conduct necessary when carrying out research and as researchers we have a moral responsibility to protect research participants from harm. Moral issues rarely yield a simple explicit right or wrong answer. It is therefore often a matter of judgement whether research is justified or not and researchers need to remember that they have a duty to respect the rights and dignity of research participants. This means that they must abide by certain moral principles and rules of conduct.

There are a number of key phrases that describe the system of ethical protections that the contemporary social and medical research establishment have created to try to better protect the rights of their research participants (Trochim, 2006). These include voluntary participation, informed consent, risk of harm and privacy and confidentiality. Even when clear ethical standards and principles exist, no set of standards can possibly anticipate every ethical circumstance. Therefore, there needs to be a procedure that assures researchers will consider all relevant ethical issues in formulating research plans.

Considering that the research project was clinical in nature, it was referred to the Clinical Research Ethics Committee for Cork Teaching Hospitals (CREC) to secure Ethics approval. Evidence of Ethics approval for each section of the study appears under the relevant chapter.

2.6.1 Voluntary participation and consent

One of the fundamental ethical requirements of research with humans is that informed consent must be obtained in advance of the research commencing. In practice this means it is not sufficient to simply get potential participants to say 'yes'. They also need to know to what it is that they are agreeing. In other words the researcher should, so far as is practicable explain in advance, what is involved and obtain the informed consent of participants. However, giving information is only half the process. Participants need to be capable of understanding this information and have the power of free choice thereby enabling them to voluntarily consent or decline participation.

To provide potential participants with accurate information for this study, it was necessary to develop several information sheets, each relevant to a particular section of the study and distributed at the appropriate time to the potential participants. Each participant information sheet drew attention to the voluntary nature of the research and that they had the right to withdraw

at any stage without prejudice. They were also informed that such decisions were kept confidential and not reported to organisation.

The consent form used was approved by CREC and consistent with the guidelines set out by the Committee that ensure all relevant elements are included in the form. Prior to commencement of any research activities, the researcher secured a signed consent form from each participant or verbal consent for telephone interviews. In addition, each participant was given a duplicate copy of their signed consent form for their records.

2.6.2 Privacy and confidentiality

Researchers have a responsibility to safeguard the privacy and the personal information of participants. Sometimes research involves the use of highly sensitive personal data. Misuse or inadequate protection of such data violates participants' rights and may have legal consequences for the researcher.

Therefore, in Ireland the requirements of the Data Protection Acts, 1988 and 2003 and Freedom of Information Act, 1998 and 2014 must be fulfilled. In particular, identifiable data must be rendered irreversibly anonymous wherever practical. Where such actions are not possible, stringent measures in relation to data protection must be taken, such as security of records, encryption, coding, use of pseudonyms and removal of identifying contextual information.

2.6.3 Risk of harm

The risks to which research subjects may be exposed to have been classified as '*physical, psychological, social, and economic*' (Levine, 1988 p. 42). The general guideline according to Polit & Beck (2012 p. 146) is that the

'*degree of risk to be taken by those participating in the research should never exceed the potential humanitarian benefits of knowledge to be gained*'. All research involves some risk but in many cases, the risk is minimal and should not be greater than those ordinarily encounters in daily life. In this study the main types of data collected that included personal details about the research participants; were interview, nursing documentation, and participant responses to a questionnaires. Although demographic data were collected from all participants, none of the participants could be identified from this information. Therefore, data collected in this study were deemed as having a minimal risk to the participant.

2.6.4 Security of data

Creating a secure environment for all data relating to the study was important to ensure the integrity of research data since it addressed concerns relating to confidentially, security, and preservation/retention of research data. For security purposes, the only persons who had access to the research data were the researcher and research supervisors. All data generated were stored in locked files, identification numbers and codes were allocated, names replaced with pseudonyms in accordance with university policy following completion of data analysis and the associated Thesis chapter. Copies of the audio tapes or corresponding transcripts were not made.

Digital research data were store on a computer that was not connected to any network and was encrypted should any unauthorized person try to access it. Ensuring that up-to-date anti-virus software was installed on the office and home computer was also part of the process. On completion of the study, the data were transferred from the computer and stored securely and archived in accordance with University College Cork Regulations. Paper copies will be shredded and hard drives/databases will be wiped clean following the defined statutory period for data storage.

2.7 Conclusion

This Chapter gives an overall description of the course the methodology followed. A summary of which is detailed in table 2.1. This is followed by a detailed description of the research design which highlights elements of the researcher's decisions on sampling, data collection and analysis. Finally, ethical issues were addressed. Further discussion on research methods used will be discussed under the relevant heading in each chapter.

CHAPTER 3 SYSTEMATIC SEARCH AND NARRATIVE REVIEW OF THE LITERATURE

Chapter 3 consists of a systematic search and narrative review of the literature on nurse prescribing both nationally and internationally. The review investigates the impact nurse prescribing has on the organisation, patient and healthcare professional, with the aim of identifying factors associated with the nurse prescribing progress.

[5]The impact of nurse prescribing on the clinical setting: A literature review. Creedon, R., Byrne, S., Kennedy, J. & McCarthy, S. (2015) British Journal of Nursing. 24(17) 878-885.

3.1 Introduction

Prescribing medications has traditionally been the domain of doctors, but nurse prescribing has been introduced in response to changing service needs and the increasing specialisation of nurses and midwives as they expand and advance their scope of practice. This has resulted in two schools of thought about the potential impact of nurse prescribing; the first is as a backward step, prioritizing 'cure' over 'care' (Cutcliffe and Campbell, 2002) and the second as formalizing the 'informal' prescribing that nurses already undertake (Nolan *et al*., 2001). The international experience of nurse prescribing has demonstrated the associated benefits in terms of increased patient satisfaction and concordance with medication regimes (Berry *et al*., 2008), cost effectiveness (Drennan *et al*., 2009) and increased nurse competence (Courtenay *et al*., 2007c). Additionally, patients interviewed about the most positive aspects of nurse prescribing identified the approachability of the NP, the relationship between the nurse and the patient in providing reassurance, continuity of care, information and health promotion details (Russell, 2003, Courtenay *et al*., 2010b). The role of the NP continues to grow in the healthcare setting internationally, increasing in both prominence and significance (Cipher *et al*., 2006). However, international differences between legislative procedures and the professional bodies responsible for the regulation of nurse prescribing have resulted in the implementation of several models of prescribing worldwide (An Bord Altranais and NMPDU, 2005, Kroezen *et al*., 2012). Nonetheless, NPs both nationally and internationally continue to publicise that extending prescribing rights has allowed nurses to make better use of their skills (Wilhelmsson and Foldevi, 2003, Drennan *et al*., 2009), gain recognition as a profession (While & Biggs, 2004, Latter *et al*., 2012), increase professional development and enhance self-esteem (Courtney and Butler, 1999, Cashin *et al*., 2009).

The continued expansion of nurse prescribing according to Naughton *et al.* (2012) and Scrafton *et al.* (2012), is motivated by an intricate mix of internal and external forces, together with changes in societal values and technology. Recent

studies have indicated that the introduction of nurse prescribing has blurred professional boundaries with jurisdictional control between the medical and nursing profession now changing (Bowskill *et al*., 2012, Ben Natan *et al*., 2013, Kroezen *et al*., 2013, Kroezen *et al*., 2014). The consequences of these changes has had an impact on the patient (Courtenay *et al*., 2011), organisation (Banicek, 2012), and healthcare professional (Latter *et al*., 2012). However, additional concerns have been identified regarding therapeutic relationships, role conflict, and lack of support, causing concern for the progress of nurse prescribing (Ross and Kettles, 2012). Building on a literature review conducted in 2009 and published in two parts by the author and colleagues (Creedon et al., 2009c, O' Connell et al., 2009), it is now timely to systematically identify and evaluate available evidence with regard to the impact of nurse prescribing from an organisational, patient and healthcare professional perspective in practice.

3.2 Aim

The aim of this Chapter was to identify and analyse the results of studies on nurse prescribing to examine the impact it has had in the clinical setting from the patient, healthcare professional and organisational perspective and identify possible factors that may impact on continued growth.

3.3 Method

A systematic search and narrative review was undertaken to address the impact of nurse prescribing in the clinical setting from the perspective of the patient, health care professional and organisation. For such a broad question, this review combined the search strategies and inclusion/exclusion criteria associated with systematic reviews as well as the analytical synthesis of a critical review (Twycross *et al*., 2015) to provide 'best evidence synthesis' available

(Grant and Booth, 2009). Multiple study designs were incorporated in the review rather than focusing on a single study design with the intention of providing a more complete picture of the research on the topic. Its primary purpose was to offer the reader a comprehensive background for understanding current knowledge and highlighting the significance of new research. To provide insight into the strengths and weaknesses of the studies included, Caldwell's *et al.* (2011) framework was applied although it was not necessary to subject the articles included to a methodological critique when using a systematic search and review (Grant and Booth, 2009).

3.3.1 Methodological design

The framework consisted of an overall approach to study critique using specific items based on the methodology and provided a list of criteria for qualitative, quantitative, and mixed methods research to assist the reader in assessing the reliability of the study to its stated design and determine the dependability of the results (Twycross *et al*., 2015). The items included such elements as: is there an hypothesis?; are key variables defined?; is the selection of participants described and sample method defined?; and are major concepts defined? Although, initially the framework did not produce a single numerical score to represent quality, for the purpose of this review the Caldwell framework that consists of 18 questions was awarded a numerical value (Bettany-Saltikov, 2012). Specifically, the application of each question has three possible answers, an answer to which scores were applied. An answer of no = 0, partly =1, and yes =2, were assigned, with the maximum value any study could achieve being 36. The structure of the framework and application of numerical value to the studies can be viewed in Appendix 2.

3.3.2 Search method

To identify relevant research studies, the following literature databases and websites were searched: CINAHL, PubMed, Online Computer Library Centre (OCLC) and Science Direct. Websites included were the Irish Department of Health and Children (www.dohc.ie), the UK Department of Health (http://tinyurl.com/c8cqtdj) and Google Scholar (www.scholar.google.com). The search terms (prescribing OR "prescriptive authority") AND (nurse OR nursing OR non-medical) were repeated across databases. Articles selected were dated from January 2009 to September 2014 with no restriction on the type of patient group for whom medications were prescribed. Further studies were included if they had a comparative design, e.g. comparing nurse prescribing with physician prescribing or comparing nurse prescribing overall. The results from the different databases revealed 443 studies of potential interest after duplicates had been removed.

3.3.3 Inclusion criteria

Original research designs applying qualitative, quantitative and mixed method that had nurses, healthcare professionals and service users as participants and published in English between September 2009 and August 2014 were eligible for inclusion in the systematic review.

3.3.4 Exclusion criteria

Studies that did not meet the inclusion criteria above were commentaries, editorials, and letters and review papers. In addition, studies focusing only on educational institutions, evaluations of theoretical frameworks, practice models, or quality assurance programmes with no research design were not included.

3.4 Results

The titles and abstracts were reviewed and assessed against the inclusion and exclusion criteria; 414 studies were eliminated. The full-text papers for the 29 studies were obtained. The reference lists of these papers were then searched together with grey material. This process revealed an additional eight papers that met the inclusion criteria, resulting in a total of 37 papers eligible for inclusion in the review: A flow diagram (Moher et al., 2009) was used to illustrate the different phases and identification of relevant studies between September 2009 and August 2014 for inclusion in the review: Figure 3.1 shows the diagram for this process.

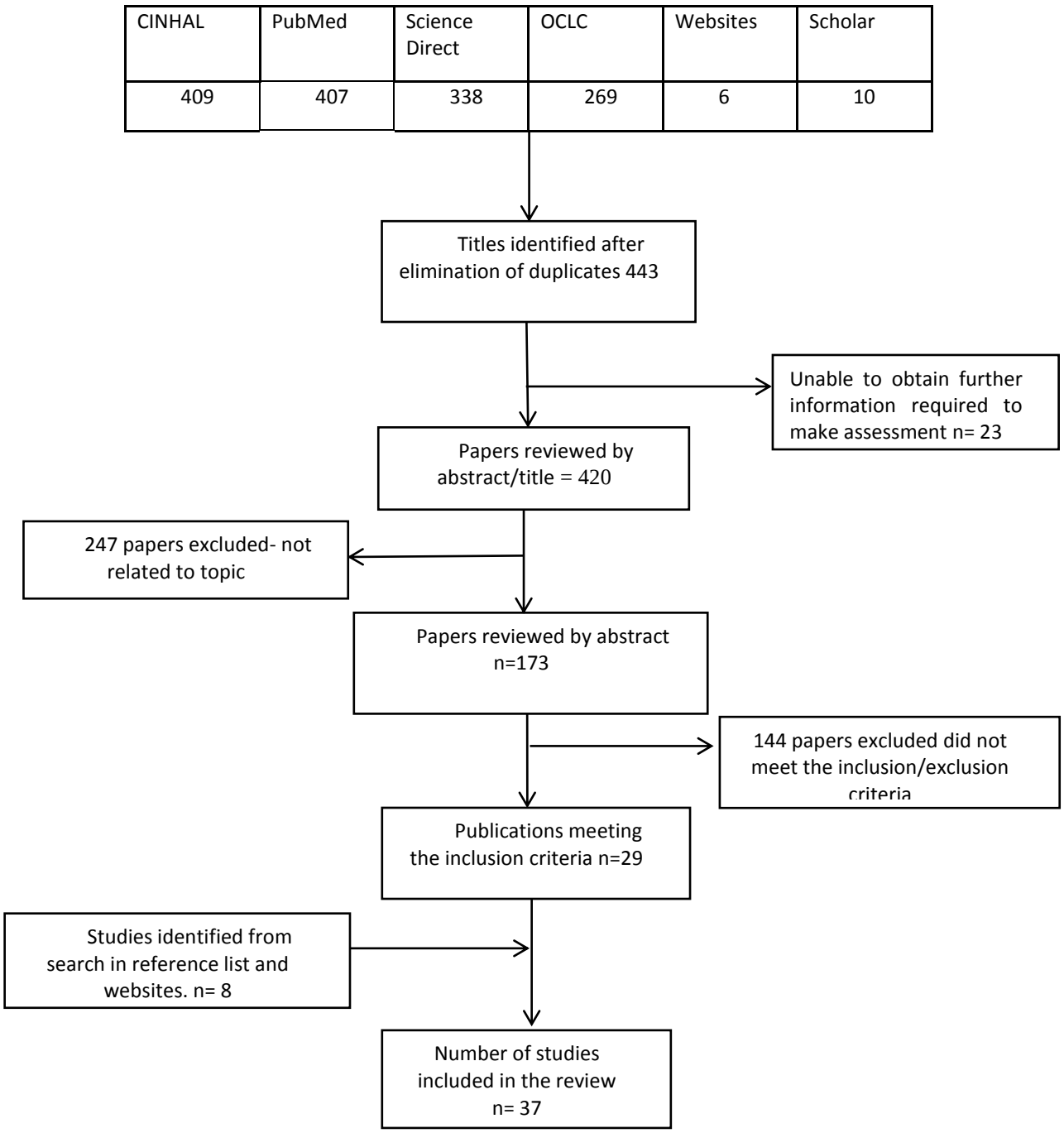


FIGURE 0.1 DIAGRAM OF STUDIES IDENTIFIED

3.4.1 Data extraction and synthesis

Data extracted from each study took the following format: study, country, study design, aim, sample (participants and setting), data collection method, main results (Table 3.1). Findings were organised into the following categories: implementation of nurse prescribing (prescribing arrangement, work force planning, treatment protocols, and infrastructure) CPD, jurisdiction, and remuneration. Information was tabulated allowing identification of prominent themes and offering structured ways of dealing with the data in each item.

3.4.2 Quality of studies

Systematic search and reviews are undertaken to summarise the activity in the field, identify gaps, determine the need for a systematic review and to summarise the findings for dissemination (Davis *et al*., 2009). The qualities of the final 37 studies were further assessed using a framework designed by Caldwell *et al.* (2011). On completion of this process, all studies scored between 20-35 scores are identified in Table 3.1. Studies were not excluded based on the assessment quality as preconceptions are inherent in the wide range of research designs included in the review.

TABLE 0-1 SUMMARY OF STUDIES INCLUDED IN THE REVIEW

Author, origin and design	Purpose/Aim	Sample/participants, setting	Measures/data collection method	Main findings	Quality according to Caldwell's Framework
Banicek (2012) UK Survey design	To examine the attitudes of postoperative patients toward nurse prescribing in the hospital setting.	n=57 Post-operative patients in the hospital setting	Questionnaire	The majority of patient had confidence in NPs however, some reported concerns regarding the qualification and training of NPs. Factors that may impact on this relationship are increased workloads and responsibilities, fear of litigation, inter-professional conflict moving from caring to curing role, blurring of boundaries between nurses and doctors.	20
Black, (2013) UK Cross sectional comparative design	To explore the application and safe non-medical prescribing in an accident and emergency and sexual health department	n=409 NPs working in emergency and sexual health setting	Interdepartmental comparison of 409 case notes was undertaken.	Over 53.5% of NPs' patients required medication, with 99.8% being clinically appropriate. Analgesics were the commonly prescribed class of medication in the emergency setting (31%) and antibiotics in sexual health setting (55%).	27
Bowskill *et al.* (2012) UK Case study	To investigate how nurse NPs integrate prescribing in clinical practice	n=26 NPs were chosen from a convenience sample of 186 NPs working in primary/secondary care settings	Interviews: Semi-structured interviews conducted by the principle investigator	The most significant finding to emerge from these case studies of nurse prescribing is the importance of trust in doctor–nurse and nurse–organisation relationships.	30
Carey *et al.* (2009) UK Case study	To explores stakeholders views on the impact of nurse prescribing on dermatology services	n=10. Findings from a larger study informed the purposively selected cases in different geographical locations in England. Cases included dermatology nurse specialists (n=4), practice nurses (n=3), nurse	Interviews: A total of 40 semi-structured interviews conducted with NPs (n=11) and members of the health care team (doctors (n=12) , administrative staff (n=11) and non-prescribing nurses (n=6)	Findings identified two themes relating to the contribution of NPs to the delivery of dermatological services. [1] Participants identified several areas where NPs had enhanced the provision of dermatological services. However, [2] participants identified several organisational issues that ultimately restricted the success of the initiative.	33

		practitioners (n=2) and a dermatology nurse consultant (n=1).			
Carey *et al.* (2010) UK Questionnaire survey	To examine the CPD needs of nurses who prescribe medicines to patients with diabetes.	n=439 NPs in Diabetic care	Questionnaire	Over 80% reported CPD was available and they had accessed it to support their prescribing role. Over 40% of nurses had CPD needs in the area of prescribing policy, pharmacology for diabetes and the management and treatment of diabetes related conditions. Senior nurses reported fewer CPD needs.	32
Carey *et al.* (2013) UK Cross-sectional survey	To explore the practices of nurses who prescribe medication for patients with skin conditions.	n=186 NP in the area of dermatology	Questionnaire	The diverse range of medicines management activities in which NPs are involved needs to be recognised by those responsible in service planning. A lack of specialist training is associated with lower rates of prescribing and reduction in the numbers of ways in which nurses use the prescribing qualification. Specific issues identified were lack of appropriate CPD, access, availability and time to undertake CPD.	32
Carey *et al.* (2014) UK Interviews	To explore how nurse prescribing is used for patients with respiratory conditions in different care settings across one strategic health authority,	n=40. A purposive sample of 138 respondents were selected from a larger study questionnaire response who identified their specialty as respiratory NPs	Interviews: semi-structured telephone interviews were conducted	The main findings related to [1]Access (Frail and housebound patients, gaps in routine care, access to treatment in hospital) [2]Adherence and risk management (managing comorbidity, prescribing and patient consultation, managing emergency or preventive medicine) and [3]Impact on nurses (job satisfaction, knowledge and confidence, anxieties and concerns for patients with respiratory conditions)	31
Cashin *et al.* (2009) Australia Survey	To report the perceptions of Australian NPs and NP candidates in regard to their confidence and practice in providing medicine information to patients/clients	n=132 NP/candidates. All areas n=68 NPs n=64 NP candidates	Electronic survey	High levels of confidence were reported in relation to providing client education regarding medications.	25
Cooper *et al.* (2013) UK Interviews	To comprehensively address both the question of whether non-medical prescribing presents a challenge to medical dominance, and more general experiences and perceptions of this form of	n=40 (n=11 doctors/nurses/pharmacists and n=28 patients) 10 case study sites were used to facilitate interviews	Semi-structured interviews	Five key themes emerged in relation to medical authority. [1]Doctors role in legitimating supplementary prescribing [2]Patients and supplementary prescribers; perceptions of doctors as hierarchically superior [3]Advice seeking and 'knock on door' policies [4]Doctors' perceived control over access to prescribing training [5]Doctors' denigration of prescribing	28

	non-medical prescribing.	in primary and secondary care		In focusing on the dependent supplementary prescribing model in this study the findings of continued medical authority is perhaps not so unexpected, given that supplementary prescribing involves the doctor in the initial diagnosis, the agreement of clinical management plans and continued overall care of patients. The claim that doctors appear to be making is that prescribing is an act they are happy to relinquish due to its increasingly rationalised nature which appears to be consistent with vertical substitution of healthcare professional work, where there is an 'active discarding of unwanted tasks to another provider' The independent non-medical prescribing model involves potentially less close medical involvement and a diagnostic role for nurses.	
Coull *et al.* (2013) Scotland Mixed method	To evaluate the extension of independent nurse prescribing in Scotland.	n=2971. The questionnaire survey was delivered to 3700 registered NPs. The response rate was 26% NP (n=948) /public (n=1016 in 2004 and n=1007 in 2007) /stakeholders National survey	Questionnaire-nurse prescribers Questionnaire – General public 2004 and 2007. Semi-structured interviews were conducted face to face and by telephone interview.	The benefits of extending nurse prescribing include: improved patient access to treatment; enhanced patient care; enabled more effective use of medical staff time and greater professional satisfaction for nurses who used nursing skills, and build interprofessional working relationships.	25
Courtney *et al.* (2009) UK Survey design	To provide an overview of the therapy area in which nurses prescribe medicines and their CPD needs	n=546 NP members of the ANP	Questionnaire	44% reported they had CPD needs in relation to knowledge of conditions. 75.2% required CPD for pharmacology of medicines and 52.8% in the area of assessment and diagnosis. 59.9% indicated their preference for e-learning, 19.9% for evening meetings 54.6% daytime meetings and 19.9% hard-copy distance learning material.	27
Courtney *et al.* (2010) UK Case study	To explore the views of patients with diabetes about nurse prescribing and the perceived advantages and disadvantages	n=41 Diabetic Patients across six national health service sites.	Interviews: semi-structured	Findings identified the following themes: [1]Benefits of efficiency and access [2]Confidence in nurse prescribing [3]Disadvantages and conditions [4]Role distinction between doctors and nurses	29
Courtney *et al.* (2011) UK Case study	To explore the views of dermatology patients about nurse prescribing and its impact on medicine management and concordance	n=42 patients. Participants were selected from the caseload of dermatology NP specialists in	Interviews: semi-structured	Findings refer to [1]Access to services and efficiency (patients reported that the NP improved access to services by increasing the number of available appointments, offering telephone access, providing local services, and improving efficiency) [2]Information giving and continuity of care (greater alignment between the views of prescribers and patients is required for medication	32

		primary and secondary care.		adherence) [3] Improvement in confidence and concordance [4]Differences between doctors and nurses (Nurses are reported to be more approachable than doctors, to have better listening skills and to adopt a more supportive role) [5]Patient concerns (it was important for patients to have continuity of care).	
Darvishpoor *et al.* (2014) Iran Qualitative meta synthesis	To aggregate and interpret existing literature and systematic studies to obtain an insight on nurse prescription.	n= 11 studies included in the review Primary care	Review	Specific findings include: [1]Leading countries in prescribing (Quality and safety of practice). [2]Views of stakeholders (Mainly stakeholders views of NP are positive there were negative views of physicians reported which may be due to lack of knowledge). [3]Feature of nurse prescribing (longer consultations that can lead to patient centred care linking back to holistic care). Benefits (improved care delivery, increased patient satisfaction, better use of personnel, and reduction in costs). Disadvantages (could be corrected by managerial planning). Infrastructure (some of the issues are linked specifically to political and economic environment however, educational preparation, competency assessment, organisational support were also discussed under this heading).	32
Dhalivaali (2011) UK Interviews	To explore patients attitudes to and experiences of nurse prescribing in inner-city general practice with different ethnic populations.	n=15 patients attending a primary care centre	Semi-structured interviews	Participants viewed NP as a positive experience which was convenient and quicker to arrange a consultation. Participants also felt that nurse prescribers had knowledge and skills to diagnose and prescribe safely and efficiently. Overall participants identified patient-centred care, information/explanation provision, and benefits of NP, quality relationships between nurse and patient as important criteria for them.	26
Dobler-Ober *et al.* (2013) UK	To evaluate the utilisation of formularies and barriers to the full implementation of independent prescribing and the views and experiences of existing independent prescribers utilising formularies.	n=20 potential participants were recruited to participate in the study Mental Health Nurses primary care over six clinical sites.	Interviews: 10 interviews were carried out before reaching data saturation	Findings identifies [1]Clear boundaries and information provided by the formularies [2]Formularies were considered helpful with the transition from supplementary prescriber to independent prescriber [3]Reservation were voiced about matching the formularies accurately with the clinical area and needs of the prescriber. Comments suggested they can become cumbersome and detract from the value of nurse prescribing.	26
Drennan *et al.* (2011) UK Cross-sectional descriptive study	The sums of the evaluation were to [1]Measure patients' satisfaction with education and advice received from nurse or midwifes with a prescribing remit. [2]Measure patients' satisfaction with the consulting process	n=140 patients general/midwifery and paediatrics	Questionnaire	In the study the whole consultation process between the nurse or midwife and patient was explored. The only element of education and advice received from the prescriber that fell below ninety per cent agreement related to information about their medication. The highest level of satisfaction was associated with the level of professional care received followed by the overall satisfaction with the consultation process undertaken by the prescriber.	34

	[3]Measure patients' self-reports of their intention to comply with the nurse or midwife prescribers' prescriptions and advice. [4]Identify the variables that predict patients' intention to comply with the prescriptions and advice provided by nurses or midwifes with prescriptive authority			Overall levels of satisfaction with the consultation process was high with the majority of patients surveyed of the opinion nurse prescribers were comprehensive in their care delivery, listened to their concerns and treated them as individuals. Compliance was associated with satisfaction and time spent with the patient during the prescribing consultation, overall satisfaction with the consultation process and patients health status.	
Dunn *et al.* (2010) **Australia** **Survey**	To conduct the first national study of Australian NPs prescribing practice.	n=132 NP/Candidates National study (n=68 nurse prescribers n= 64 prescribing candidates)	Electronic survey	Over two thirds of Australian NPs identified prescribing as part of their practice. A substantial proportion of prescribers face insurmountable barriers to prescribing in practice. These barriers include inconsistencies in State legislation, restrictive protocols, lack of funding and opposition from medical colleagues.	26
Earle *et al.* (2011a) **UK** **Single case study (Interpretive phenomenology)**	1. To explore and compare the experiences and views of practicing and non-practicing nurse prescribers working in one mental health trust. 2. To explore the views of service users in receipt of this care. 3. To consider some of the issues regarding how nurse prescribing is implemented in teams based on the experiences of a practising prescriber.	n=8 NP/Patients Mental Health n=2 nurse prescribers n=6 service users	Interviews: semi-structured interviews were used for each group	Overall service users appeared to be very satisfied with their care and receiving their medication from a nurse. In particular convenience, therapeutic relationship, reduced stress, information, choice and autonomy were suggested improvements. However, more complex prescribing would still require a doctor. NPs issues included training and in particular, recognised they had a great deal to learn and this would continue. Marrying their previous workload with prescribing was a concern and nurses struggle to balance the role of prescriber and nurse. Furthermore, the lack of pay incentive could slow the growth of the initiative. Benefits identified included improved concordance and compliance and a trusting and more open relationship with clients. The prescribers also wanted the organisation to be supportive of the role and that colleagues recognise the limitations of the role.	28
Earle *et al.* (2011b) **UK** **Interviews**	To explore at the views of mental health professionals, and specifically psychiatrists, regarding their experiences and beliefs related to mental health nurse prescribing specifically.	n=11 HCP Mental health (n=2 psychiatrists n=3 nurses, n=1 psychologist, n=1 occupational therapist, n=1 nutritionist, n=1 psychologist, n=1 social worker	Interviews: psychiatrists interviewed did not participate in the focus group (n=9) interviews.	Psychiatrists – highlighted that the organisation lacked a clear management structure to support the process of nurse prescribing. [1]Doctors had no training to support in their supervisory role. [2]Psychiatirsts had some choice as to whether or not to supervise a particular individual prescriber. [3] One saw treatment protocols as positive and helpful whereas another saw danger because of protocols could be followed blindly when inappropriate to do so Overall the views of health professionals toward NPs were positive.	25

		and n=1 (support worker)			
Fisher (2010) **UK** **Interviews**	To investigate the real world of nurse prescribing	n=24 NP/nurses/pharmacists Urban and semi-rural clinical sites N=17 nurse prescribers, n=4 non-prescribing nurses, n=2 pharmacists, n=1 general medical practitioner.	Semi-structured interviews.	There is a suggestion that in some nurse prescriber/GP relationships there is a struggle for dominance and control which might be considered at best unproductive, and at worst, to undermining collaborative working relationships. The potential for change within professional roles and relationships within the wider primary care team has implications for all involved as roles and boundaries become blurred and unclear.	29
Gielen *et al.* (2014) **Netherlands** **Systematic review**	To identify, appraise and synthesise the evidence of the effects of nurse prescribing when compared with physician prescribing on the quality and type of medications prescribed and on patient outcomes.	n= 35 studies review nursing and medicine	Systematic review that does not include qualitative study design	Patients are generally more or equally satisfied with the care provided by nurses compared with the traditional care provided by physicians. Based on the results it appears that nurse prescribing is of similar quality to physicians prescribing, and worries about whether nurses have the competence to prescribe appear to be unfounded. Nurse prescribing is embedded in tasks such as consultation, diagnosis and treatment, making it difficult to distinguish the effects of nurse prescribing. Raising the question are patients satisfied with nurse prescribing because of their prescribing practice or because of the time nurses invest in the prescribing process?	33
Green *et al.* (2009) **UK** **Mixed method**	Reports on the training needs for non-medical prescribers by the South of England Strategic Health Authority	n=270 non-medical prescribers (questionnaire) n=11 stakeholders (interviewed) All specialties	Questionnaire and interviews.	[1]The nature and academic level of pharmacology within curricula of pre-registered and post-registered nursing programmes should be reviewed. [2]Formal specific CPD recognising the variety of multi-professional activity in nurse prescribing needs to be recognised. Study days and training updates need to be local to the work base and easily accessible during work time. [3]The involvement of medical, pharmacy, senior nurses and university colleagues should be sought to develop areas where clinical specialties are new to medical and diagnostic skill development as part of non-medical prescribing. [4]A clear evaluation framework and process should be put in place to provide data relating to all ongoing CPD activity for non-medical prescribers including the informal arrangements at organisational level.	28
Hobson *et al.* (2010) UK **Interpretive phenomenology**	To explore the opinions of patients on the development of non-medical prescribing	n=18 Nurse prescribers /Patients Primary/secondary care	In-depth interviews	Participants had a preference for nurses as prescribers because nurses were considered to be trustworthy, caring and from a devoted profession with which patients' relationships are established. Participants expressed concern about clinical governance, privacy and whether sufficient space was available to provide the service in	30

		n=11 male and n=7 female		community pharmacies. Participants also acknowledged the expert drug knowledge of pharmacists and their accessibility. Nurses are highly regarded, accepted and preferred as prescribers with few concerns.	
Jones *et al.* (2010) UK Mixed method single case study	To report on an evaluation of the implementation of nurse prescribing in an acute care hospital in England.	n=140 NP/Patients Acute care hospital Observation n=2 nurses and n=2 doctors n=122 patients	Non-participant observation Questionnaire	Nurse prescribing was found to benefit patients through service delivery improvement and using staff skills differently. No differences were found between the way in which nurses and doctors performed prescribing roles but there was a statically significant difference between the medication-related information satisfaction ratings of patients who had seen a nurse prescriber, compared with those seen by a doctor.	*31*
Kroezen *et al.* (2012) Netherlands International survey	To gain more insight into the forces that lead to the introduction of nurse prescribing and into legal, educational and organisational conditions under which nurse prescribing of medicines is realised in western Europe and Anglo-Saxon countries.	n=39 International stakeholders Nursing /medical /government representatives	Survey	Prescribing rights in most countries are limited to certain categories of nurses. In practically all countries that have granted nurses independent prescribing rights, nurse are allowed to prescribe prescriptions-only medicines, albeit often limited to medications that fall within their scope of practice. Independent and supplementary nurse prescribers bear the same responsibilities for the treatment process of patients, in which the prescription of medicines from just one element. The content of training programmes for independent and supplementary nurse prescribing seems rather similar. There is no remuneration for prescribers from the employing organisation. Jurisdictional control for prescribing between the medical and nursing profession is severely restricted by formularies of medicines and /or protocols.	34
Kroezen *et al.* (2013) Netherlands Survey study	To gain insight into the views of Dutch registered nurse, nurse specialists (with a Master's in Advanced Nursing Practice) and physicians on the consequences of nurse prescribing.	n=1257 RN/nurse specialists/physicians National sample Registered nurses n=617 Nurse specialists n=375 Physicians n=265	Questionnaire	Nurse specialists were more convinced than registered nurses and physicians that nurse prescribing improvement quality of care and are also more positive about the consequences of nurse prescribing. However, all groups agreed that nurse prescribing benefits nurses' daily practice and the nursing profession as a whole. When asked about their views on the consequences of nurse prescribing on the relationship between the medical and nursing professions, all three professional groups agreed that nurse prescribing increases professional group consultation between the physician and nurse.	34
Kroezen *et al.* (2014) Netherlands A multiple case study	To study how prescribing by nurse specialists is taking shape in the workplace and how jurisdictional control over prescribing is divided between nurse specialists and physicians	n=29 Nurse/medical specialists Selection of clinical contexts n=15 nurse	Interviews: in-depth interviews	Most nurse specialists worked from protocol that were almost always developed and/or approved by medical staff and hospital pharmacists. Across the work settings there was variety in both the extent and way in which nurse specialists' legal prescriptive authority was implemented. Prescribing by nurse specialists as spoken about by policy makers, healthcare professionals and patients alike is nothing more than an umbrella term. If the knowledge level of the profession is ambiguous as	35

		specialists, n=14 medical specialists.		it is in terms of what is understood by nurse prescribing, the status of the initiative itself may become ambiguous. Internationally there is a need for detailed evaluation of the cost effectiveness of nurse prescribing considering cost effectiveness was cited one of the main reasons for introducing prescriptive authority for nurses initially.	
Latter *et al.* (2012) UK	To evaluate the clinical appropriateness of prescribing by nurses and pharmacists.	n=464 NP/Pharmacist prescriber All specialties	Medication Appropriate Index	Generally nurses and pharmacists tend to prescribe within specific clinical specialties. There was room for improvement in skills of either history-taking and assessment or diagnosis.	32
Naughton *et al.* (2012) Ireland Cross sectional study	To evaluate the clinical appropriateness and safety of nurse and midwife prescribing practice.	n=25 NP All specialties	Medication Appropriate Index Tool	95-96% of medications prescribed were indicted and effective for the diagnosed condition. Criteria related to dosage, directions, drug-drug or disease-condition interaction and duplication of therapy were judged appropriate in 87-92% of prescriptions. Duration of therapy received the lowest value at 76%. Overall reviewers indicated that between 69-80% of prescribing decisions met all included criteria.	33
Natan *et al.* (2012) Israel Correlational study	To explore the attitudes of patients with chronic conditions toward the expansion of nurse authority with an emphasis on nurse prescribing of medications for chronic conditions	n=230 Patients.	Questionnaire	Nurse prescribing shortens waiting lists for medical care, improves adherence to treatment and ensures a rapid medial response. The image of nursing was identified as important for respondents – the more positive the image the more positive their attitudes to prescribing. Public attitudes affect the decisions of policy makers and their institutions of improved courses of action. Patients with chronic conditions support the expansion of nurse prescribing.	30
Rana *et al.* (2009) UK Survey study	To explore the attitudes of all grades of psychiatrists working in two mental health trusts in the West Midlands to nurse prescribing.	n=147 Psychiatrists Mental health	Questionnaire	The minority of participants, mainly non-consultant, stated that although nurses were capable of prescribing some medication, they should not be granted full independent prescribing rights. The majority, largely senior doctors, felt that no distinction should be made about where nurses should prescribe and should do so independently Despite resistance from junior doctors to nurses prescribing independently, they felt that nurses should be able to prescribe out of hours and at weekends.	30
Ross& Kettles (2012) UK Mixed method	The aim of the study was to ascertain mental health NPs views of the barriers to their prescribing independently but also include perceptions of barriers to supplementary prescribing.	n=33 NP Mental health (questionnaire) n=12 NP Mental Health (Focus group)	Questionnaire and Focus group	There is an ongoing problem with the implementation of nurse prescribing. This relates to both lack of recognition for the additional responsibility that prescribing entails and lack of support for the role. The issue of apparent lack of clear prescribing policy and guidance left respondents in confusion and unsurprisingly unwilling to prescribe. Findings specifically indicate when nurse prescribers did not feel supported they were less likely to prescribe The role needs to be recognised and valued.	30

Scrafton *et al.* (2012) UK Qualitative study	To explore the experiences of secondary care NP to establish how prescribing is employed and what its benefits and disadvantages are perceived to be.	n=6 NP secondary care	Interviews.	Overall participants viewed nurse prescribing as a valuable addition to existing roles and having prescribing rights promoted greater accountability and patient safety. Respondents suggested workforce planning and review needs to take into account the additional time required to make prescribing decisions, if other aspects of care are not to be compromised.	31
Snowden *et al.* (2010) UK Grounded Theory	To explore the impact of prescribing rights on mental health nurse prescribers in UK	n=13 Clinicians/service users Mental Health n=6 mental health nurse prescribers n=2 service users of mental health nurse prescribers, n=3 senior mental health nurse managers, n-1 consultant psychiatrist, n=1 senior nurse researcher.	Interviews.	The research shows that there is a possibility clinical mentors may be overestimating their own understanding of medication management. There is, therefore, a case for structural education in medicines management to be introduced into pre and post registration mental health nursing. [1]Critically evaluate the concept of concordance in medication management. [2]Analyse the potential conflict between modern nursing ideology and legal and ethical issues pertaining to medication management. [3]In psychopharmacological terms demonstrate critical understanding of likely adverse events. [4]Justify an individual approach to medication management. There is therefore a case for structured education in medicines management to be introduced into pre- and post-registration mental health nursing in UK.	24
Stenner *et al.* (2012) UK Descriptive questionnaire survey	To provide information on the profile and practice of nurses in the UK who prescribe medication for pain.	n=214 NP. Both independent and supplementary prescribing specialties.	Questionnaire	The survey describes in detail the profile and practice of UK nurses who prescribe for patients in pain. The majority of treatments are related to minor injuries and illnesses and are seen within general practice, emergency care, walk in centres and out-of-hours clinics. Access to CPD is particularly important where nurses are developing new areas of practice. Compared with other countries there are fewer restriction on UK NPs.	32
Weglicki *et al.*(2014) UK Interviews	To ascertain the aspirations, priorities and preferred mode of CPD for non-medical prescribers.	n=16 NP Primary/secondary care	Semi-structured interviews.	Anxiety and lack of confidence in non-medical prescribing pose a significant challenge for CPD resulting from contrasting professional contexts, individual skill levels, work-place expectations and demands.	33

Note: NP =Nurse Prescriber

CPD continuing professional development

3.5 Findings

The literature originated from UK (27), Scotland (1), Australia (2), The Netherlands (4), Israel (1), Iran (1) and Ireland (1). All data extracted from the studies were based on the results and discussion sections of papers, not the study conclusion. Outcomes were classified according to the categories identified. Categories were then grouped according to the research question to reveal the effects of nurse prescribing on the patient, and healthcare professional and organisation for discussion.

Study details

Of the 37 studies reviewed, 31 included data on prescribing in practice, frequently from the viewpoint of prescribers and clients/patients. Seven studies included data about CPD, four directly and three indirectly. Five reported on issues of jurisdiction with two focusing specifically on this issue. Although there were no studies that reported specifically on financial issues although four studies did mentioned financial incentives as significant.

There were a mixture of quantitative (n=15), qualitative (n=20) and mixed methods (n=2) studies sourced using a range of data collection methods. Details of specific methodological issues are set out in Table 3.1

3.5.1 Prescribing in practice

Variations in the way nurse prescribing translates into practice have been identified. Even though nurses in most countries are allowed to prescribe medicines on an independent basis, their scope of practice varied considerably depending on whether or not protocols or formularies are in place and how restrictive they are (Kroezen *et al*., 2012). This directly impacted on the extent to which nurse specialists made use of their

prescriptive authority in everyday practice (Kroezen *et al*., 2014). Although the majority of studies referred to issues about prescribing in practice, seven studies focused specifically on this area. Overall findings agreed that nurse prescribing increases effectiveness and autonomy in practice which in turn raises many issues concerning confidence, workload (Earle *et al*., 2011a), access to ongoing or specialist training (Stenner *et al*., 2012, Courtenay, 2013), appropriate clinical decision-making (Latter *et al*., 2012), self-restriction (Bowskill *et al*., 2012), and safety (Naughton *et al*., 2012, Black, 2013). NPs in general are aware of their limitations and regularly consult with medical colleagues in an informal way that was agreeable to both nurses and doctors (Kroezen *et al*., 2014).

3.5.2 Workforce planning

There was a strong feeling that service development must take into account the additional work entailed in prescribing. Having the ability to prescribe increased workloads for the NP (Earle *et al*., 2011a) who appear to struggle with balancing their new role, particularly where boundaries of the nursing work and prescribing roles are unclear (Bowskill *et al*., 2012). Earle *et al.* (2011a) suggests that this can be overcome through local negotiation. However, Carey *et al.* (2013, p. 20) has a more specific approach stating that those responsible for service planning need to recognise '*the diverse range of medicines management activities in which NPs are involved'* to address the hidden workload. Additional issues of concern identified were budgetary constraints that impacted negatively in terms of prescribing itself, numbers accessing training and the ability to demonstrate the effectiveness of nurse prescribing (Scrafton, 2012). Workforce planning in some instances did not support funding arrangements and agreements were not always in place to support nurse prescribing thereby creating potential inequalities in service provision for patients (Carey *et al*., 2014).

3.5.3 Continuing Professional Development (CPD)

NPs expressed anxiety that they were '*not keeping up to date'*. There was also a fear of making incorrect decisions if they could not recall theory learned during the prescribing course (Weglicki *et al*., 2014). This anxiety and lack of confidence by nurses in their prescribing ability poses a significant challenge for CPD. Contrasting professional backgrounds, individual skill levels, work-place expectations and demands are but some of the concerns to be addressed when focusing on CPD needs for NPs. Four studies reported specifically on CPD for NPs (Courtenay and Gordon, 2009, Green *et al*., 2009, Carey and Courtenay, 2010, Weglicki *et al*., 2014). The number is low considering the importance placed on CPD by governing bodies and organisations to ensure NPs' knowledge remains current. However, additional studies included CPD in their findings or discussion as an important element of nurse prescribing to be addressed (Scrafton, 2012, Stenner *et al*., 2012). The pace of change in the area of prescribing presents educators with a new challenge as professionals from a broad range of disciplines pursue ongoing development to prescribe in their specialty area of practice.

Specific difficulties with respect to the provision and access of CPD included cost, time, workload pressure, staffing levels, and workload patterns (Courtenay and Gordon, 2009). Pressure to satisfy mandatory updates (Green *et al*., 2009), lack of organisational support (Carey and Courtenay, 2010), patient safety, workforce planning and education of line managers, were identified as issues impacting on CPD. In addition, Weglicki et al. (2014) identified reduced education budgets, and lack of support from employers or the professional body for CPD as contributing to anxiety and lack of confidence in non-medical prescribing, and individual skill development. From a more encouraging perspective, studies also identified positive outcomes of CPD. Consolidation of learning, information on new skills, an opportunity to share with colleagues (Green *et al*., 2009); organisational benefits, improved patient care, knowledge and confidence (Carey and Courtenay, 2010),

networking between practice settings, colleagues learning from informal debate, and reduced anxiety (Weglicki *et al*., 2014) were all identified. The main barriers to CPD were summarised by Stenner *et al.* (2012) as financial, time/staff shortage, availability of training at an appropriate level, and lack of organisational support for role development.

Pharmacology knowledge is the most important CPD need identified by NPs, a situation that Carey & Courtney (Lacobucd. G, 2006) acknowledged as warranting further investigation. However, additional studies identified assessment and diagnostic skills up-dates as taking priority (Courtenay and Gordon, 2009, Green et al., 2009, Carey and Courtenay, 2010). Weglicki *et al.* (2014) did, however, voice concern that an adequate CPD strategy is not yet in place considering the advancements in prescribing over the past decade.

3.5.4 Jurisdiction

The expansion of prescriptive authority has affected professional boundaries and in some relationships there is a struggle for dominance (Fisher, 2010). The consequences of this can impact on the relationship between the nursing and medical professions and jurisdictional control over prescribing (Kroezen *et al*., 2014). The attitudes of doctors to the initiative and, in particular, the differences between junior and senior doctors toward nurse prescribing may represent concerns about their future role (Rana *et al*., 2009). However, findings from Kroezen *et al.* (2013) emphasise that once healthcare professionals have experience with nurse prescribing their views become more positive toward the initiative. This is an important finding because a '*lack of peer support and/or objections from physicians can hamper progress'* (Kroezen et al., 2012, p. 1010) despite there being evidence since the 1960's in the USA supporting the nurse prescribing initiative. Healthcare professionals are now renegotiating these blurred boundaries by addressing the issues through formal workplace policies (Kroezen *et al*., 2013) that

require clear organisational structures (Earle *et al*., 2011b). For NPs, the acquisition of prescribing rights is not considered a challenge to medicine but the 'evolution' of nursing to meet practice demands (Kroezen *et al*., 2013). Only in the UK, where nurses prescribe independently from the national formulary, is jurisdiction over prescribing considered equal to that of the medical profession (Kroezen *et al*., 2012).

3.5.5 Prescribing arrangements and treatment protocols

Protocols and formularies for prescribing developed and approved by medical staff causes restriction to the process and places NPs in a subordinate position to the medical staff. Even though medical specialists are confident about nurse prescribing, they still feel that they have '*final responsibility for the nurse and the patient'* (Kroezen et al., 2012, p. 1009). The impact of nurse prescribing on professional relationships may differ depending on whether supplementary or independent prescribing is practised. Continued medical authority is expected with supplementary prescribing given that the doctor makes the initial diagnosis and is involved in agreeing a clinical management plan for the patient (Cooper *et al*., 2013). The independent prescribing model is more autonomous allowing NPs to diagnose and prescribe without direct medical involvement. Independent prescribing therefore poses a different challenge to medical authority and the role associated with prescribing (Fisher, 2010, Earle *et al*., 2011b). More recently, nurses and other healthcare professionals were granted the same prescribing rights as doctors in the UK.

3.5.6 Financial incentive

NPs were of the opinion that recognition and support should take the form of financial incentives for taking on additional non-medical prescribing responsibilities (Green *et al*., 2009). In reality, nurses struggle with balancing their role as prescriber and may harbour resentment about extra work and

responsibility without extra pay (Earle *et al*., 2011a). Kroezen *et al.* (2012) did find that NPs in most countries who earned more than nurses without prescribing qualifications did so because of advanced qualifications unrelated to prescribing qualifications. A lack of pay incentive was also recognised by Earle *et al.* (2011a) as an issue that may slow the development of nurse prescribing.

3.5.7 Factors relating to the patient

The patients' perspective of nurse prescribing was at the core of six studies; two studies used the term 'views of patients', three studies used the term 'patients' attitude' and one study 'patients' satisfaction' of nurse prescribing (Courtenay *et al*., 2010b, Drennan *et al*., 2011, Dhalivaal, 2011, Courtenay *et al*., 2011, Banicek, 2012, Ben Natan *et al*., 2013).

Patients viewed NPs positively with regard to convenience, accessibility, timeliness, knowledge, safety, holistic care approach and a good relationship with the nurse. However, an interesting concern identified by Banicek (2012) and Dhalivaal (2011) was patients' apprehension related to the qualifications and training of NPs. This is significant because patients confidence is inspired by the nurse's level of knowledge (Cashin *et al*., 2009, Courtenay *et al*., 2011, Drennan *et al*., 2011, Coull *et al*., 2013) and is associated with increased levels of patient satisfaction and adherence to medication regimens and a good relationship with the patient (Courtenay *et al*., 2010b). Incidents were also identified where patients compared the NP with the physicians whom they perceived as having more extensive knowledge due to their lengthy training (Courtenay *et al*., 2011) with some patients continuing to think that the role of the nurse is to help the physician (Ben Natan *et al*., 2013). Initial patient impressions according to Ben Natan *et al.* (2013) change and became more positive the more exposure patients have to nurse prescribing. Overall,

findings indicated that patients welcomed the addition of NP to the healthcare team.

3.5.8 Factors relating to the healthcare professional

The healthcare professional perspective highlighted benefits such as increased recognition of abilities, professional autonomy, accountability, increased job satisfaction, improved multidisciplinary communication, monitoring and reporting of adverse drug events (Coull *et al*., 2013, Darvishpour *et al*., 2014). In addition, the development of confidence and competence in practice were significant factors identified by the healthcare professional (Cashin *et al*., 2009, Snowden and Martin, 2010, Dunn *et al*., 2010, Dobel-Ober *et al*., 2013). In particular, Snowden and Martin (2010), emphasised that confidence and competence is dependent upon pharmacology knowledge and the quality of the nurse/patient relationship. Cashin (2009) found that through the provision of patient information, education, discussion, and assisting clients in making informed decisions, confidence and competence were also advanced. Many countries use formularies to support nurse prescribing and competence development. However, Dobel-Ober *et al.* (2013) found that using formularies was cumbersome, and needed regular review to take into account prescribers' needs and confidence development. There are positive aspects to using formularies such as reviewing progress in terms of critical evaluation, analysis of potential conflict, demonstration of critical understanding and justification of the NPs approach to medication management (Dobel-Ober *et al*., 2013). In contrast, Dunn *et al.* (2010) cautions over reliance on protocols or personal formularies, as they may decrease opportunities to independently prescribe in practices which in turn reduces confidence levels (Cashin *et al*., 2009). Developing peer and interdisciplinary relationships enables integration of nurse prescribing and promotes safety in patient assessment, clinical decision-making and documentation (Bowskill *et al*., 2012, Naughton *et al*.,

2012, Black, 2013). Overall, it was found that nurses provide a prescribing service for patients comparable in quality and safety with prescribing by doctors (Latter *et al*., 2012).

3.5.9 Factors relating to the organisation

Lack of support within the organisation was identified as three fold: 1) lack of supervision, 2) lack of support within the role, and 3) lack of support from other healthcare professionals (Ross and Kettles, 2012). In addition, organisational implementation of practice protocols is restrictive and should not be confused with best practice (Dunn *et al*., 2010). Organisational confidence is required to ensure the role is recognised and valued otherwise nurse prescribers do not feel supported and are less likely to prescribe (Ross and Kettles, 2012).

The benefits identified from an organisational level include – improved access and care delivery, faster and more efficient service, better patient satisfaction, cost-effectiveness and streamlining of staffing skills (Carey et al., 2009a, Darvishpour et al., 2014). Patient benefits were convenience, better patient education, enhanced patient care, easier access to medicines, reduced waiting times, improve safety, improved satisfaction (Carey et al., 2009a, Ross and Kettles, 2012, Darvishpour et al., 2014).

The barriers to prescribing from an organisational perspective were identified by Carey *et al.* (2009a) as local restrictions, lack of CPD and formal support. At present prescribers are working to capacity and further benefits will not be evident unless resources are put in place. Similar difficulties with infrastructure were identified by Coull *et al.* (2013). In addition, Ross & Kettle (2012) also highlighted that organisations required greater commitment to nurse prescribing than appearing to do what was cost effective and appropriate from the political and policy makers' perspective. A broader

perspective of nurse prescribing is required to ensure an appropriate infrastructure supports the continued evolution of the role (Coull *et al*., 2013).

Healthcare professionals, particularly nurses, have anxieties and concerns related to prescribing that have been identified as barriers or potential barriers to prescribing. For instance, remuneration was identified by Ross & Kettles (2012) as a continuing barrier for nurses considering that additional responsibility and increased workload did not equate to financial reward. To date, this situation has not changed with Carey *et al.* (2014) highlighting that structural reorganisation in the health service is now looking at GPs and managers gaining greater control over already stretched resources.

3.6 Discussion

Despite differences in prescriptive authority for nurse prescribing in different countries, a review of the literature shows many similarities in relation to the benefits that it provides for patients, carers, nurses, doctors and the overall delivery of healthcare. Compelling advantages for nurse prescribing across health care settings include a nurse's continuous contact with patients that facilitate the patients' needs in more detail, giving more options for patients, holistic care, time saving, use of advanced nurse practicing skills and cost saving for the health care system. The advantages come hand in hand with the concerns about patient care, inappropriate prescribing, inter-professional relationships, cost of CPD and jurisdiction of prescribing. It is important to note that studies included in this review meet specific inclusion and exclusion criteria which may not allow full exploration of nurse prescribing process that is embedded in other tasks such as consultation, assessment and revision of treatment. One should note that the majority of the studies are undertaken from a UK perspective which is more

progressive in advancing nurse prescribing than other countries. Other countries with a larger geographical area have nurse prescribing practice spread across state and separate governing jurisdictions, and is often inconsistent, complex and in some cases restrictive (Dunn *et al*., 2010).

3.6.1 The impact of nurse prescribing on the patient

Improved speed and convenience of access to medicines have been consistently reported as key benefits of nurse prescribing by patients (Drennan *et al*., 2009). Increasing the number of NPs has two-fold effect a) improved patient access to services and b) relieved pressure on doctors thereby preserving limited medical resources for the most seriously ill patients. However, these efficiency changes are supported with limited evidence from research using case studies.

The nurse-patient relationship is one of the central factors contributing to the success of nurse prescribing because the continuity of care that the NP provides has a positive effect on the patient's level of satisfaction. The literature further reveals that patients are highly satisfied and confident in the NPs ability to prescribe because of their specialist knowledge, experience and a belief that nurses know their own limitations (Courtenay et al., 2011). Patients also consider nurses to be more approachable than doctors, better at communication and more likely to include them in discussion about their medications. This approach to prescribing makes it easier for patients to share information, ask questions, and address problems and as a result, they understand their condition and treatment better. In promoting a good prescribing relationship with the patient, it is important to avoid confusion because there may be limitations imposed on prescribing certain medications depending upon the country in which the NP is practising. This can present problems when treating patient with multiple comorbidities. To overcome this, when embarking on the prescribing relationship, NPs must be clear with

patients about what they can and cannot prescribe. Such clarity is important if the prescribing role is to be developed purposefully.

3.6.2 The impact of nurse prescribing on healthcare professionals

Nurse prescribing is viewed as a valuable addition to existing roles, and expansion of prescribing rights was believed to be a positive step that promotes greater accountability and patient safety (Cashin et al., 2009, Earle et al., 2011a, Latter et al., 2012, Naughton et al., 2012, Carey et al., 2014). This increase in responsibility was not undertaken lightly but was welcomed, as long as it was for patient benefit and not just to fill gaps left by staffing shortfalls. The main factors identified that facilitated effective prescribing in practice include teamwork, peer support and doctor support that is accessible and positive regarding nurse prescribing. Having such support can facilitate prescribing when present but limit nurse prescribing when absent. Therefore, the education of medical practitioners on prescribing and the role of the NPs is of paramount importance to ensure a collegial relationship. Addressing this issue at the education level may be an option for the future. Using an interdisciplinary educational approach to preparing both doctors and nurses for prescribing would improve relationships and understanding of both roles.

Supplementary prescribing was credited with improved understanding between the professions because the doctor taking responsibility for the diagnosis however, this is depended on individual attitudes. It was Rana *et al.* (2009) who stressed the importance of Health Trusts (organisations) to help make the transition toward new roles for prescribers with the intention of reducing conflict. A comparison of nurses and doctors prescribing practices would also be useful to compare the decision making process by both nurses and doctors, ideally incorporating patient outcomes and cost effectiveness in the clinical setting.

3.6.3 The impact of nurse prescribing on the organisation

The healthcare environment has changed significantly over the last decade driven by changing demographics and epidemiology with organisations now requiring the services of NPs more and more to help provide a streamlined and timely service for patients. Clinical governance and overall organisational support have been identified repeatedly as important factors for the success of nurse prescribing. Having organisational structures in place also support NPs to fully integrate into the healthcare team. Current knowledge is an essential element for NPs to work as part of the healthcare team because prescribing knowledge extends beyond the act of consultations for issuing prescriptions to also encompass education, titration and discontinuation of medication. Inadequate support in the face of heavy work commitments reduces the opportunity for development (Green *et al*., 2009). Having access to a supportive environment encourages NPs to attend updates and opportunities to networking between the different healthcare settings however, a clear evaluation framework is required to obtain a robust picture of the CPD that works for NPs. The challenge of providing appropriate CPD for experienced NPs is pharmacology education which, if appropriately focused, relates to their specialty making it applicable to a small number of prescribers. This focused education creates challenges for providers of CPD who may find it difficult to deliver at an affordable cost. In addressing these issues, the organisation needs to consider workforce planning and review needs to take into account the additional time required to make prescribing decisions, if other aspects of care are not to be compromised.

Having the time to prescribe is also a concern for NPs who suggest they sometimes have to satisfy unrealistic expectations imposed by the organisation. Assessing and meeting the more complex needs of patient medication requires time and the components of stress and workload balance identified by Creedon *et al.* (2014) tend to relate to excessive workloads rather than challenging care situations. The progressive, dynamic nature of nurse prescribing requires shared

responsibility with health service providers to develop robust systems to support competence, assurance and safe clinical governance. This requires that the health service expand their narrow view of prescribing which tends to be focused on a consultation that results in a medication being prescribed (Health Service Executive, 2014c). Education, titration and discontinuation of medications are equally important in the cost-conscious and prescribing optimisation environment of today's health service. Understanding the true cost-effectiveness of the NPs contributions within the organisation needs to be undertaken through robust research. Where cost savings were identified, redirection of these savings to address issues such as protected study time and financial support that hinder the access of CPD could be made.

The issue of remuneration, or lack thereof, was mentioned in several papers and could be identified as a barrier to the implementation of nurse prescribing. This may explain why nurses do not prescribe although remuneration does not factor highly in reported findings on the topic. Nevertheless, it does seem unrealistic to expect nurses to undertake such a skilled independent role that is cost effective for the organisation without recompense.

3.7 Conclusion

It is evident from the literature that nurse prescribing is beneficial for the patient, organisation and healthcare professional and could also be viewed as one of the most exciting initiatives in the recent history of nursing. Nurses clearly understand the requirements of the role, however, it is important that they continue to make the role explicit within the multidisciplinary team to ensure that collaboration is optimal and misunderstanding minimal. The results also reveal that there are issues of concern such as workloads, remuneration, support, CPD, and workplace jurisdiction need to be addressed if NP is to continue evolving.

To understand the issues concerning workloads, a broader view of nurse prescribing needs to be considered to capture the true impact of the initiative. To ensure barriers do not develop, future research should consider the inclusion of all nurse prescribing consultations in evaluations and not just those that end in a medication being prescribed. In addition, understanding and remaining up-dated on the key principles of nurse prescribing will allow nurses to remain instrumental in the development of this role over the next decade.

Publication for this chapter can be viewed in appendix 3.

CHAPTER 4 QUALITATIVE INVESTIGATION OF NURSE PRESCRIBERS' EXPERIENCE OF THE MINIMUM DATA SET IN CLINICAL PRACTICE

Chapter 4 – describes how in Ireland, monitoring of nurse prescribing is achieved through inputting data directly to a database called the Minimum Data Set (MDS) that is managed by the Health Service Executive (HSE). This chapter explores NPs' experiences of using the MDS in clinical practice using a qualitative investigation that was undertaken in January and February 2012.

[6] Nurse prescribers' experiences of recording prescribing data to the Minimum Data Set in Ireland. Creedon R., McCarthy S. & Kennedy J. (2014) British Journal of Community Nursing, 19(12) 594-600.

[7] The Impact the Minimum Dataset has on the Nurse prescribing process. Creedon R., McCarthy S. & Kennedy J. All Ireland School of Pharmacy 34th research Seminar (2013) Poster presentation

[8] The 2014 paper was used as part of a national review of nurse prescribing in Ireland which was undertaken in 2015 report published in December 2016.

4.1 Introduction

Nurse prescribing has been introduced nationally and internationally in response to changing service needs and the increasing specialisation of nurses and midwives as they expand and advance their scope of practice (McKenna *et al*., 2008, Kroezen *et al*., 2012). However, international differences between legislative procedures and the professional bodies responsible for the regulation of nursing practice has resulted in the implementation tailored models of prescribing to meet the specific demands of health services worldwide (An Bord Altranais and NMPDU, 2005, Kroezen *et al*., 2012).

Nurse prescribing in Ireland follows the model of independent nurse prescribing that utilises a limited formulary extending to those medicinal products normally used in a named clinical area. More specifically, the identified medications are *'listed in a collaborative practice agreement (CPA) and approved by the collaborating medical practitioner and authorised by The Director'* (Health Service Executive, 2012a, p. 1). Encouragingly, nurse prescribing in Ireland has continued to grow over the past five years with the role of the NP in the healthcare setting increasing in prominence and significance in keeping with international development (Cipher *et al*., 2006, Latter *et al*., 2010). As a result, nurse prescribing is generating an ever-increasing amount of rich clinical and patient information that needs appropriate management and analysis. Collecting and utilising nurse prescribing data correctly is, therefore, of major significance (Munsch, 2002) and considered by Dr. June Crown (Personal correspondence, 2010) as a significant opportunity that was missed in the UK.

Nurse prescribing activity in Ireland is monitored using data recorded in the National Nurse and Midwife Prescribing Minimum Data Set (MDS) which was funded and introduced to Ireland by the Health Service Executive (HSE) in February 2008, (Adams *et al*., 2010). The MDS is an electronic system that was specifically developed to collect nurse prescribing data and is a web-

based application used for the recording of prescribing information. The main purpose of the system is to allow *'each individual nurse and/or midwife prescriber to report on the number of prescriptions written by them and for which principal clinical indication over any specified time period'* (Health Service Executive, 2008b, p. 49). Each registered NP in clinical practice is required to use the system. The MDS contains data on 12 items that are listed below Table 4.1 screenshot of which can be viewed in Figure 1.1.

TABLE 0-1 ITEMS CONTAINED IN THE MDS

1. Prescribing site
2. Registered nurse prescriber (RNP) – personal identification number
3. Clinical area
4. Date
5. Shift
6. Patient- medical record number (MRN)
7. Prescribing mode
8. Clinical indication (prophylaxis, diagnosis or treatment)
9. Medicinal product
10. Dose
11. Frequency
12. Route

However, it should be noted that the HSE states *'it is not a prescribing system nor is it used to record clinical or patient information'* (Health Service Executive, 2008b, p. 51) even though patient medical record numbers and specific clinical sites are recorded. The benefits of introducing this system are set out in Table 4.2 (Health Service Executive, 2008b).

TABLE 0-2 BENEFITS OF THE MDS IDENTIFIED BY THE HSE

- Accessibility in any location with web access.
- The fact that the system is centrally administered and funded thereby, ensuring that there are no additional requirements on local information communication technology departments.
- Security and confidentiality of the system.
- Ability to retrieve any aspect of the information entered in the system using the search function.
- Ability to run standard reports on prescribing activity over a given time period.
- Transparency and comparability in relation to activity of prescribers.
- Functionality to prepare, print, export, save or email reports immediately when required.
- Capacity to export information, pre-formatted for analysis and research.
- A key resource for registered nurse prescribers to demonstrate their continuing competence within their area of prescriptive authority.
- An important mechanism for clinical supervision among registered nurse prescribers and the interdisciplinary team.
- Access to resources – journal articles and texts, related to prescribing including links to key websites
- A tool for use as the basis for undertaking an audit of prescribing activity.
- Links to other Registered Nurse Prescribers and the Office of the Nursing Services Director through the notice board section of the system.

(Health Service Executive, 2008b)

The system was also designed to allow for immediate answering of questions in relation to the prescribing practice *'either by using standard reports or the search and export function'* (Health Service Executive, 2008b, p. 55). However, one of the primary challenges to the effective use of health information technology (HIT) in the health care setting remains its adaptation and successful implementation (Sequist *et al.*, 2008). HIT may have limitations in its effectiveness because the management of clinical data for supporting patient care/direction is a complex endeavour that is highly dependent on appropriate management and accurate input of information to any new

system developed (Bose, 2003). Lapane *et al,* (2008) highlight the importance of careful attention to the details when implementing HIT, including active promotion of the benefits of these technologies, setting the appropriate sensitivity and specificity of the interventions and incorporating them into workflow and clinical activities in practice. This structured approach to the introduction of HIT in the form of the MDS was not followed by the HSE. Instead, a directive was issued to the clinical areas that the MDS would be introduced and was a compulsory part of the prescribing process. This was perhaps a somewhat restricted view of HIT, considering appropriate collection and management of such data can be useful to the health service. In order to track increasing consumer demands for quality care services that are cost effective and guides health services toward the potential of HIT to help *'lower health care cost, improve efficiency, quality and safety of medical care'* (Jamal et al., 2009, p. 35). These optimistic expectations are predicated based on the substantial role HIT already plays in improving health care internationally along with evidence from research undertaken (Ortiz and Clancy, 2003, Chaudhry *et al*., 2006, Bates and Bitton, 2010).

Anecdotal evidence was presented at a meeting with ABA in November 2011 that the MDS was having a negative impact on prescribing in the clinical setting and many NPs had stopped inputting data while others were inputting limited data to the system. In light of this, research was then undertaken to gain an insight into the NPs experiences of using the MDS in clinical practice.

4.2 Aim

The purpose of this qualitative descriptive study was to gain a better understanding of NPs' experience of the MDS in clinical practice.

4.3 Method

There are different research designs within qualitative research which include phenomenology, grounded theory, exploratory and descriptive (Burns and Grove, 2011) In this study, a qualitative descriptive approach was used to explore the research question as it was best suited to the study of human experiences and aimed to gain an understanding of nurse prescribers experiences of the MDS. Using this research method researchers describe phenomena about which little is known. From the data collected, patterns or trends that may emerge and possible links between variables can be observed but the emphasis is on the description of the phenomenon (Parahoo, 2006) The researcher stays closer to their data and the surface of the words and events than researchers conducting phenomenological, ethnographic, or narrative research (Sandelowski, 2000). Specifically, the goal of the research was to establish a comprehensive summary of events in the everyday terms of nurse prescriber's use and understanding of the MDS. This approach is well suited for researching topics about which little is known and yielding practical answers of relevance to health care practitioners (Sandelowski, 2010).

4.3.1 Design

A descriptive, qualitative design was adopted, which aims to provide a rich straight description of a phenomenon (Neergaard MA et al., 2009). In line with this study's objective of providing a truthful account of the nurse prescribers experiences, this design is less theoretical than some, which can be considered an advantage, as it allows for findings to emerge from the raw data without being restricted by imposed methodologies or predetermined theories (Thomas, 2003). The aimed was to stay as close as possible to the participants' descriptions of their experiences of the MDS with minimal interpretation (Sandelowski, 2010). Given that this was a descriptive study,

the interpretation was low inference, in that the findings were not described in terms of a conceptual or philosophical framework (Sandelowski, 2000). However, it did involve a degree of interpretation, as this cannot be avoided based on the underlying assumptions of interpretivism as a basis for qualitative research.

Qualitative descriptive research aims to help understand social phenomena in a natural rather than an experimental setting while emphasising the experience, attitudes, and views of the participants rather than providing measured answers to a question (Nieswiadomy, 2008). Qualitative descriptive research obtains data usually in the form of words, based on interviews that is focused on obtaining deep and meaningful information from small groups which fulfil certain criteria set out by the researcher (McCarthy G. O'Sullivan, 2008) and has the ability to assist with guiding future nursing practice (Barroso, 2010). A qualitative descriptive study was selected to allow the investigator to come to know and understand the experience of MDS, within the 'life world' of the nurse prescribers perspective The value of qualitative descriptive research lies not only in the knowledge it can produce, but the establishing of 'facts' about the MDS which ultimately rendered a summary and a 'straight description' of the events experienced from the nurse prescribers perspective in practice (Sandelowski, 2000).

To ensure the researcher addressed personal bias, a reflexive journal was started in which preconceptions were identified throughout the research process (Ahern, 1999). There were still '*grey areas*,' and as the researcher discovered, professional judgement was required to make decisions for which there were no clear guidelines or rules. The aim is to make the process of data analysis as visible and transparent as possible (Ortlipp, 2008). A strategy that can facilitate reflexivity, whereby researchers use their journal to examine '*personal assumptions and goals" and clarify "individual belief systems and*

subjectivities' (Ahern, 1999 p. 409) claiming to create transparency through knowing and exposing the self through reflective journal, is also subjective. This research project was primarily interview-based and therefore it was the main '*instrument*' of data collection. Reading about the role of the researcher was thus in relation to the role of the researcher as interviewer.

Qualitative studies almost always use small, non-random samples. The basis for sampling in phenomenology is that participants have experienced the phenomenon under investigation and are willing and able to articulate their experiences (Corben, 1999). According to Polit and Becks (2012) qualitative researchers begin the process with a specific sampling question in mind: Who would be an information rich data source for my study? With this in mind a purposive sampling strategy was employed in this study to ensure experiences of the phenomenon to be researched (O'Rielly and Kiyimba, 2015) and a representation of the different levels of nurse prescribers experiencing the phenomenon were also included in the sample.

4.3.2 Inclusion exclusion criteria

Inclusion criteria - participants were required to have completed the nurse prescribing programme, have registered with the Nursing and Midwifery Board of Ireland, currently working for the Health Service Executive (HSE) which mandated all prescriptions be entered onto the minimum data set.

Exclusion criteria – nurse prescribers not registered with the Nursing and Midwifery Board of Ireland and employed outside the services of the HSE

4.3.3 Ethics considerations

A research proposal was submitted for examination by the Regional Clinical Research Ethics Committee (CREC) Cork. The study met the research governance criteria and approval to undertake the study was granted (Appendix 4).

4.3.4 Participants

Purposive sampling was utilised to recruit participants who had experience of the phenomenon of interest in order that a rich and dense text might be generated (van Manen, 1990). In particular, the participants were accessed through the practice development coordinators across a number of organisations in the HSE throughout the south of Ireland. The twelve participants interviewed were of different age groups, from different clinical backgrounds, and held positions from staff nurse to advanced nurse practitioner that permitted an in-depth understanding of the lived experience of inputting data to the MDS in clinical practice.

4.3.5 Data collection

The interviews were conducted in February-April 2012 with NPs who met the inclusion criteria of having experience of the phenomena. During the interview, a broad opening question requested the participants to *'reflect on their knowing-in-practice'* (Schon, 1991, p. 61) of the MDS. From this initial question, additional questions emerged naturally.

4.3.5.1 Interviews

Semi-structured interviews facilitated data gathering with the process informed by a single open-ended question *'What is your experience of using the MDS in practice?'* to commence the interview. This provided a starting point but additional questions were allowed to emerge naturally from the dialogue. A list of core questions was utilised if the participant did not address specific areas in revealing their experience of using the MDS in practice (Appendix 5). The researcher also availed of the opportunity to probe the meaning of the experience for that individual, thereby facilitating a deeper understanding of the experiences, thoughts and emotions of the participant. In addition, the researcher needed to be flexible during the interview process to account for additional topics and a dynamic conversational exchange. It needed to be borne in mind that the interview is reciprocal with both researcher and research subject engaged in the dialogue.

The use of semi-structured interviews is believed to provide a 'deeper' understanding of social phenomena than would be obtained from purely quantitative data gathering methods, such as questionnaires (Silverman, 2004). There are three fundamental types of research interviews: structured, semi-structured and unstructured. The choice between different interview methods is often dictated by fundamental concerns such as whether the premise of the research is inductive or deductive (O'Rielly and Kiyimba, 2015). Semi-structured interviews used in this study consisted of one key question that helped to define the areas to be explored, but also allowed the interviewer or interviewee the latitude to diverge in order to pursue an idea or response in more detail (Britten, 1999). This flexibility, particularly compared with structured interviews, allowed for the discovery or elaboration of information that is important to participants but may not have previously been thought of as pertinent by the research team. In this way interviews are not natural tools for gathering data but are active interactions (Fontana and Frey, 2003) and therefore it is important to appreciate the

researchers place in the production of the data (Potter, 2002). The type of questions asked, the way in which those questions are asked and the relationship between the interviewer and interviewee shaped the outcome (O'Rielly and Kiyimba, 2015). However, one needed to bear in mind the comments of Fontana & Frey (2005) who highlighted that ambiguity is imbedded in the spoken and written word no matter how carefully questions are worded, asking questions and getting answers is a much harder task than it may at first seem.

The interview process incorporated the principles that aimed to reduce the traditional, hierarchal relationship between the researcher and research participant by such means as mutuality, dialogue (Lather, 1991) and building trust (Oakley, 2013). To maintain consistency, all of the interviews were conducted by one researcher.

4.3.5.2 Pilot interviews

Two NPs (one from primary and one from secondary care) were invited to take part in the pilot interviews as it was important to have representation from both sectors Gerrish and Lacey (2006) suggested pilot studies provide a valuable opportunity to see if the proposed overarching interview question is relevant and appropriate. Therefore, the question was used to commence the interview was *'Tell me your experience of using the MDS in practice'.* Talk developed naturally, leading from one topic to the next in the participant's response. As the interview continued, the information revealed by the participant addressed the specific areas of interest on the topic to the researcher. A final check of the question schedule towards the end of the interview picked up just one topic that had not arisen from the interview. At the second pilot interview, the interview began once again with the overarching question, *'Tell me your experience of using the MDS in practice'*. It was soon apparent that the subsequent questions to be asked by the

interviewer were addressed automatically by the interviewees once they began discussing their experiences of the MDS in practice in fact, all the areas included in the interview schedule were at some point discussed during the interview by the participant without additional prompts. This approach felt comfortable and the pilot interviews gave the researcher a valuable opportunity to practice their interview skills in advance of conducting the formal interviews. However, the researcher needed to be aware that questions may evolve as interviews progressed.

The pilot interviews for the MDS study lasted 35 and 40 minutes respectively. There was an interruption to one interview because the bleep was activated. This raised the researcher's awareness to ensure time allocated to interviews was adequate and flexible to accommodate the possibility of such an incidence with the remaining interviews to be undertaken.

Prior to the interviews, all participants were provided with information sheets detailing the purpose and nature of the research and had the opportunity to ask the researcher any questions. Informed consent was obtained and forms were signed in addition the possibility of re-negotiating consent was discussed. Consent form and the participant information sheet have been included in appendix 6. Confidentiality was assured and the right to withdraw at any time during the investigation, without prejudice, was guaranteed. The interviews were digitally recorded and later transcribed verbatim by the researcher to ensure the experience as described by the participant was accurately captured. The strength of emotion regarding some issues was identified by noting recurrence of key statements and themes.

4.3.6 Data analysis

Sandelowski (2000, 2010) noted that in a qualitative descriptive design there may be overtones from other methods. While this is a qualitative descriptive study there are elements of phenomenological overtones as noted in the use of Colaizzi's (1978) method of data analysis. This method *'remains with the human experience as it is experienced, one which tries to sustain contact with the experience as it is given'* (p. 53). Colaizzi's method does seek to describe the phenomenon of interest but facilitated an account of the facts of the experience (Sandelowski, 2000, Truglio-Londrigan, 2013). A series of steps was employed to accomplish this (see table 4.3). Each participant's transcript was read as a whole to gain a sense of the experience. Meaning statements were clustered into common themes and again referred back to the original commentary for validation, thus ensuring that only the participant's perception was captured. In following the principles of data reduction, all themes were included until a description of the experiences of the nurse prescribers as a whole was obtained. Significant phrases were extracted. These phrases revealed categories, themes and subthemes. Individual findings were presented to participants for validation, leading to confirmation and/or additional questions at the end of the process. In addition, checks with my research supervisor were also conducted which determined agreement about categories, themes and subthemes. Throughout the analysis the investigator also returned to the literature to clarify and expand upon findings. The investigator, however, had no preconceived notions as to specific facts of this experience or the events and stayed with the data as presented by the participants.

TABLE 0-3 COLAIZZI'S FRAMEWORK

1. Each transcript should be read and re-read in order to obtain a general sense about the whole content.
2. For each transcript, significant statements that pertain to the phenomenon under study should be extracted. These statements must be recorded on a separate sheet noting their pages and lines numbers.
3. Meanings should be formulated from these significant statements.
4. The formulated meanings should be sorted into categories, clusters of themes, and emergent themes.
5. The findings of the study should be integrated into an exhaustive description of the phenomenon under study.
6. The fundamental structure of the phenomenon should be described.
7. Finally, validation of the findings should be sought from the research participants to compare the researcher's descriptive results with their experiences.

(Colaizzi, 1978)

Thematic analysis allowed the researcher to report the experiences of the study participants which were captured during the interview process. Specifically, thematic analysis is a method for *"identifying, analysing and reporting patterns (themes) within data. It minimally organises and describes the data set in (rich) detail'*. However, frequently it goes further than this, and *'interprets various aspects of the research topic."* (Braun and Clarke, 2006 p. 79). Thematic analysis is flexible and what researchers do with the themes once they uncover them differ based on the intentions of the research and the process of analysis. While researchers debate whether thematic analysis is a complete '*method*' per se, it is a process that can be used with many kinds of qualitative data, and with many goals in mind. The aptness being it does not ascribe to any particular epistemology or discipline (Braun and Clarke, 2006). Therefore, the researcher considers it would be suitable and beneficial for

inclusion in this study. To direct the thematic analysis Colaizzi's framework was used. It included understanding the data and identifying significant statements which in turn were converted into formulated meanings. The results were then integrated and exhaustive description reduced giving a fundamental description which was returned to the participants for validation. An overview of this process is set out in Figure 4.1

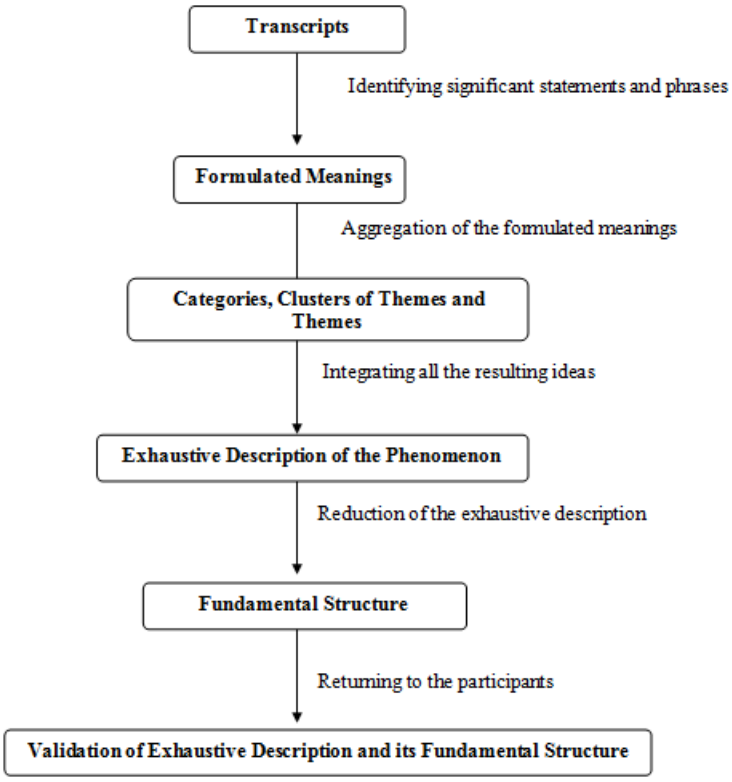


FIGURE 0.1 OVERVIEW OF COLAIZZI'S PROCESS

(Abu Shosha, 2012)

The framework entailed following the steps that represent Colaizzi's process for qualitative descriptive data analysis (Sanders, 2003, Speziale and Carpenter, 2007) that are set out in more detail as follows:

Step 1- Gaining a sense of the transcript

The researcher conducted and transcribed each of the interviews personally which helped gain a sense of the experience of each participant. As suggested by Colaizzi (1978) the narrative was listened to and re-read several times to gain a sense of the whole content. During this stage any thoughts, feelings and ideas that arose by the researcher due to previous work with NPs were added to the reflective journal. This helped the researcher maintain focus on the participants lived experience. To ensure accuracy the transcriptions was checked by a second researcher.

Step 2 – Extraction of significant statements

Transcripts were read and re-read to identify the participant's experience of using the MDS in clinical practice. Undertaking this process according to Colaizzi (1978) helped identify and extract significant statements from the transcripts that detect each participant's knowledge of the lived experience. Significant statements were highlighted on each page of the transcript and colour coded depending on the statement and how it related to the phenomenon. Following this each statement was extracted from the transcript retaining the transcript, page and line number and pasted to a separate document. Although there are a number of computer programmes available to analyse qualitative data the researcher chose to analyse and extract the significant statements manually with the help of MS word. This process also facilitated further immersion in the data. The 12 transcripts revealed 273 significant statements. Table 4.4 provides examples that were identified and extracted from the NP data

Step 3 – Formulation of meanings form significant statements

At this stage Colaizzi's process (1978) endorses that the researcher formulate a more general summary of meanings for each significant statement extracted from the transcripts. It is essential to bracket when analysing phenomenology data using a Husserlian approach who states that it is only when this has been accomplished that more specific investigations can begin (Husserl, 1960). In addition to maintaining a reflective journal the researcher engaged in discussion with an outside source to ensure there were not harmful effects of unacknowledged preconceptions related to the research (Rolls and Relf, 2006). Once presuppositions had been stated and set aside in so far as is possible each significant statement relating to the phenomenon was studied carefully to determine a sense of its meaning. This required working back and forth between significant statements and original transcripts to ensure there was no misinterpretation of the information.

Step 4 - Sorting formulated meanings into categories

Once the meanings were formulated for each of the significant statements the next step was to organise the meanings into clusters of themes. From the description of the phenomenon 273 statements of significance were identified and arranged into 54 theme clusters which were then collapsed into eight emergent themes. At this stage groups of cluster themes were grouped together to form a distinctive construct of themes.

Step 5 – Exhaustive description of the phenomenon

The fifth stage of Colaizzi's Process (1978) advises the researcher to integrate all the emergent themes into an exhaustive description of the phenomenon. After merging all study themes, the whole structure of the phenomenon '*The impact the MDS has on the nurse prescribing processes'* had been extracted. The narrative analysis was described and returned to the

researcher supervisor who double checked the exhaustive description for validation.

Step 6 – Describe the fundamental structure of the phenomenon

In this step Colaizzi (1978) advises that the exhaustive description be reduced to an essential structure. A reduction of finding was performed in which redundant, misused or overestimated descriptions (Abu Shosha, 2012) were eliminated from the overall structure. Overall themes identified together with the discovery of challenging comments refined the data on the NPs experience of the MDS.

Step 7 – Validation of findings by participants.

The final validation of the data analysis involved returning to the participants for review to ensure the content represents their experiences. It was not physically possible to interview all participants again therefore a hard copy of the findings was sent to each individual for comment. Initially feedback obtained via email from two participants indicated that the information contained in the transcripts was accurate and reflected their experience of the phenomenon. Reminders were sent to the remaining participants however, only one additional comment was received. All three comments identified satisfaction with the study findings as reflective of their feelings and experiences of using the MDS.

An example of the significant statement, formulated meaning, theme clusters and emergent themes have been derived from the transcripts of raw data and are presented in Table 4.4. The overview offers a perspective for understanding the complex, variant and changing ways in which nurse prescribers experience the MDS in practice.

TABLE 0-4 SAMPLE OF WRITTEN DESCRIPTORS AND THEMES

Significant statements (Random selection from interviews)	Formulated meaning form significant statements	Theme clusters	Emergent themes	Phenomenon
Interview 3 (86-95) I don't really know why we have the MDS because as I was saying I only put in what tablet I prescribed I never record what I have done before that. Say if there was a kidney infection you would have the urinalysis, you know you might have an awful lot of work done before you decide to prescribe. Then you just write down the tablet you never say…I never write down why I am giving a particular medication. Or I might assess the patient and discontinue a medication and that's not recorded anywhere. Even if you are recharging PRN drugs the patient has to be assessed and that's not recorded either. **Interview 7** (59-61) Just to make a long story short I fine the MDS totally of no use to me personally and I suppose this sounds awful but we often wonder what it's for. I tried contacting the HSE but got no satisfaction **Interview 2** (54-57) It (the MDS) works well but I don't feel that the HSE data base captures the right information.	• Lack of information regarding the MDS provided to the nurse prescribers • Unable to input the data considered appropriate because of choice limitations. • Specialty requirements not facilitated by the database or recognised by the HSE. • Discontinued meds cannot be recorded. • The rationale and decision making for prescribing not captured. • The MDS database is poorly designed.	Capture of appropriate information The prescribing process is more complex than writing a prescription	Communication	**The impact the MDS has on the nurse prescribing process**

Interview 7 (54-59) At the moment the MDS is absolutely of no value for audit purposes to me. I absolutely do not input all the data and I cannot say that the information is accurate or up to date. I think the last time I inputted data was nearly 8 months ago. I'm embarrassed to say. Also access to a computer is limited here in our hospital and very slow so entering prescriptions takes so much time. **Interview 6** (78-82) There is a lot in prescribing and the MDS does not reflect that workload. As I said you just input the patient's name, date the drug you prescribe, dosage and the reason why which is very limited choice and that's all that is on the database. Everything I do for the patient is recorded in the chart. This is only duplicating all my workload.	• The MDS is a bottleneck for prescribing. • Access to computers is limited and infrastructure poor • Duplication of information increases workloads. • The MDS is not a priority in practice. • The MDS is an inaccurate reflection of workload. • Nurses do not have an issues with prescribing, just the MDS • Prescribing is very beneficial but not streamlined	Database problems Fit for purpose	Workload and time	**The impact the MDS has on the nurse prescribing process**
Interview 3 (55-58) There are four prescribers here and one I know does not input any data to the MDS but I don't know about the others. So the MDS is not a true representation of the prescriptions written here. **Interview 3** (74-80) There is an awful lot of repetition do you know between the nursing notes and the medical notes…it's just time consuming. I don't have time to input the prescriptions I write down on the sticker (patient stickers from notes)	• Not all prescriptions written are inputted onto the database. • The MDS is an unreliable source of information for staff and the HSE.	Effectiveness of the MDS	Attitudes and behaviour	**The impact the MDS has on the nurse**

what I prescribe, date and time. I could have about 5 or 10 of them in my pocket or they could be gathering for two or three weeks or more in my locker. I know they say make time but it's hard. I don't input all of the information to the MDS. May be down the line if they are doing an audit or something but, like I say it won't reflect what we are prescribing on the wards and I don't know why we have it at all. **Interview 7** (25-28) My prescription record is better viewed through the records kept here in this hospital, so if anyone wanted to look back or ask about a certain prescription I would have a record of it.	• Separate recording systems are developed in practice to meet clinical needs. • Relevance of MDS information in practice is not obvious.	Accuracy of information	**prescribing process**

4.3.7 Rigour

Qualitative studies need to demonstrate different standards of rigour than quantitative studies. According to Lincoln and Guba (1985) the criteria for rigour in qualitative research are to be expressed as trustworthiness and their credibility, transferability, dependability, and confirmability. Techniques used to meet criteria for trustworthiness were (1) peer debriefing, which ' *is a process of exposing oneself to a disinterested peer in a manner paralleling an analytical session and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer's mind'* (Lincoln & Guba, 1985 p 308); (2) when the researcher derives themes from one interview, the themes will be checked against other transcripts to ensure they also appropriately indicated within the content of these interviews; (3) member checks, in which participant are asked to validate emerging themes and confirm accuracy of findings (Colaizzi, 1978 (Step 7), Lincoln & Guba, 1985); and (4) an audit trail of the systematic process were made to allow transparency of decision-making. Similar steps are identified in Ryan *et al*. (2007) and Tong *et al.* (2007) to ensure rigour is addressed.

4.4 Results

Three main themes emerged from the analysis of the data, each of which is elaborated on in this section. While the themes are distinctive and demonstrate that the NPs recognise and identify benefits and challenges to inputting data, they also had reservations about the effectiveness of the MDS and its use in the clinical setting.

4.4.1 Theme 1 - Communication

The most immediately apparent issue for all participants was communication that was perceived as inadequate between the HSE (decision-makers) and the NPs (participants), and which seemed to be controlled by the HSE. In particular, nurse prescribers explained how the lack of communication regarding the MDS caused frustration because the challenges experienced with inputting data in the clinical setting were not acknowledged or recognised. The situation was further compounded by the fact that when the HSE introduced the MDS in 2008, NPs were clearly informed that the initiative would be revisited after one year. When this did not transpire, participants sought guidance from colleagues, Nurse Practice Development Coordinators and Directors of Nursing on how to manage the issues encountered with the MDS.

'...so I was under the impression from the first ehmm...nurse prescribing course (2007) that it would be a year that we would have to input the information on the MDS then it would be reviewed...and I or my colleagues never heard anything about it being reviewed since then…So, I stopped inputting data in 2010. I did contact the HSE via email and tried to make phone contact but I got no reply. ….the nurse practice development coordinator fed it back nationally that there were issues with the minimum data set and prescribers in her site were stopping inputting data for that reason…we heard nothing'.

(Nurse Prescriber 1)

'I made phone calls and sent email to the HSE regarding issues I had with the MDS but I got no reply…I just didn't have the time to keep contacting them'.

(Nurse Prescriber 6)

In addition, participants reported that a properly structured communication system was a priority for NPs to facilitate them in foreseeing and adjusting their responses to the prescribing process including the data monitoring system. The lack of response to emails and phone call queries by the HSE raised even more questions by the nurse prescribers.

'…why be monitored so closely…we are autonomous in our practice and we are able to make decisions that we can stand by and there are no mistakes being made by nurse prescribers?'

(Nurse Prescriber 8)

'…I have no other issue with prescribing just the MDS and the restrictiveness of it'.

(Nurse Prescriber 1)

Failure by the HSE to respond to direct queries by the participants was interpreted by participants as the HSE having a limited understanding of the NPs role and additional workload which means their contributions appeared to be unrecognised and undervalued. The task of reporting on each prescription written by inputting the information into the MDS is now questioned by the majority of participants to its value and accuracy, considering four of the participants do not input any data and five of the participants only input data on a proportion of prescriptions written. In fact, NPs voiced concerns that the end user and technology did not interact to achieve a common goal and having the means to record nurse prescribing data on the MDS does not mean that it will actually be done.

'I discussed it (MDS) with colleagues and other advanced nurse practitioners everybody had the same gripe that it was of little value to the clinical area and patient'.

(Nurse Prescriber 2)

'Prescribing is really valuable to my work…I absolutely don't input data to the MDS and I cannot say it's even accurate, or up to date I think the last time I inputted data on it was nearly eight months ago…I know from talking to other nurse prescribers I am not the only one not inputting data'.

(Nurse Prescriber 7)

It was important for NPs that they felt able to trust and have confidence in the nurse prescribing structures, particularly communication managed by the HSE. As the role of nurse prescribing develops, it has become clear to participants that the absence of established structures for exchanging information constitutes a one-way communication structure that does not facilitate the communication of clinical issues which impacts on nurse prescribing back to the HSE.

'…the MDS is causing a terrible bottleneck …the unfortunate thing about it is that it is actually affecting patients and prescribing'.

(Nurse Prescriber 6)

4.3.2 Theme 2 - Workload and time

Having the time to prescribe was a concern for all participants because of the impact of the moratorium on recruitment employed by the HSE in 2009. Resulting problems identified by the participants included frontline disorder, staff shortages, rising patient waiting lists, ward and bed closures, and increased trolley numbers in emergency departments. The research participants' views suggested that they have to satisfy unrealistic expectations by coping with an unacceptable working environment to meet the HSE's financial targets. Assessing and meeting the more complex health needs of patient medications requires time and participants reported difficulties because of increasing reductions in staffing levels and time available to complete their work in the clinical setting.

'…when I do prescribe it's time is an issue… I can't spend a whole lot of time with the patient because the next patient is waiting on a trolley'.

(Nurse Prescriber 2)

'If I have 10 minutes to spare, inputting data to the MDS is not a priority by no means there is a way more to do and this (the MDS) is down at the bottom of the list really to be honest.'

(Nurse Prescriber 3)

The components of stress and workload balance highlighted by participants tend to relate to excessive work, rather than challenging care situations. The participants' cognisance of their workloads was defined in terms of time spent on conducting assessment, administration issues

(documentation) patient communication and education. Several issues were identified as increasing workload problems. The issue highlighted most was duplication of documented information regarding prescribing.

'There is a lot of repetition, like I would have to document in the medication chart first, then the nursing notes, then the medical notes and by the time you get to the MDS it comes down to whether or not I have time to input data'.

(Nurse Prescriber 3)

'… the MDS is not a true representation of the prescriptions written here so we keep our own records of prescribing…I don't like the MDS because I don't use the information for anything'.

(Nurse Prescriber 3)

Because of time and workload constraints, narrow parameters of the data system and incomplete entry of data to the MDS, NPs now identify the MDS as inaccurate and time consuming with little benefit for practice, patients or audit purposes. This situation has resulted in the development of separate audit structures being put in place depending on the local requirements.

'the database provides you with none of the quality indicators I feel support best practice in relation to prescribing…I use an auditing tool we devised here in the hospital for auditing my prescribing now, not the MDS'.

(Nurse prescriber 4)

'…I can imagine what ever data is pulled off it if it is looking at reflection of numbers of nurses prescribing I can tell you now it is not accurate…the data is absolutely skewed and flawed…I do not use it for auditing.'

(Nurse Prescriber 7)

'*the data on the MDS is flawed and does not capture information on diagnosis, comorbidities, or drug interaction and should not be used for reports or research'.*

(Nurse Prescriber 8)

At present, NPs feel there is limited understanding of their role and the additional workload of the prescribing process that is taken on in addition to an already full clinical workload. Whilst some participants felt that having a means of identifying when NPs were becoming overburdened was important, others felt that there was the additional element of valuable data loss which contributed to the negative reaction to the MDS that needed to be addressed.

'*…it is totally of no use to me personally (MDS)and I suppose ahmm...this sounds awful but we often wonder what it's for I wonder what it's for…but I do feel there is valuable data that needs to be captured and used more appropriately'.*

(Nurse Prescriber 7)

Now that participants are experiencing the MDS as an obstacle with little perceived value, their motivation appears to be challenged.

'…I think the MDS is overkill and is not of any benefit to the prescriber or patient…if I didn't have the MDS in place I would be more inclined to prescribe for patients'.

(Nurse Prescriber 6)

Comparisons were also made between the prescribing process in place for nurses and those for doctors. As doctors are not required to input their prescriptions onto a database, six respondents felt it was more time efficient to get the doctor to prescribe.

'The main problem I have is the time it takes and….doctors don't have to do it (input data) so I just ask them to prescribe it's easier'.

(Nurse Prescriber 8)

4.4.3 Theme 3 – Attitude and behaviour

In general, participants' attitudes to NP were very positive and they agreed that having prescribing rights improved continuity of care and delivery time for patients. However, the impact on their own workload did cause them concern because they did not experience any significant change to work arrangements to accommodate the prescribing process once registered as a NP.

'The extra work prescribing generates is always in the back of my mind…and controls my decision to prescribe or not, yes it's a big element of my decision to prescribe'.

(Nurse prescriber 5)

The same participant avoided prescribing complex medications or taking on high-risk patients because of their inability to take on the extra workload. *It's (MDS) stopping patient care and that's not what nurse prescribing was about in the first place. The MDS is defeating the purpose of prescribing for me'.*

(Nurse Prescriber 5)

NPs appear to react to their environment in an evaluative fashion and, the structures of the prescribing process that are controlled by the use of standards, policies and improved patient outcomes. This was perceived by many participants as a reliable impetus for the administration of a medication in a safe, consistent and structured manner for clients/patients.

'…with nurse prescribing organisational policy in place we are within our own comfort zone and have the knowledge base… that's good'.

(Nurse Prescriber 4)

It was important for participants that they continued to trust the structures in place that support NP. Consequently, they expressed concern regarding the process of evaluation and lack of representation from their clinical areas for such procedures. In particular, participants felt that NPs views on structures in place and relevance of these structures to patients and practice was central to the future development as nurse prescribing was becoming a stressful experience in some clinical situations.

'... I am very happy to prescribe, I am very happy to do the assessments I just find the MDS is a complete waste of my time, I find very stressful…and you see there is no benefit in it for me.'

(Nurse Prescriber 10)

However, participants found it is difficult to align their thoughts and actions with the expectations and change experiences within the HSE because of its state of continuous flux. In fact, each nurse prescriber's unique understanding of what change is, or what change represents, seems to add to the formulation of attitudes and reactions to change in the clinical setting. This situation appears to be causing considerable frustration to the research participants and the prescribing process.

'Prescribing can be very frustrating because it's such a good course and you learn so much…in fact it is the best course I have ever done …it's just

so frustrating when you can't use it more…it (MDS) even stop you from extending your CPA (collaborative practice agreement)'.

(Nurse Prescriber 11)

'I get very stressed out about it, I worry about not filling it, I just do not …absolutely not have any time in my working week even to consider putting data into the MDS'.

(Nurse Prescriber 7)

Participants felt that role overload and expansion of duties without clear description was causing problems for them as prescribers. The extra time that it takes to write the prescription and subsequent documentation does have

its costs to patients, and participants would like to see role expansion and increased work load offset with sufficient support. In addition, participants felt that they were in a good position to identify and resolve underlying systemic issues and offer ideas for possible resolution to issues encountered with the MDS.

'…I thought the MDS was to be in place for one year and then it would be reviewed, but that was six years ago… and like any new initiative there are things that work and things that don't but no one came back to the prescribers using the system(MDS) to find out what they were'.

(Nurse Prescriber 6)

Many participants felt that reassessment of the MDS in consultation with NPs is required in order to ensure that valuable nurse prescribing data does not continue to be lost.

'…I would say having the right to prescribe is very beneficial but the MDS stops me from prescribing'.

(Nurse Prescriber 12)

'…nurse prescribing is the greatest thing I have experienced in years and years ...it's brilliant…but I have so many issues with the MDS'.

(Nurse Prescriber 10)

These quotes demonstrate the importance of nurse prescribing and the negative attitude developing toward the data gathering initiative in the

clinical setting. The MDS appears to be creating a negative attitude to prescribing because the participants cannot see the benefit of results considering the time that is required to input the data onto the system.

'…the (MDS) information is not beneficial and the way I look at it now is …if I didn't have the MDS in place I would be more inclined to prescribe for patients'.

(Nurse Prescriber 1)

4.5 Discussion

Findings indicate that participants believe prescribing rights for nurses is of significant benefit in the healthcare service, results that are comparable with those identified in other settings where nurses prescribe medicines (Avery, 2004, Latter et al., 2005, Courtenay and Berry, 2007a, Stenner and Courtenay, 2008, Courtenay et al., 2010b, Bowskill et al., 2012). However, findings also provide insight into some of the concerns and anxieties nurse prescribers had regarding data recording that has been described by the HSE as a 'mandatory' part of the prescribing process. Factors identified that contribute to these anxieties and concerns are.

- The Minimum Data Set (Perceived value)
- Communication
- Staffing levels
- Time and workload

Since commencing this research the HSE has undertaken a review of the data collection system (Health Service Executive, 2014a) the main challenges of the system were identified as time constraints, additional work, deterrent to prescribing, inaccurate statistics published, benefit of the database. Perhaps these challenges identified are better understood in the context of the HSE National Implementation Report (Health Service Executive, 2014b) which states 1067 nurses and midwives have been funded to undertake the NP programme to date. However, the numbers of registered nurse prescribers in the country as of March 2014 was 772 equating to 72.3% of the nurses and midwives who have been funded and completed the education programme since April 2007. Significant repetition of information appears throughout this bi-monthly report (Health Service Executive, 2014b) and information gleaned from the data strategy provides little or no benefit to the prescriber, organisation or patient, considering the time and effort spent on inputting data. More significantly, my results find that the database does not capture important data on diagnosis, patient age, co-morbidities, drug interactions or discontinuation of drugs that could be cross-referenced to inform practice and policy. Participants acknowledged this from their concern that the database end-user and technology do not interact to achieve a common goal. Perhaps the independent lists contained in the data and identified by O'Halloran (2010) as not structurally designed to generate queries need to be addressed before the data are viewed as valuable in the clinical setting. NPs have moved beyond the simplistic presentation of prescribing data in the National Implementation Report (Health Service Executive, 2014c) to now understanding that recorded prescribing data is information that could be valuable to inform their decision making and guide quality improvement. Perceived and real inefficiencies in the MDS encouraged the nurse prescribers to use *'workarounds'* (Lawler *et al*., 2011). These are locally-constructed paper-based alternatives that meet their clinical needs and goals more efficiently and effectively. While the

'*workarounds*' may benefit the nurse prescriber they are also a manifestation of the incompatibility with the MDS and clinical requirements. Resolving competing demands by managing nurse prescribing data using *'workarounds'* creates new pathways of documentation that must now be cross referenced with the MDS to fully understand the challenges of nurse prescribing in practice. NPs identified that their prescribing workload is under represented in the MDS, a fact that is supported by the National Implementation Report (2014c). Considering the source of the data, findings from this research would dispute the accuracy of these figures which are, in fact, a serious under-reporting of the actual prescribing for this time period. The dramatically reduced HSE nursing staff levels by 5,197 in the last five years (O' Regan, 2013) further support concerns regarding unacknowledged workloads. These figures, together with my results, imply that clinical workloads have been increased substantially since the introduction of nurse prescribing to the clinical setting without consideration for altering existing arrangements or roles. Difficulties in adapting to such demands on time in the clinical setting appeared with nurse prescribers reducing the numbers of prescriptions written, asking the doctor to prescribe, not expanding their collaborative practice agreement to add new drugs or simply not prescribing. Whilst participants believe that prescribing is very beneficial, these difficulties have caused stress for the NP which is now becoming an inhibiting factor to the initiative making it unattractive, problematic and leading to a non-supportive attitude (Vakola and Nikolaou, 2005). However, participants were also aware that smart use of prescribing data and information is an important component of creating a responsive system that contributes positively to the nurse prescribing initiative and provides opportunity to improve health in terms of both quality and cost. Having access to good data that are accurate, reliable and consistent, reflects what is really happening in practice with nurse prescribing. Interpretation of these data then determines the most appropriate interventions to address the

issues/problem identified in the study. Participants have revealed an insightful understanding of the nurse prescribing processes and are well placed to select the most appropriate interventions to establish implementation strategies in collaboration with the HSE to improve workload issues in their particular clinical setting.

Evidence from this research finds the MDS is designed to meet different needs than those of the local clinical areas, making it difficult to implement. This in turn results in reduced productivity and access to nurse prescribing information that is a critical component of future patient care and safety. The task for the HSE is to re-evaluate the design of the MDS to ensure benefits significantly outweigh the disadvantages clearly communicated by the research participants.

4.6 Conclusion

The concept of the MDS has potential valuable and NPs recognise the integral connection of nurse prescribing data to evidence-based practice and the role both those components play in clinical decision making, nursing research, professional development, operational effectiveness, and ultimately, the patient-nurse relationship. However, nurses need to be actively involved in the MDS, so the right information and knowledge required to support care is targeted and the transition from informed patient care to patient informed care is developed to improve prescribing expertise.

The role of the NP is clearly an important element of future healthcare, and issues surrounding workload management, and communication needs to be addressed by the HSE to guarantee appropriate and accurate management of nurse prescribing data. Time and resources need to be invested to improve

information management as demonstrated by international research in the long (term see section 4.1).

The paradox for NPs at present is that on one hand they are a service that is valued by patients and, on the other, a disenfranchised, overworked and undervalued group of staff within the health organisation. Further investigation into the unregistered nurse prescribers who have successfully completed the education programme is required to understand if the impediment extends beyond the MDS.

Acknowledgment

The author would like to thank the nurse prescribers who generously gave of their time to participate in the interviews for this study.

Publication of this chapter can be viewed in appendix 7.

CHAPTER 5 IRISH/UK QUESTIONNAIRE: UNDERSTANDING THE PARALLELS BETWEEN NURSE PRESCRIBERS IN IRELAND AND THE UNITED KINGDOM USING A SURVEY STUDY DESIGN

Chapter 5 – describes a survey which was designed to understand how nurse prescribers in Ireland compare with their counterparts in the United Kingdom. Completed questionnaires were analysed using descriptive statistics.

[9] Understanding the Parallels between Nurse Prescribers in Ireland and the UK using a Survey Study Design. Creedon R., Kennedy J., Byrne S. & McCarthy S. (2015) International Journal of Nursing Studies - Under review

5.1 Introduction

Since the introduction of nurse prescribing to the Irish healthcare setting in 2007 there has been significant changes experienced within the health service making the outcome of the initiative difficult to predict. Evidence from existing research is focused within the country (Drennan *et al*., 2009, Naughton *et al*., 2012) and does not give an indication of how nurse prescribers in Ireland compare with international counterparts.

Following the introduction of prescribing authority to the Irish setting the nurses' professional role has expanded considerably. In particular, prescribing authority has expanded the core function of nursing and, as a result, significantly extends the horizons for the future of the nursing profession in Ireland, (Creedon, 2010b). Today, nurse prescribing is considered an essential part of nursing practice in our health service nationally (Drennan *et al*., 2011) with 772 nurses and midwives registered to prescribe medications producing 34,688 prescriptions for 27,405 patients during the year 2014 (Health Service Executive, 2014b).

In the United Kingdom (UK) expansion of nursing practice to include prescribing authority began in 1994 and has developed steadily in the interim. During 2010, nurse prescribing across the UK produced 12.8 million prescriptions (RCN, 2010). Similar to Ireland, nurse prescribing in the UK is an independently registerable qualification that complements a more patient-centred way of working that emphasises an integrative approach to care delivery at primary, secondary and tertiary levels within the health services. Emphasis is also placed on quality, standards, education and ongoing evaluation of the prescribing initiative which has challenged traditional approaches to nursing care (Bradley *et al*., 2007) that were previously based on tasks, rituals and workforce division (An Bord Altranais, 2012a, RCN, 2012).

However, international differences between legislative procedures and professional bodies responsible for the regulation of nurse prescribing have

resulted in the implementation of several models of prescribing worldwide (An Bord Altranais and NMPDU, 2005, Kroezen *et al*., 2012). The two models most often discussed in the literature are independent and supplementary nurse prescribing with each role having clear directives (Courtenay *et al*., 2007c, Kroezen *et al*., 2012). The independent prescribing model is autonomous allowing NPs to diagnose and prescribe without direct medical involvement in the process. The supplementary prescribing model is based on a voluntary prescribing partnership between the doctor and the nurse once the patient has been diagnosed by a doctor.

In Ireland the independent nurse prescribing model is used to facilitate prescribing using a limited number of medicines that are listed in a collaborative practice agreement (CPA). Each NP develops their own CPA that specifically outlines the medicines for their practice area and which are approved by the Drugs and Therapeutics committee, medical consultant and representatives from the health care setting, usually the Director of Nursing or relevant manager. The CPA can be adjusted at any time depending on the service needs but as part of the national evaluation in 2009 (Drennan *et al*., 2009) it was recommended to consider phasing out the CPA. The supplementary model of nurse prescribing utilised in the UK is not supported in the Irish setting because there was a concerted effort to move away from protocols already in place in practice.

Outcomes of new nursing initiatives are often difficult to predict with certainty. While many nurses acknowledge that prescribing authority is fast becoming an essential part of clinical practice, there are others of the opinion that restrictive structures in place for nurse prescribing does not allow the role to reach its full potential (Ross and Kettles, 2012, Coull *et al*., 2013, Creedon *et al*., 2014). Many questions about the role of NPs remain unanswered (Kroezen *et al*., 2012) and, in addition to restrictive structures, support and autonomy have come to the fore requiring consideration. The uncertainty of evidence from existing research about such issues is made more obvious by the ongoing considerable challenge of engaging Irish NPs

who delay registration once the educational preparation for prescribing had been completed (Health Service Executive, 2014b).

Given that the Health Service Executive (HSE) in Ireland is committed to increasing the number of prescribers, it is important to evaluate nurses' experiences of this process and identify key issues that need to be addressed or amended to ensure improvement continues. Therefore, this study examined the perceptions of NPs in Ireland in relation to their counterparts in the UK to better understand their competence, and future requirements for continued improvement.

5.2 Aim

The aim of the study was to gain an understanding of how Irish NPs practice, their competence, perceptions of the role and future needs compared with their counterparts in the UK.

5.3 Method

In order for the researcher to gain different perspectives and draw attention to different factors that affect NPs, descriptive research methods were employed in this study to provide a snapshot of prescribing in practice and surrounding issues. Descriptive research deals with questions that seek to explain what things are like and describe relationships but do not predict relationships between variables or the direction of the relationship (Michel, 2008). The main objective is therefore *'the accurate portrayal of the characteristics of persons, situations or groups and or the frequency with which certain phenomenon occurs'* (Polit and Beck, 2012, p. 752). The intention of this methodology is that descriptive research provides a relatively complete picture of what is occurring at a given time in the area of nurse

prescribing. The methods of collecting data for descriptive research can be employed singly or in various combinations, provisional to the research questions at hand. Depending on the methodology utilised, data can be tangible (quantitative) or abstract (qualitative). As each type of descriptive data provides different representations of the world, their integration widens the range of perspectives that can be explored and understood.

5.3.1 Design

A survey design was used; participants were asked to self-complete an online questionnaire that was distributed via Survey Monkey®. Whilst many people think of a questionnaire as the "survey", the questionnaire is just one part of the survey process. Surveys also require selecting populations for inclusion, pre-testing instruments, determining delivery methods, ensuring validity, and analysing results (Gray, 2014). In general, questionnaires are relatively quick to collect information and offer the possibility for respondents to remain anonymous and are suitable for sensitive topics which people may be reluctant to talk about in person. Nonetheless, in some situations questionnaires can not only they take a long time to design but also to apply and analyse.

The questionnaire was modified by the authors. A combination of open and closed questions was used in the questionnaire. Closed questions (apart from the demographic and CPD data) were in a format of five possible answers for each question (accepting only one right answer) according to the 5-point Likert Scale a model that complemented data entry and statistical analysis (Appendix 8).

The research evaluated the consistency and understanding of the completed questionnaires from the pilot group and, after modifying the wording of some questions, the final draft was created for the Irish participants (questions 1-43). This draft was then reviewed by an advanced

nurse practitioner with prescribing rights in the UK to ensure terminology used was appropriate. Before implementing the UK questionnaire, further adjustment to wording was required for clarity (Appendix 9). Similar to the Irish questionnaire, UK respondents were asked to tick a box to indicate their responses or comment on a negative answer to ensure qualitative data was also generated from this section of the research.

Validity of research is a complex concept that is broadly concerns with the soundness of the study evidence (Polit and Beck, 2012). Specifically, for questionnaires validity, one of the greatest risks in developing response sets is leaving out an important alternative or response (Burns and Grove, 2005). For the purpose of this research validity is the extent to which a test measures what it is supposed to measure and is raised in the context of the three perspectives, identified by Burns and Grove (2005) as the form of the test, the purpose of the test and the population for whom it is intended.

Understanding the target audience for which the questionnaire was developed was important for the researcher to ensure the relevance and comprehensiveness of the questions were appropriately structured.

In order to support face content validity, the questionnaire structure and format was based on a modified version of previous work undertaken for the national evaluation of nurse prescribing (Drennan *et al*., 2009). In addition to assure clarity, accuracy and consistency of the questions, the questionnaire was piloted with ten Irish NPs. After completing the questionnaire, respondents in the pilot sample were asked to comment on its ease of completion, and if they experienced any difficulties understanding what was required of them at any point throughout the questionnaire. It was evident from the completed questionnaires that both the format and content of the questions were appropriate. A pilot of the UK version of the questionnaire was undertaken with an advanced nurse practitioner. However, to further enhance the face and content validity of the questionnaire it was reviewed in conjunction with the research supervisors to ensure questions were phrased

appropriately together with options for responding. As a result, for clarity, further adjustments incorporated amendments to language were subsequently made to the final version of the questionnaire.

Unlike the original questionnaire, this study did not combine any items to form a scale therefore Cronbach's alpha was not reported.

5.3.2 Ethics approval

A proposal was submitted for examination to the Clinical Ethics Research Committee, University College Cork. The study met the research governance criteria and approval to undertake the study was granted (Appendix 10).

5.3.3 Participants

Convenient samples of NPs registered in Ireland and the UK were emailed extending an invitation to participate; this email contained information about the study and contact details for the researcher should the potential participant require further information (Appendix 11). In addition, the email informed the potential participants that the study was completely voluntary, responses were strictly confidential and privacy assured. Consent to participate in the survey was assumed on the basis of a returned and completed questionnaire. Those who wished to participate used the electronic link within the email to access the online survey and simple instructions were included on how to complete the questions. Data collected included demographic information, level of satisfaction experienced by NPs and possible need for continuing professional development. Data collection took place in Ireland during October - January 2013 and in the UK March - April 2013.

At the time of data collection, there were two educational institutions delivering the nurse prescribing education programme in Ireland, University College Cork (UCC) located in the HSE South and the Royal College of Surgeons in Ireland (RCSI) located in the HSE East. When approached, access to the students at the RCSI site was not facilitated. To counteract this access issue, the National Nursing and Midwifery Board Ireland (NMBI formally ABA) was also approached to accommodate broader access but the request was not facilitated. In order to ensure inclusion of the NPs from the HSE East, individual hospitals were contacted directly through site coordinators and Directors of Nursing requesting participants for the study. A total of 140 potential participants were identified for the study at the end of this process. After two email reminders and delivery of a hardcopy of the questionnaires with a personalised letters to each potential participant by post, 70 (50%) completed questionnaires were returned by the Irish NPs (60 from the HSE South and 10 from the HSE East).

UK NPs was accessed through the membership list of the Association of Nurse Prescribing database. This association is an independent organisation, providing support and education for nurses in their role as a prescriber. All members were sent an email invitation by the Association of Nurse Prescribers administrator to participate in the online survey. The Association of Nurse Prescribers members' database was used to disseminate the questionnaire. A total of 346 (29%) completed questionnaires were returned from the UK.

5.3.4 Data analysis

Descriptive statistics were used to describe the characteristics of the Irish and UK respondents. Categorical data were described numerically using frequency (percentage) and graphically using bar charts. For comparisons between Irish and UK respondents, the chi-squared test or Fisher's exact test

(in the case of small expected counts) were used for nominal categorical variables and the Mann-Whitney test was used for ordered categorical variables. All statistical analyses were performed using IBM SPSS Statistics 22.0 (Illinois, Chicago) or Stata 9.2 (TX, USA). All tests were two-sided and a p-value <0.05 was considered to be statistically significant. The purpose of this section of the research was not to prove a difference or identify a study hypothesis but a start point or baseline research that could generate a study hypothesis for future research on the topic as no previous studies have been conducted in this area

5.4 Results

Of the potential 140 nurse prescribing participants working in care of the elderly in Ireland a total of 70 (50%) returned completed questionnaires. In the UK 1,200 potential participants were invited to participate 346 (29%) returned completed questionnaires.

5.4.1 Nurse prescribers' profile and service provision

The first section of the questionnaire reported on the demographic, professional and academic profile of the NPs in both Ireland and the UK (Table 5.1). Demographic data revealed that the highest concentration of NPs for both groups in the age range 40-54 years. Details of participants' experience and employment positions are also shown in Table 5.1

TABLE 0-1 DEMOGRAPHIC PROFILE OF STUDY PARTICIPANTS

	Total (N=416)*	Ireland (n=70)*	UK (n=346)*	p-value1
Age group				<0.001
25-29 years	5 (1.2)	3 (4.3)	2 (0.6)	
30-34 years	20 (4.8)	9 (12.9)	11(3.2)	
35-39 years	47 (11.3)	17 (24.3)	30(8.7)	
40-44 years	87 (20.9)	15 (21.4)	72(20.8)	
45-49 years	114 (27.4)	12 (17.1)	102 (29.5)	
50-54 years	91(21.9)	13 (18.6)	78 (22.5)	
55-59 years	46 (11.1)	1 (1.4)	45 (13.0)	
60 years and over	6 (1.4)	0 (0.0)	6 (1.7)	
Years of clinical experience				<0.001
1-5 years	1 (0.2)	0 (0.0)	1 (0.3)	
6-10 years	15 (3.5)	6 (8.6)	9 (2.6)	
11-15 years	47 (11.3)	15 (21.4)	32 (9.2)	
16-20 years	74 (17.8)	23 (32.9)	51 (14.7)	
21-25 years	80 (19.2)	8 (11.4)	72 (20.8)	
26-30 years	115 (27.6)	14 (20.0)	101 (29.2)	
31-35 years	59 (14.2)	4 (5.7)	55 (15.9)	
36-40 years	18 (4.3)	0 (0.0)	18 (5.2)	
41 years or more	7 (1.7)	0 (0.0)	7 (2.0)	
Highest academic qualification apart from nurse prescribing[2]				0.259
None	8 (1.9)	0 (0.0)	8 (2.3)	
Certificate	25 (6.0)	0 (0.0)	25 (7.2)	
Diploma	55(13.5)	17 (25)	38 (11.0)	
Degree	132 (31.9)	11 (16.2)	121 (35.0)	
Post Certificate	1 (0.2)	0 (0.0)	1 (0.3)	
Postgrad Diploma	70 (16.9)	16 (23.5)	54 (15.6)	
Masters	101 (24.4)	23 (33.8)	78 (22.5)	
PhD	4 (1.0)	1 (1.5)	3 (0.9)	
Other	18 (4.3)	0 (0.0)	18 (5.2)	
Employment level				
Staff nurse	23 (5.5)	15 (21.4)	8 (2.3)	
District/primary care nurse	49 (11.8)	2 (2.9)	47 (13.6)	
Practice nurse	62 (14.9)	1 (1.4)	61 (17.6)	
Nurse practitioner	104(25.)	19 (27.1)	85 (24.6)	
Clinical nurse manager	61 (14.7)	22 (31.4)	39 (11.3)	
Advanced nurse practitioner	94 (22.6)	10 (14.3)	84 (24.3)	
Consultant	10 (2.4)	0 (0.0)	10 (2.9)	
Director of nursing	12 (2.9	1 (1.4)	11 (3.2)	
Other	1 (0.2)	0 (0.0)	1 (0.3)	
Clinical practice area[1]				
Community practice	113(27.0)	6 (8.6)	107 (31.8)	
Emergency practice	28 (6.9)	11 (15.7)	17 (5.0)	
Elderly practice area	16 (3.9)	12 (17.1)	4 (1.2)	
General hospital practice area	177 (43.5)	22 (31.4)	155 (46.0)	
Intellectual disability	5 (1.2)	3 (4.3)	2 (0.6)	
Maternity / Sexual health practice	22 (5.4)	8 (11.4)	14 (4.2)	
Paediatric practice	11 (2.7)	5 (7.1)	6 (1.8)	
Palliative care practice	22 (5.4)	1 (1.4)	21 (6.2)	
Psychiatric practice	7 (1.7)	1 (1.4)	6 (1.8)	
Rehabilitation	6 (1.5)	1 (1.4)	5 (1.5)	

*Unless otherwise stated [1]n=337 for the UK [2]n=68 for Ireland

Participants from the UK were older ($p<0.001$) with 37% of them aged 50 years and above compared with 20% of Irish participants. Similarly, participants from the UK had more years of clinical experience ($p<0.001$) with 73% of them having greater than 20 years of experience compared with 37% for Irish participants. No differences were found between the UK and Irish participants regarding their academic qualifications ($p=0.259$). Respondents were asked to give details of their current employment position and area of clinical practice. A wide range of positions and area of practice were reported a summary of which is set out in Table 5.1

5.4.2 Prescribing independence

Participants were asked how independently they prescribed in practice. However, for the purpose of this question, a specified list equated to independently prescribing medications from a list of drugs agreed with the organisation and a predetermined list referred to supply and administration of medications using directives set by the organisation without input from the NP. Responses indicated that 88% of prescribers from the UK were more likely to prescribe independently from a national formulary whereas the majority of Irish participants (97%) prescribe from a specified list. In addition, 51% Irish participants were also more likely to prescribe from a predetermined list sanctioned by the local health care organisation whereas only 38% of UK respondents follow this route of prescribing. None of the Irish participants had their prescriptions co-signed by a doctor compared with 8% of UK participants. Specific details can be viewed in Table 5.2

TABLE 0-2 PRESCRIBING INDEPENDENCE

	Ireland		UK		
	no. of responses	Agree n(%)	no. of responses	Agree n(%)	p-value[1]
I independently prescribe from a national formulary	49	9 (18.4)	337	298 (88.4)	<0.001
I prescribe from a specialised list	68	66 (97.1)	258	99 (38.4)	<0.001
I prescribe from a predetermined list	49	25 (51.0)	255	96 (37.6)	0.008
The doctor co-signs my prescriptions	46	0 (0.0)	242	19 (7.9)	0.051[2]

[1] From chi-squared test unless otherwise stated; [2] From Fisher's exact test

In this section, respondents were asked to give details regarding the prescribing consultation process which facilitated a decision to prescribe or not.

5.4.3 Workload within the prescribing process

To gain a better understanding on the number of prescriptions written by NPs, respondents were asked to indicate the number of prescriptions they issued each month. Differences in prescription patterns between Ireland and the UK can be viewed in Figure 5.1.

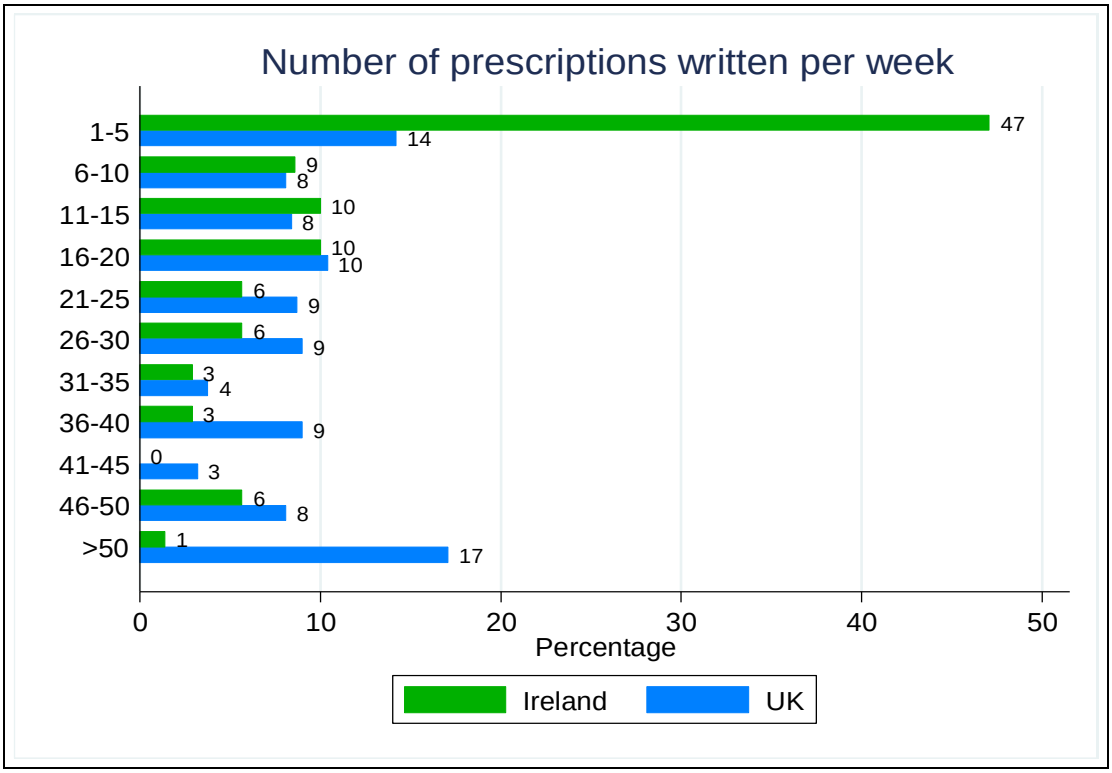


FIGURE 0.1NUMBER OF PRESCRIPTIONS WRITTEN PER WEEK

However, the time dedicated to prescribing each week was greater in the UK than Ireland (Table 5.3).

TABLE 0-3 TIME DEDICATED TO PRESCRIBING EACH WEEK.

	Ireland n=68	**UK n=345**	**p-value[1]**
Dedicated time to prescribing per week	n (%)	n (%)	<0.001
<0.5 hours	0 (0.0)	1(0.3)	
0.5-1 hours	14(20.6)	39(11.9)	
1-2 hours	12(17.6)	39(11.9)	
2-3 hours	11(16.2)	33(9.6)	
3-4 hours	13(19.1)	36(10.4)	
4-5 hours	5(7.4)	23(6.7)	
5-6 hours	10(14.7)	52(15.1)	
> 6 hours	3(4.4)	122(35.4)	

[1] From Mann-Whitney test

Perhaps a more accurate reflection of the consultations (workload) involved in prescribing medications can be viewed in Table 5.4 considering that not all consultations result in a medication being prescribed.

Respondents were also asked to indicate if consultations were required for the purpose of education, titration, and discontinuation of medications depending on the specialty and/or patients' health problems. Respondents indicated that consultations varied in duration depending on the patient's needs. Irish participants (36%) had a higher ratio of consultation that resulted in the prescribing of a medication than UK participants (17%). However, UK participants had a higher ratio of consultations resulting in the discontinuation of medications compared with Irish participants (Table 5.4) but the difference failed to reach statistical significance ($p=0.058$).

TABLE 0-4 CONSULTATIONS UNDERTAKEN PER WEEK FOR PRESCRIBING/AMENDMENT OF MEDIATION

	Consultation resulting in the prescribing of a medication			**Consultation resulting in the amendment of a medication**			**Consultation resulting in the discontinuation of a medication**		
Consultation ratio	Ireland (n=70) n (%)	UK (n=346) n (%)	p-value[1]	Ireland (n=70) n (%)	UK (n=346) n (%)	p-value[1]	Ireland (n=69) n (%)	UK (n=345) n (%)	P value[1]
All	25(35.7)	58(17.1)	0.001	3(4.3)	37(10.7)	0.058	2(2.9)	22(6.4)	<0.001
1 in 2	10(14.3)	53(15.3)		2(2.9)	27(7.8)		4(5.8)	13(3.8)	
1 in 3	13(18.6)	68(19.7)		4(5.7)	37(10.7)		3(4.3)	32(9.3)	
1 in 4	0(0%)	61(17.6)		12(17.1)	40(11.6)		5(7.2)	31(9.0)	
1 in 5	9(12.9)	37(10.7)		2(2.9)	21(6.1)		6(8.7)	30(8.7)	
1 in 6	8(11.4)	21(6.1)		3(4.3)	25(7.2)		0(0%)	29(8.4)	
1 in 7	0(0%)	8(2.3)		2(2.9)	9(2.6)		0(0%)	7(2.0)	
1 in 8	0(0%)	31(9.0)		8(11.4)	57(16.5)		15(21.7)	87(25.5)	
None	0(0%)	4(1.2)		0 (0%)	86(24.9)		34(49.3)	70(20.3)	

On average, participants from Ireland had longer consultations than their counterparts in the UK with the majority of respondents in both Ireland and the UK requiring 15-30 minutes to complete the process of prescribing (figure 5.2).

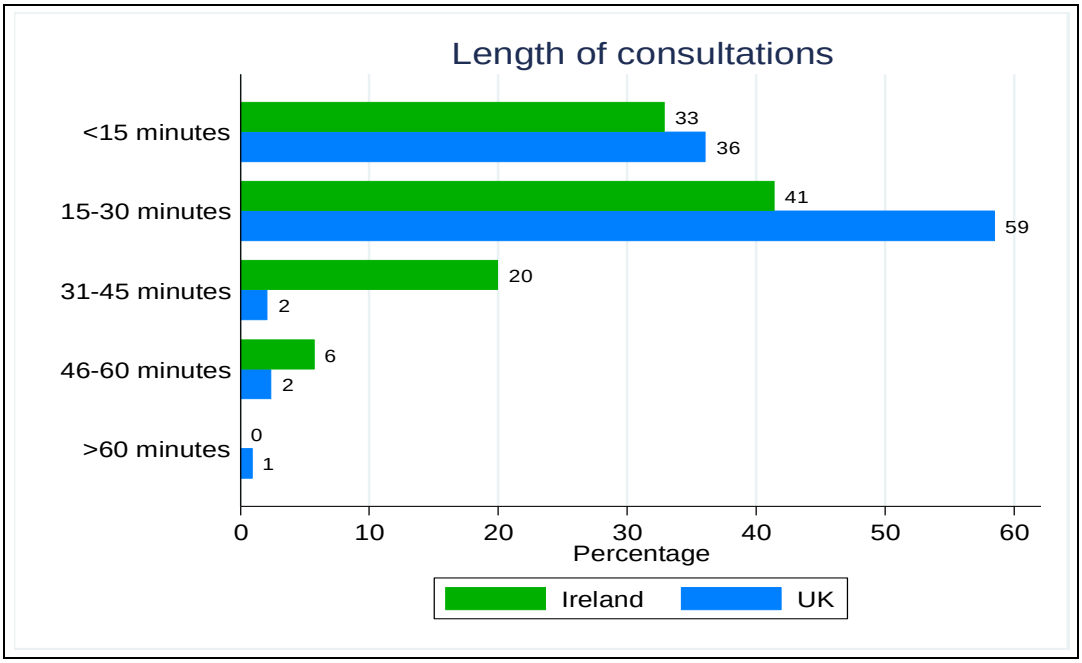


FIGURE 0.2 LENGTH OF CONSULTATIONS

Considering the time involved in prescribing, respondents were asked how advantageous prescribing authority was to their practice. Both cohorts responded positively with 98% of UK respondents and 95.7% of Irish respondents answering 'very positive' nevertheless, there were concerns regarding increased workload with the majority of respondents from both Ireland and the UK affirming a significant increase in workloads. A more accurate reflection of the increased workload involved in prescribing medications can be viewed in Figure 5.3.

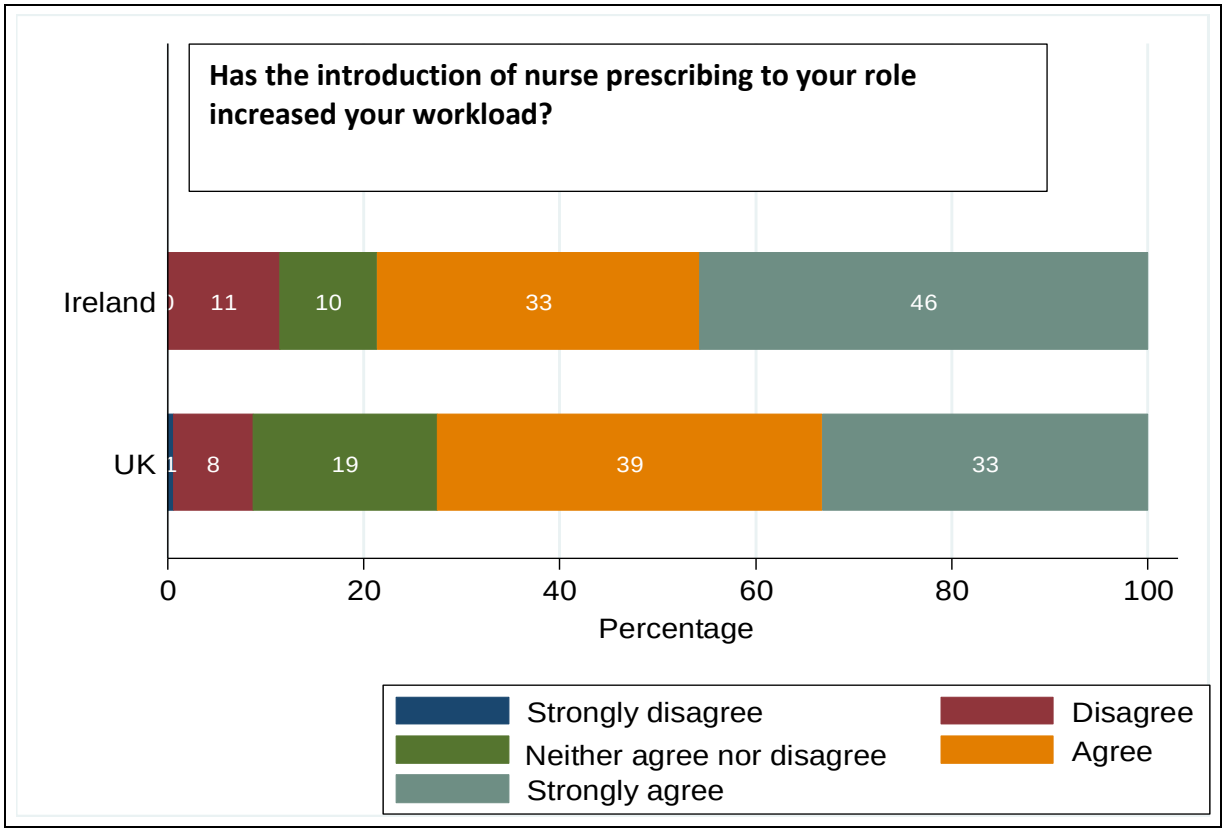


FIGURE 0.3 PARTICIPANTS PERCEPTIONS OF INCREASED WORKLOADS

5.4.4 Satisfaction and autonomy

Both cohorts of respondents identified that there were significant increases in their satisfaction, autonomy and confidence because of prescribing. Table 5.5 gives specific details of prescribers' perceptions with differences found between the Irish and UK participants for seven of the 22 statements regarding prescriber's perceptions of their role. Support from doctors was enjoyed by 100% of Irish NPs as opposed to 87% of UK NPs. Seventy nine percent of Irish participants felt they were less dependent on doctors compared with 90% of UK participants who agreed with this statement. However, a frustration with prescribing from a pre-approved list was experienced by 46% of Irish participants compared with 20% of UK participants.

TABLE 0-5 PRESCRIBERS' PERCEPTION OF THEIR ROLE

	AGREE Category of response agree and strongly agree				
	Ireland n=%		**UK** n=%		p-value[1]
Nurse prescribing has made access to medications more convenient for patients	**70**	65 (92.3)	**346**	329 (95.1)	0.393[2]
The doctors I work with support nurse prescribing	**70**	70 (100.0)	**346**	302 (87.3)	0.002
The prescribing course prepared me adequately for my role	**70**	58 (82.9)	**345**	288 (83.5)	0.899
As a NP I am less dependent on doctors	**70**	55 (78.6)	**345**	311 (90.1)	0.006
I have greater satisfaction and autonomy	**70**	64 (91.4)	**345**	326 (94.5)	0.405[2]
My professional status has improved	**68**	52 (76.5)	**345**	243 (70.4)	0.314
The additional responsibility causes anxiety	**70**	22 (31.4)	**345**	108 (31.3)	0.984
I fear making an incorrect diagnosis	**76**	23 (33.3)	**345**	100 (29.0)	0.471
I fear making a medication error	**70**	29(41.4)	**342**	150 (43.9)	0.709
I am frustrated with limitations of prescribing from an approved list	**70**	32 (45.7)	**335**	67 (20.0)	<0.001
I would feel confident prescribing a greater range of drugs	**70**	43 (61.4)	**339**	140 (41.3)	0.002
I am confident to decide what is within my competency	**70**	70 (100.0)	**339**	334 (98.5)	0.593[2]
I am confident in my ability in this role	**69**	67(97.1)	**346**	333 (96.2)	1[2]
I am confident to communicate with patients	**70**	70 (100.0)	**342**	341 (99.7)	1[2]
I am aware of the cost of drugs	**69**	50 (72.5)	**345**	319 (92.5)	<0.001
I treat patients/clients as partners in the consultation process	**70**	65 (93)	**341**	334 (97.9)	0.037[2]
I address the principles of adherence with patients	**70**	63 (90.0)	**341**	334 (97.9)	0.004[2]
I adhere to professional and organisational standards	**70**	70 (100.0)	**346**	346 (100.0)	1[2]
I take responsibility for prescribing decisions	**70**	70 (100.0)	**342**	341 (99.7)	1[2]
I keep up to date with current prescribing practice	**69**	66 (95.7)	**340**	332 (97.6)	0.406[2]
I can critically appraise relevant information and apply to practice	**70**	68 (97.1)	**346**	333 (96.2)	1[2]
I work with colleagues to benefit patients	**70**	68 (97.1)	**345**	335 (97.1)	1[2]

[1] From chi-squared test unless otherwise stated; [2] From Fisher's exact test

The differences identified in seven of the 22 statements regarding NPs perceptions of their role are as follows:

1. *"The doctors I work with support nurse prescribing":* 100% of Irish participants compared with 87% of UK participants agreed with this statement (p=0.002).

2. *"As a NP I am less dependent on doctors":* 79% of Irish participants compared with 90% of UK participants agreed with this statement (p=0.006).

3. *"I am frustrated with limitations of prescribing from an approved list":* 46% of Irish participants compared with 20% of UK participants agreed with this statement (p<0.001).

4. *"I would feel confident prescribing a greater range of drugs*": 61% of Irish participants compared with 41% of UK participants agreed with this statement (p=0.002).

5. *"I am aware of the cost of drugs*": 73% of Irish participants compared with 93% of UK participants agreed with this statement (p<0.001).

6. *"I treat patients/clients as partners in the consultation process*": 93% of Irish participants compared with 98% of UK participants agreed with this statement (p=0.037).

7. *"I address the principles of adherence with patients*": 90% of Irish participants compared with 98% of UK participants agreed with this statement (p=0.004).

NPs were also asked if there were any disadvantages to their prescribing (Q 18) and asked to elaborate on a negative response which included

'I have difficulties in adapting to increased demands on my time'

'The more prescriptions I write the more paperwork I have'

'The is no place to record the assessment, education and discontinuation or titration of drugs as part of my workload'

5.4.5 Continuing professional development and support

Finally respondents were asked about the amount of support they received from their organisation/clinical area for continuing professional development (CPD). Seventy percent of Irish participants and 69.9% of UK participants indicated that they received adequate support. All respondents gave additional information with regards to CPD (Table 5.6). UK participants were more likely to have undertaken additional education since completing the prescribing programme from both a formal (linked to education programmes) and informal (study days, conferences) perspective, whereas a higher number of Irish respondents indicated additional CPD was required.

TABLE 0-6 NPS' CPD REQUIREMENTS IN RELATION TO PRESCRIBING

	Answering 'Yes'		
	Ireland (n=70)	**UK (n=346)**	**p-value[1]**
Undertaken informal CPD to date	57 (81.4)	319 (92.2)	0.005
Undertaken formal CPD to date	32 (45.7)	221 (63.9)	0.005
Additional CPD is required	32 (45.7)	114 (32.9)	0.013
Adequately supported to undertake CPD	49 (70.0)	241 (69.7)	0.954

Over 90% of Irish and UK participants would attend industry sponsored study days. There was no difference between Irish and UK respondents. UK participants were more likely to have undertaken additional education since

completing the prescribing programme (43% for UK vs 23% for Irish participants, p=0.001).

TABLE 0-7 OTHER QUESTIONS ASKED

	Answering 'Yes'		
	Ireland (n=70) n(%)	**UK (n=346) n(%)**	**p-value[1]**
I received support and supervision in practice	49 (70.0)	241 (69.7)	0.954
Would you attend an industry sponsored study day?	66 (94.3)	324 (93.6)	1[2]
I have undertaken additional education since completing the prescribing education programme	16 (22.9)	150 (43.4)	0.001
Have you changed your job title since completing the prescribing programme?	8 (11.8)	93 (27.3)	0.007
Have you changed your practice area since completing the prescribing programme	2 (3.4)	50 (16.1)	0.010

UK participants were more likely to have changed their job title since completing the prescribing programme (27% for UK vs 12% for Irish participants, p=0.007). UK participants were more likely to have changed their practice area since completing the prescribing programme (16% for UK vs 3% for Irish participants, p=0.010).

The Irish questionnaire only included additional questions on the minimum dataset which revealed the following. When asked if they use the minimum set data to inform practice changes there was a significant disagreement identified n=44 (62.9%). Participants were also asked if they used the data for audit purposes, review of prescribing history, to inform

studies and surveys and support discussion regarding prescribing. Results are set out in table 5.8

TABLE 0-8 USE OF THE MDS IN PRACTICE

	YES (n=70) n(%)	NO (n=70) n(%)	Omitted answer
I use the MDS to compile my audit reports	47 (67.1)	23 (32.9)	0
I use the MDS to inform practice	25 (35.7)	44 (62.9)	1
I use the MDS to review prescribing history	31 (44.3)	38 (54.3)	1
I use the MDS to inform studies and surveys	49 (70)	20 (28.6)	1
I use the MDS to support discussion on prescribing	24 (34.3)	45 (64.3)	1

Findings in relation to these additional questions will be further discussed in the contest of the findings and discussion for chapter 8.

5.5 Discussion

This study is the first to compare Irish and UK NP across a number of areas related to prescribing. Overall, participants have a positive attitude toward nurse prescribing (Table 5.5). In particular confidence in communication and establishing a partnership with patients returned very high scores which are additionally underpinned by the high levels of autonomy and satisfaction in practice.

5.5.1 Nurse prescriber's profile

The majority of participants were highly qualified with extensive experience and employed across a number of clinical specialties. The largest group of respondents for both settings were employed in the acute care setting. Findings are similar to those identified in previous studies (Latter et al., 2005, Courtenay and Carey, 2008b, Stenner et al., 2011) whose research also included a cross section of nurse prescriber's from different areas of practice.

5.5.2 Role Independence

Responses from the UK can be viewed in the context of having two distinct types of prescribing, independent and supplementary, with each role having clear directives (Courtenay *et al*., 2007, Kroezen *et al*., 2012), whereas, the Irish NPs' independence is negotiated at organizational level and the outcome is heavily dependent on the doctor and Drug and Therapeutic committee (An Bord Altranais, 2012a). Participants from the UK (88%) were more likely to prescribe independently from the national formulary as opposed to 18% of Irish nurse prescribers. This percentage returned by Irish nurse prescribers does not appear to reflect the Irish prescribing process considering all Irish nurses prescriber are governed by a CPA which specifically identifies the drugs each NP may prescribe. However, subject to individual situations, local structures in place for advanced NPs can vary and may allow a more independent prescribing practice hence the return of 18% (n=9). Recent work by this research group has identified that the CPA is hampering or preventing prescribing in the Irish setting (Creedon *et al*., 2014). This is a direct result of control of the Irish nurses and midwives who prescribe from a CPA which is approved by the Drug and Therapeutic Committee and medical consultants within the organisation. Having a CPA has led to a two tiered approach to prescriptive authority for nurses and doctors causing conflict

between nurses' perceived prescribing role and the role that the organisation imposes on them. In addition, doctor's co-signatures on nurse's prescriptions identified by 8% of UK respondents may be due to a team approach to treating patients with multiple comorbidities a situation identified in studies by Courtenay *et al.* (2007) and Carey *et al.* (2014) as a position nurse prescribers may find challenging. No Irish NP identified this within their practice, suggesting the possibility that more complex cases are managed by doctors because of limitations imposed on NPs by the CPA which restrict the drugs available for prescribing. This finding requires further exploration. Moreover, the absence of a clear job description for Irish NPs allows further interpretation of the role and, therefore, continued lack of independence identified.

5.5.3 Workload

Findings provide additional insight into workloads and if prescribers' workloads are to be measured correctly then the hidden workload identified in the research needs to be acknowledged considering not all consultations conclude with an action. The range of prescriptions written by respondents in Ireland and the UK does not appear to reflect the number of consultations/workload undertaken by NPs. This discrepancy is outlined more clearly in Table 5.4 (page 120) where consultations resulting in the prescribing of a medication are outlined more accurately and represent only a portion of consultations undertaken. Similar findings of increased workloads have been identified by Coull *et al.* (2013) and a decision not to prescribe within a consultation should also be recognised and is distinct from titrating dosages, discontinuing medications and education.

Identification of hidden workloads is important to NPs as confirmed by the response to the question on increased workloads (Figure 5.3). A significant number of respondents from Ireland (79%) and UK (73%) identified

increased workloads due to increased responsibilities as a result of prescribing and the dedicated time required for the prescribing process. Incomplete recognition of NPs 'hidden' workload in Ireland together with the effects of the moratorium has had a negative impact on the numbers of NPs in clinical practice (Health Service Executive, 2014c). Difficulties in adapting to such increased demands on time in the clinical setting surfaced when respondents were asked to expand on negative responses comments. For example, to manage the increased prescribing workload, NPs choose to reduce the number of prescriptions written, asked the doctor to prescribe or simply did not prescribe. Other factors such as assessment, education, titration and discontinuation of drugs were identified by participants in this study as important elements of the prescribing process considering the cost-conscious nature of the health service today.

Acknowledgement of workloads is important to ensure nurse prescribing is not regarded as an add-on to the nurses' role. Respondents must sometimes contend with understaffed clinical environment that contribute to the responsibilities and at times stressful nature of nurse prescribing. However, Carey *et al.* (2013) was more specific in stating that those responsible for service planning need to recognise '*the diverse range of medicines management activities in which nurse prescribers are involved'* (p. 2073). This strong response for identification of increased workloads is also supported by research undertaken by Coull *et al.* (2013).

5.5.4 Competence and confidence

Both cohorts of respondents identified that there were significant increases in satisfaction autonomy and confidence because of prescribing. However, differences were found between the Irish and UK participants for seven (of the 22 statements) regarding prescribers perceptions of their role. Support for nurse prescribing from doctors was experienced by all of the Irish

participants compared with 87% of UK participants. This finding is supported by Kerozen *et al.* (2014) with the exception of some junior doctors who are perhaps not as familiar with nurse prescribing in practice. However, a small number of nurse prescribers remain dependent on doctors with 79% of Irish participants indicating they were less dependent on doctors compared with 90% of UK participants. These numbers can perhaps be explained by the less experienced NPs continuing to need guidance until confidence and competence develops in practice.

Irish participants (46%) also indicated they were frustrated with the limitations of prescribing from an approved list as opposed to 20% of UK participants. Participants from both cohorts 61% of the Irish and 41% of the UK participants also indicated they would feel confident prescribing a greater range of medicines.

UK respondents (93%) were more aware of the cost of medicines compared with their Irish counterparts (73%). This is an important factor to be investigated further considering a major proportion of the health budget is spent on medications each year in both Ireland and the UK.

5.5.5 Continuing Professional Development (CPD)

Respondents reported CPD needs across the majority of clinical areas. The role of CPD in nurse prescribing has repeatedly been identified as a crucial element in maintaining competence (Otway, 2001, Courtenay *et al*., 2007c, Carey and Courtenay, 2010, Dobel-Ober *et al*., 2013, Weglicki *et al*., 2014) and is intrinsic to the nurse prescribing role (Courtenay *et al*., 2007d, Green *et al*., 2009). UK respondents (92%) were more likely to have undertaken CPD compared with (81%) of Irish participants. The majority of respondents from both cohorts (70%) believed that they received adequate support and supervision in practice similar to findings by Carey *et al.* (2013). However, difficulties identified from free text comments precisely identify a

lack of appropriate pharmacology CPD as an ongoing issue which needs further investigation.

In comparison with previous findings (Latter *et al*., 2005, Carey and Courtenay, 2010) this study divided CPD into formal and informal development. Findings identified for formal CPD are similar to Latter *et al.* (2005) who reported that just under 60% of the participants in their study had undertaken formal CPD, whereas Carey & Courtenay (2010) reported that over 80% of participants had undertaken CPD but did not identify if CPD was formal or informal. Courtney *et al.* (2007d) identified the lack of opportunity in maintaining CPD resulted in nurses having less confidence to prescribe in comparison with those who engage in CPD on a regular basis but, once qualified, the CPD needs of NPs are frequently unmet (Courtenay and Gordon, 2009). For instance, a specific rationale given for requiring an assessment skills revision course were attributed to working in highly specialised areas. Respondents identified that assessment skills utilised tended to focus on specific systems thereby not allowing the opportunity for continued practice on remaining systems which were not specifically linked to the clinical specialty of the NP or patient condition. The discrepancy in the responses for this question on formal and informal CPD between cohorts of respondents may be influenced by the ongoing recruitment moratorium in place in Ireland that has resulted in limited opportunity to undertake CPD. Even though acquisition of the necessary knowledge to prescribe has been positively evaluated (Drennan *et al*., 2009, Latter *et al*., 2012) nurses require support (Carey et al., 2009b). Nevertheless, individual responsibility for CPD has been written into the Nurses Act stating that '*a registered nurse and registered midwife shall maintain professional competence on an ongoing basis'* (Oireachtas and Department of Health, 2011 Nurse and Midwives Act, part 1. 88-(1)). Introducing such a change firmly puts the onus on the nurse not the organisation, to ensure CPD is relevant for practice.

5.6 Conclusion

Although nurse prescribing has only been in existence in Ireland for eight years, the majority of Irish NPs are as confident in their ability to prescribe as their counterparts in the UK. However, a considerably large portion of the respondents in both Ireland and the UK have issues with increased and hidden workload within the prescribing role. This has serious implications for the progress of NPs in the Irish setting particularly considering the moratorium on recruitment in place at the time of the study. With this survey, an understanding has been gained of what nurses require of organisations to meet their commitment to the prescribing process. The issues specifically identified as warranting attention were adequate acknowledgement of the workload involved in daily practice along with supportive organisational structures for implementation related aspects such as CPD. In the Irish setting having such support may help to overcome the perceived barriers appearing in the form of reduced applications for the education programme and lack of commitment to register as a prescriber once the education programme has been completed.

Furthermore, a review of the Irish collaborative practice agreement which was also highlighted in the National Evaluation Report (Drennan *et al*., 2009) is timely to address the medical dominance of NP. The system must learn to trust the education process and the NPs ability to prescribe safely and appropriately without unnecessary obstacle.

Acknowledgment

The researcher wishes to acknowledge Barbra Stuttle at the Association of Nurse Prescribers in the UK for assistance accessing the nurse prescribers in the UK and Matt Griffith (Visiting Professor at Birmingham City University, Advanced Nurse Practitioner and Nurse Prescriber) for assistance with

questionnaire clarity. The researcher would also like to thank Irish Nurse Prescribing Site Coordinators and Directors of Nursing who facilitated access to nurse prescribers and the participants both from Ireland and the UK who took the time to answer the questionnaires for this study.

CHAPTER 6 APPLICATION OF THE STOPP/START EVALUATION TOOL QUANTITATIVE AND QUALITATIVE ELEMENTS

Chapter 6 – focuses on the application of the STOPP/START evaluation tool to the prescribing of nurse prescribers. Quantitative and qualitative data are presented and discussed in this Chapter as follows:

Stage 1: A prospective study was conducted to evaluate the prescribing of NPs working in care of the elderly. Using information from the nursing and medical notes along with the medication kardex, the researcher applied the STOPP/START criteria to nurses' prescriptions to identify potential inappropriate prescriptions (PIP) or potential prescriptions of omission (PPO). Feedback letters were placed in the patients' chart for the NP to review.

Stage 2: Explored the NPs' utilisation of the feedback letters issued following stage 1 of the study. The qualitative approach sought to understand the motivations and perceptions of the research participants allowing the researcher to gain rich knowledge about the participants, their emotions, perceptions and actions, regarding the feedback letters.

Parts of this chapter have been submitted for publication to the International Journal of Nursing Research (2016)

6.1 Introduction

Nurse prescribing in Ireland have grown nationally over the past six years with a large concentration of nurse prescribers now working in care of the elderly. To date approximately 9.8% (n=76) of the 772 nurse prescribers registered to work with the HSE prescribe directly for older adults with an additional number working in other specialties areas that also cater for elderly patients (Health Service Executive, 2014c). Despite the improved access to medications following the introduction of nurse prescribing, the need for improved medication management in older adults continues to remain a priority (Fick and Selme, 2011).

Internationally, the acceptance of the nurse prescribing role by stakeholders such as peers, doctors and patients is essential if nurse prescribing is to continue evolving (Stenner *et al*., 2010a, Earle *et al*., 2011b). Extensive research has been undertaken in the area of nurse prescribing in relation to the patient's perspective (Courtenay *et al*., 2010b, Drennan *et al*., 2011, Dhalivaal, 2011, Courtenay *et al*., 2011, Banicek, 2012, Ben Natan *et al*., 2013), benefits and barriers (Carey et al., 2009a, Ross and Kettles, 2012, Coull et al., 2013, Darvishpour et al., 2014, Carey et al., 2014), professional relationships (Dunn *et al*., 2010, Fisher, 2010, Earle *et al*., 2011b, Kroezen *et al*., 2012, Kroezen *et al*., 2013), and competence development (Cashin *et al*., 2009, Snowden and Martin, 2010, Dobel-Ober *et al*., 2013). The literature further discloses that patients are happy to consult with NPs but also wish to reserve the right to see a doctor when they feel it is necessary (Luker et al., 1998a, Brooks et al., 2001, Latter and Courtenay, 2004, Berry et al., 2006, Drennan et al., 2011). Such reservations may be addressed through comparative analysis of prescribing practices and clinical outcomes for patients treated by medical and non-medical prescribers.

Within the Irish setting, nurse prescribing research has mainly focused on implementation (Creedon and O'Connell, 2009, Adams *et al*., 2010), cost

effectiveness (Drennan *et al*., 2009), the need for CPD (Creedon, 2010a), and clinical appropriateness and safety (Naughton *et al*., 2012). Considering inappropriate prescribing is a growing public health problem (Spinewine *et al*., 2007) with the cost of medications to the health service rising annually (Barry, 2013), it is surprising that there is limited published research on prescribing practices for NPs and particularly if prescribing is appropriate or inappropriate. Older adult patients are the largest consumers of prescribed medications and considering the projected rise in this sector of the population from 532,000 in 2011 to almost 1.4 million by 2046 (Age Action, 2013) emphasis on nursing research needs to shift.

Older adult patients suffering from multiple conditions consume a large range of medications and the occurrence of potentially inappropriate prescribing (PIP) is a well-documented problem (Spinewine *et al*., 2007, Gallagher and O'Mahony, 2008a). However, the appropriateness of nurses' prescriptions has not been investigated, leaving a void in the understanding of the impact it has in practice. In general, medicines in older people are considered appropriate when they have a clear evidence-based indication, are well tolerated in the majority and are cost-effective (O'Mahony and Gallagher, 2008). In contrast, medications that are potentially inappropriate have no evidence-based indication, carry a substantially higher risk of potential side effects compared with use in younger people or are not cost effective (Gallagher and O'Mahony, 2008a). In addition, older adult patients are more likely to have multiple comorbidities, a higher risk of adverse drug events (ADEs) and to have more than one prescriber involved in their care (Ryan *et al*., 2012). Risks to prescribing are further augmented by age-related changes in physiology and body composition that affect the pharmacokinetics and pharmacodynamics of medications prescribed (Barry, 2008). These factors, combined with the increasing availability of new medications potentially contribute to polypharmacy and PIP. Optimal prescribing is critical to the goal of older adult care in order to cure disease, eliminate or reduce symptoms and improve functioning (Gallagher and O'Mahony, 2008a). Prescribing medications

is therefore, one of the most powerful tools available to NPs in the prevention and treatment of disease and alleviation of symptoms.

The national evaluation of nurse prescribing undertaken in 2009 gave a snapshot of prescribing by reviewing the accuracy and clarity of drug details in 208 prescriptions using the following seven headings:

- Name of prescribed item,
- Dosage,
- Frequency,
- Quantity (in number of dose units or days of treatment),
- Instructions,
- Signature,
- Registered nurse prescriber PIN

(Drennan *et al*., 2009)

Medication safety and appropriateness was also assessed using eight items from the modified *Medication Appropriateness Index (MAI)* tool (Fitzgerald *et al*., 1997).

- Medications indicated,
- Medications effective for condition,
- Dosage correct,
- Directions correct,
- Clinically significant medication interactions,
- Clinically significant medication disease/condition interactions,
- Unnecessary duplication with other medications,
- Duration of therapy acceptable,

All indicators returned an appropriate score of between 76-96%. A small number of prescriptions required attention to detail in terms of prescription instructions because of potential medication or disease interactions. This

reflected the reality of clinical practice where prescribing for the elderly can be influenced by risk benefit assessment (Steinman and Hanlon, 2010).

Understanding the role of medication management by NPs in older adult care is valuable considering the ageing Irish population and present published figures that 12.7% of the population is aged 65 years or older (CSO, 2014), 3.5% of whom require long-term care. Specifically understanding the influence of nurse prescribing is crucial in view of 1) the increasing volume of prescriptions written by nurse prescribers, 2) how inappropriate prescribing is common in older patients (Spinewine *et al*., 2007), 3) how inappropriate prescribing is associated with ADEs (Lund *et al*., 2010), hospitalisation (Klarin *et al*., 2005), and wasteful utilisation of resources (Cahir et al., 2010a). More recently, concerns regarding PIP practices in the older adult population have come under considerable scrutiny (Gallagher and O'Mahony, 2008b, Barry, 2008, Ryan *et al*., 2009a, Ryan *et al*., 2012, O'Sullivan *et al*., 2013). In particular, the use of medicines that have clinically significant drug-drug, drug-disease and the underuse of beneficial medicines (Gallagher and O'Mahony, 2008b) that can pose more risk than benefits to patients are being reviewed.

It is therefore timely to conduct a detailed evaluation of NPs' prescriptions to understand their prescribing practices for patients. If nurses are to truly become independent prescribers then their practices must be benchmarked with their medical counterparts. The exploration of nurse prescribing through the application of the Screening Tool of Older Persons Prescriptions (STOPP) and Screening Tool to Alert doctors to Right Treatments (START) offers a reasonably inexpensive and time-efficient method of exploring prescriptions written by nurses in the care of the older adult setting.

6.1.1 Screening tool

There are a number of medication screening tools that can be used to measure the appropriateness of prescribing. For instance, the Beers criteria tool is widely used in the United States of America however, its application in Europe is limited owing to differences in prescribing patterns, drug availability and transferability of criteria (Spinewine *et al*., 2007). Recognising the deficiencies of the Beers criteria, newer explicit screening criteria have been devised and validated, with the aim of improving applicability and usefulness. These include the STOPP/START criteria by Gallagher *et al.* (2008c). A review undertaken by Laroche *et al.* (2009) examined the strengths and weaknesses of inappropriate prescribing screening tools and endorsed the use of STOPP/START as the more appropriate tool in the European context. In addition, a number of studies undertaken by Gallagher and O'Mahony (2008b), Ryan *et al.* (2009c), Kruse *et al.* (2010), O'Sullivan *et al.* (2010) and Gallagher *et al.* (2011) have used the STOPP/START criteria to assess prescribing appropriateness and addressed perceived deficiencies of the Beer's criteria in relation to European prescribing patterns.

STOPP comprises of 65 criteria; each criterion is accompanied by a concise explanation why the prescription is potentially inappropriate. START consists of 22 evidence-based prescribing indicators that highlight prescribing omissions for commonly encountered diseases in older people (Gallagher *et al*., 2008c) (Appendix 12). STOPP/START criteria were validated by a panel of experts in geriatric pharmacology from Ireland and the United Kingdom. However, O'Mahony (2010) advised that STOPP/ START criteria should be used in unison on the basis that the inclusion of inappropriate medicines and omission of essential medicines are interconnected problems in geriatric pharmacotherapy.

STOPP/START is current and relevant to Irish practice as it focuses on medicines routinely prescribed to older patients in Ireland. It links the prescription of these medicines to potential problems associated with their use in the context of patients' co-morbidity and medical history. As well as referring

to drug-disease interactions, it also considers drug-drug interactions, therapeutic duplication and drugs that increase the risk of falls. The criteria are arranged in accordance with physiological systems and will be set out accordingly in the results.

The prevalence of potential inappropriately prescribed drugs for older adult patients by NPs was determined using the START/STOPP screening criteria. However, information regarding feedback from healthcare professionals following the use of the STOPP/START and its application in routine clinical practice has not as yet been sufficiently captured in the published research (O'Sullivan *et al*., 2013). Even though detection of PIP can provide a valuable insight into unsafe practices and help identify opportunities for improvement (Kiekkas *et al*., 2011), the process has to be safe, easy and effective.

STOPP/START Quantitative Study –Stage 1

6.2 Aim

The aim of the study was to determine the prevalence and nature of nurse prescribers' potential inappropriate prescriptions (PIP) and potential prescribing omissions (PPO) using the STOPP and START criteria.

6.3 Method

The STOPP/START tool (Gallagher *et al.*, 2008c) was applied to prescriptions written by NPs for patients aged ≥65 years. The STOPP/START indicators facilitated the researcher to screen medication regimes prescribed within daily clinical practice from patient records and medication charts.

6.3.1 Participants

In this study a purposive sample of forty potential registered NPs working with older patients' ≥ 65years in the southern region of Ireland (HSE South) and spanning 17 different clinical sites were eligible to participate in the research. Each nurse was contacted individually to establish their willingness to participate in the research and also asked if they could identify ten patients in their care for whom they had written prescriptions for independently.

<u>Inclusion criteria</u> – participants were required to have completed the nurse prescribing programme, have registered with the Nursing and Midwifery Board of Ireland, were prescribing medications independently for patients ≥65 years, currently working for the Health Service Executive (HSE) and had a) written at least 10 different prescriptions for b) ten separate patients.

Exclusion criteria - nurses who have undertaken the nurse prescribing programme but who have not registered with the Nursing and Midwifery Board Ireland to prescribe. Nurses with fewer than ten prescriptions written for ten individual patients.

6.3.2 Research sites

The participating sites in this study spanned the HSE South represented by the light green area on the map from Kerry in the West to Wexford in the East. Seventeen sites were included in the study covering all areas except Carlow. At the time of data collection this area did not have a nurse prescriber working in care of the older adult.

When the NPs were contacted individually there were issues that did not facilitate participation. Specifically, two NPs were not registered with the nursing governing body, one NP was unable to participate due to illness, eight had insufficient prescriptions (<10) written, two had moved to the private sector, one NP's practice was on hold due to issues with clinical indemnity and one refused to participate. The remaining 25 nurse prescribers were informed of the two stage process of the study before agreeing to participate. This was important to ensure that participants having completed the first stage of the study were available to participate in the second stage. Each of the 25 participants identified prescriptions written for ten individual patients equating

to 250 patient records requiring review. Access to relevant documents was negotiated directly with the NP, organisation, and practice development coordinators.

A pilot of the STOPP/START data collection database was undertaken in a pre-determined site using ten patients' charts to ensure information obtained from the database was accurate and feedback generated for the NPs was appropriate. Two academic pharmacists who were experienced in STOPP/START criteria application reviewed the data from these ten patients. Each case/file was discussed in detail including the feedback letter generated from the data until agreement was reached regarding the nature of feedback information to be returned to the NP. The pilot data was included as part of the overall date collection.

One month prior to commencing data collection, an information sheet containing the details of the study, along with a copy of the ethics approval letter was emailed to each participating NP. Participating NPs received a supplementary telephone call to answer any questions and organise a mutually suitable date on which to gather the data. Participants were again contacted by phone seven days before the agreed visit date to answer any additional queries and ensure access to the relevant documents could be facilitated on the agreed date for data collection.

6.3.3 Ethics approval

A research proposal was submitted and approved by the Clinical Research Ethics Committee of the Cork Teaching Hospitals and University College Cork (Appendix 13)

6.3.4 Data collection

Data were collected from the nursing and medical records and medication kardexes of the patients identified. Data inputted to the database did not contain any information that would allow identification of research participants or patients. However, to ensure the feedback letters placed in the medical notes could be identified appropriately patient's name and medical record number were included. One copy of the feedback letter was printed and returned to the file for the NP to review (Appendix 14). This letter was not used for any additional purpose during the collection or analysis of the data in the study.

6.3.4.1 Chart review

Data collected on medications prescribed by NPs from charts including medical, nursing and the medication kardex were managed using a modification of a specifically constructed database E-Pharma-Assist Clinical Decision Support System (CDSS) (Appendix 15), designed and validated by the Department of Geriatric Medicine, Cork University Hospital, and the School of Pharmacy at University College Cork (O'Sullivan et al., 2013). The database is structured to facilitate analysis and eventual usability of the findings. The database also enables collection of data in a format that keeps all individual records separate but allows for easy compiling and cross-referencing. Additional electronically stored data on Microsoft Word®, Excel®, Access® (Microsoft Corp.) 2007 and SPSS were done in accordance with the provisions of the Data Protection Act 2003.

Collection of data took place over a twelve month period February 2013-January 2014 and took approximately 60 minutes per patient chart. Specific profile data were obtained from the medical and nursing notes and included

the following details; patient's age and gender, current diagnosis, relevant medical history, Barthel score, current medications, and biochemical data where available. Any additional query regarding information was discussed directly with the NP. Each patient was assigned a number at the point of data entry to ensure anonymity. Medication data collected including name, dose, frequency, and the total number of medications was obtained from the most recent medication kardex. Both regular and 'as required'/*pro re nata* (PRN) prescription medications were recorded to ensure a complete profile of medication data was collected. All medications were supplied by prescription and charted accordingly, non-prescription over the counter medications were not included in the data. Medications were coded according to the World Health Organisation's Anatomical Therapeutic Chemical (ATC) classification system and all medical diagnoses were coded according to the International Classification of Diseases 10th edition (ICD-10) (WHO, 2010, WHO, 2011).

Feedback letters generated from the application of the STOPP/START tool regarding PIP and PPO were placed in the patient's file immediately following the review. Recognising that confidentiality was of paramount importance, any further issues regarding PIP and/or PPO was viewed directly from the appropriate section of the anonymised database.

6.3.5 Data analysis

Categorical data were described using frequency (percentage) and continuous data using mean and standard deviation (SD) or in the case of skewed data, the median and interquartile range (IQR). The Chi–squared test was used to compare PIP and PPOs. Univariate and multivariate logistic regression analyses were performed to investigate factors associated with PIPs and PPOs. All statistical analyses were performed using IBM SPSS Statistics 22.0 (NY, USA). All tests were two-sided and a p-value <0.05 was considered to be statistically significant.

Once the data had been calculated for results, it was then necessary to compare these results with local or national benchmarks. The application of the STOPP/START criteria in care of the older adult has limited but sufficient studies in the Irish setting to facilitate such comparisons.

6.4 Results

All patients included in this study were inpatients in long term care nursing home and hospitals settings and prescribed for by NPs. The background demographic details and most prevalent disease states affecting patients are discussed in section 6.4.1.

6.4.1 Demographics

Due to unforeseen circumstances three patients' records were not included in the data collection, (one patient died prior to data collection, the medical status of another patient deteriorated requiring transfer to palliative care facility and one patient was transferred to the acute care setting for treatment). Therefore, the study included 247 patients, of whom 58.7% (n=145) were female. Overall, the mean age of the patients was 81.3 years (SD±9.2) and when categorised by gender, the mean age (SD) was 77.7 (±8.6) years for males and 83.8 (±8.8) years for females. The five most prevalent diagnoses in the population studied was dementia (n=72; 29.1%), conditions causing reduced mobility (n=48; 19.4%), osteoarthritis/osteoporosis (n=25; 10.1%), diabetes (n=23; 9.3%) and respiratoryl problems (6.9%) details are set out in Table 6.1.

TABLE 0-1 CLINICAL CHARACTERISTICS OF PATIENTS, OVERALL AND BY GENDER

	Overall (n=247)	**Gender**	
		Male (n=102)	**Female (n=145)**
Age (years) Mean (SD)	81.3 (9.2)	77 (8.6)	83.8 (8.8)
Range	65 to 101	65 to 101	65 to 100
Age group: n (%)			
65 -74 years	67 (27.1)	41 (40.2)	26 (17.9)
75-84 years	83 (33.6)	40 (39.2)	43 (27.7)
≥85 years	97 (39.7)	21 (20.6)	76 (52.4)
	n (%)	n (%)	n (%)
Primary diagnosis			
Dementia/cognitive impairment/confusion	72 (29.1)	24 (23.4)	48 (33.1)
Reduced mobility (MS, Parkinson's)	48 (19.4)	12 (11.8)	36 (24.8)
Osteoarthritis, osteoporosis	25 (10.1)	14 (13.7)	11 (7.6)
Diabetes	23 (9.3)	11 (10.8)	12 (8.3)
Respiratory disease	17 (6.9)	8 (7.8)	9 (6.2)
Gastrointestinal problems	14 (5.7)	6 (5.9)	8 (5.5)
Cardiac disease/problems	10 (4.0)	5 (4.9)	5 (3.4)
Falls	10 (4.0)	6 (5.9)	4 (2.8)
Depression	9 (3.6)	5 (4.9)	4 (2.8)
CVA	7 (2.8)	5 (4.9)	2 (1.4)
Social reasons	5 (2.0)	2 (2.0)	3 (2.1)
Renal disease/problems	3 (1.2)	2 (2.0)	1 (0.7)
Palliative care/ respite care	2 (0.8)	1 (1.0)	1 (0.7)
Neurologic problems	2 (0.8)	1 (1.0)	1 (0.7)
Baseline information			
Dementia/cognitive impairment[1]	85 (35.6)	30 (29.7)	55 (39.9)
Indigestion/heartburn	62 (25.1)	25 (24.5)	37 (25.5)
Trouble sleeping	59 (23.9)	23 (22.5)	36 (24.8)
Falls in the past three months[2]	29 (16.5)	19 (19.0)	20 (14.6)
Ongoing constpation[2]	17 (7.2)	7 (7.0)	10 (7.3)
Recent ongoing nausea/vomiting	7 (2.8)	3 (2.9)	4 (2.8)
Barthel activities of daily living			
Median (IQR)	11 (5 to 16)	12 (7 to 12)	10 (5 to 14)
High dependency (0-4)	43 (19.3)	14 (15.1)	29 (22.3)
Medium dependency (5-8)	40 (17.9)	15 (16.1)	25 (19.2)
Low/medium dependency (9-12)	61 (27.4)	23 (24.7)	38 (29.2)
Low dependency (13-20)	79 (35.4)	41 (44.1)	38 (29.2)

[1] n=239 (n=101 for males and n=138 for females); [2] n=237 (n=100 for males and n-137 for females); [3] n=223 (n=93 for males and n=130 for females)

All 247 patients were prescribed a range of medications between 2 and 27 the total number of medications prescribed being 2,463 (Table 6.2).

TABLE 0-2 FREQUENCY OF MEDICATIONS PRESCRIBED FOR PATIENTS, OVERALL AND BY GENDER

	Overall (n=247)	**Gender**	
		Male (n=102)	**Female (n=145**
All medications			
Total number	2463	1007	1456
Median (IQR)	10 (7 to 12)	9 (7 to 12)	10 (7 to 12)
Range	2 to 27	3 to 19	2 to 27
n(%)			
1-5	20 (8.1)	9 (8.8)	11 (7.6)
6-10	128 (51.8)	54 (52.9)	74 (51.0)
>10	99 (40.1)	39 (38.2)	60 (41.4)
Regular medications			
Total number	2200	909	1291
Median (IQR)	9 (6 to 11)	9 (6 to 11)	8 (6 to 11)
Range	2 to 21	2 to 16	2 to 21
PRN medications			
Total number	263	98	165
Median (IQR)	0 (0 to 2)	0 (0 to 2)	0 (0 to 2)
Range	0 to 6	0 to 6	0 to 6

Of the total medications identified, 2200 were regular medications and 263 (12%) were PRN medications. Overall, the median number of medications per patient was 10 (IQR: 7 to 12). The fewest number of medications for a single patient was 2 while the highest was 27.

6.4.2 STOPP criteria

The most frequently encountered STOPP criteria are detailed in table 6.3 and 6.4. STOPP identified 204 instances of PIP in 136 (55.1%) patients. Of the 65 criteria in STOPP, 28 (43.1%) were used to identify these PIP. Eighty four (34.0%) patients were prescribed one PIP, 41 (16.6%), were prescribed two, nine (3.6%) were prescribed three and two (0.8%) were prescribed four or more PIPs (Table 6.3). The central nervous system (CNS) accounted for the highest proportion of PIP identified (n=84; 41.2%), followed by the gastrointestinal

system (n=77; 37.7%), the cardiovascular system (n=18; 8.8%), and the endocrine system (n=11; 5.4%).

In terms of drug class, proton pump inhibitors at extended full dose accounted for the highest proportion of PIP identified (n=76; 37.3%); the second most common instance was the prescribing of benzodiazepines (n=49; 24.0%).

TABLE 0-3 MOST FREQUENTLY ENCOUNTERED POTENTIAL INAPPROPRIATE PRESCRIBING (PIP) ACCORDING TO STOPP CRITERIA

PIP Identified According to STOPP Criteria	
Criteria	Total (n=204)
Cardiovascular System	
Loop diuretic as first-line monotherapy for hypertension (safer, more effective alternatives available)	2 (0.8%)
Calcium channel blockers with chronic constipation (may exacerbate constipation)	1 (0.4%)
Aspirin with no history of coronary, cerebral or peripheral vascular symptoms or occlusive event	9 (3.6%)
Warfarin for first uncomplicated pulmonary embolus for longer than 12 months duration	1 (0.4%)
NSAID with moderate-severe hypertension (risk of exacerbation of hypertension)	3 (1.2%)
NSAID with heart failure (risk of exacerbation of heart failure)	1(0.4%)
Alpha-blockers with long-term urinary catheter in situ i.e. more than 2 months	1(0.4%)
Central Nervous System	
Tricyclic antidepressant with cardiac conductive abnormalities	1(0.4%)
Tricyclic antidepressant with an opiate or calcium channel blocker	1(0.4%)
Long-term (i.e. ≥ 1 month), long-acting benzodiazepines	22 (8.9%)
Long-term (i.e. ≥1 month) neuroleptics as long-term hypnotics	16 (6.5%)
Long-term neuroleptics (≥ 1 month) in those with Parkinsonism	2 (0.8%)

Prolonged use (≥ 1 week) of first generation antihistamines	1(0.4%)
Bladder antimuscarinic drugs with dementia	2 (0.8%)
Benzodiazepines (sedative, may cause reduced sensorium, impair balance)	27(10.9%)
Neuroleptic drugs (may cause gait dyspraxia)	1(0.4%)
First generation antihistamines (sedative, may impair sensorium)	3 (1.2%)
Long-term opiates in those with recurrent falls	4 (1.6%)
Use of long-term powerful opiates e.g. morphine or fentanyl as first line therapy for mild-moderate pain	1(0.4%)
Long-term opiates in those with dementia unless indicted for palliative care or management of moderate/severe chronic pain syndrome	3 (1.2%)
Gastrointestinal System	
Aspirin with a past history of peptic ulcer disease without histamine H_2 receptor antagonist or proton pump inhibitor	1(0.4%)
Proton pump inhibitor for peptic ulcer disease at full therapeutic dosage for ≥ 8 weeks	76 (30.9%)
Musculoskeletal System	
Long-term use of NSAIDS (>3 months) for symptom relief of mild osteoarthritis	2 (0.8%)
Genitourinary System	
Alpha-blockers in males with frequent incontinence	1(0.4%)
Endocrine System	
Glibenclamide or chlorpropamide with type 2 diabetes mellitus	1(0.4%)
Beta-blockers in those with diabetes mellitus and frequent hypoglycaemic episodes	10(4.0%)
Respiratory System	
Non cardio selective Beta-blocker with chronic obstructive pulmonary disease (COPD)	10 (4.0%)
Theophylline as monotherapy for COPD.	1(0.4%)
Total	**204**

The overall number of PIP identified by STOPP per patient can be viewed in Table 6.4 including percentages according to gender.

TABLE 0-4 PATIENTS WITH PIP OVERALL AND BY GENDER

Number of inappropriate medications	Overall n=247	Gender	
		Male (n=102)	Female (n-145)
0	111 (44.9)	42 (41.2)	69 (47.6)
1	84 (32.0)	39 (38.2)	45 (31.0)
2	41 (16.6)	16 (15.7)	25 (17.2)
3	9 (3.6)	4 (3.9)	5 (3.4)
4	2 (0.8)	1 (1.0)	1 (0.7)

6.4.3 START criteria

A total of 161 PPOs were identified in 120 (48.6%) patients (Table 6.5). Of the 22 criteria in START, 14 (63.6%) were used to identify these PPOs. A total of 83 (33.6%) patients had one PPO, 33 (13.4%) had two, and 4 (1.6%) had three. Of the 22 criteria in START, 14 (63.6%) were used to identify these (Table 6.5). The cardiovascular system accounted for the majority of the PPOs identified n=135 (83.9%) followed by the musculoskeletal system n=12 (4.9%) the CNS n=7 (2.8%) and respiratory system n=7 (2.8%). Of the 161 incidents identified by PPO 144 (89.4%) were attributed to five groups of medicines: statins (42.2%), angiotensin-converting-enzyme inhibitor (ACE inhibitor) (32%), aspirin (16.8%), calcium vitamin D_3 supplements (6.8%), and antidepressants (3.7%).

TABLE 0-5 MOST FREQUENTLY ENCOUNTERED POTENTIAL PRESCRIBING OMISSIONS (PPO) ACCORDING TO START CRITERIA

PPO Identified According to START Criteria	
Criteria	Total
Cardiovascular system	
Warfarin in the presence of chronic atrial fibrillation	6 (2.4%)
Statin therapy with a documented history of coronary, cerebral or peripheral vascular disease, where the patient's functional status remains independent for activities of daily living and life expectancy is ≥ 5 years	68 (27.5%)
Angiotensin Converting Enzyme (ACE) inhibitor with chronic heart failure	26 (10.5%)
Aspirin in the presence of chronic atrial fibrillation, where warfarin is contraindicated, but not aspirin	4 (1.6%)
Aspirin or clopidogrel with a documented history of atherosclerotic coronary, cerebral or peripheral vascular disease in patients with sinus rhythm	19 (7.7%)
ACE inhibitors following acute Myocardial Infarction	6 (2.4%)
Antiplatelet therapy in diabetes mellitus with co-existing major cardiovascular risk factors	4 (1.6%)
Beta-blocker with chronic stable angina	2 (0.8%)
Central Nervous System	
Antidepressant drug in the presence of moderate-severe depressive symptoms lasting at least three months	6 (2.4%)
L-DOPA in idiopathic Parkinson's disease with definite functional impairment and resultant disability	1 (0.4%)
Musculoskeletal System	
Calcium and vitamin D supplement in patients with known osteoporosis	11 (4.5%)
Disease modifying anti-rheumatic drug (DMARD) with active moderate-severe rheumatoid disease lasting >12 weeks	1 (0.4%)
Respiratory System	
Regular inhaled beta 2 agonist or anticholinergic agent for mild to moderate asthma or COPD	6 (2.4%)
Regular inhaled corticosteroids for moderate-severe asthma or COPD, where predicted FEV1<50%	1 (0.4%)
Total	**161**

A more concise overview of PIP and PPOs can be viewed in table 6.6

TABLE 0-6 TOTAL NUMBERS OF POTENTIALLY INAPPROPRIATE PRESCRIPTIONS (PIP) AND POTENTIAL PRESCRIBING OMISSIONS (PPOS)

PIP =204	**n (%)**	**PPO =161**	**n (%)**
System		**System**	
Central nervous system	84(41.3)	Cardiovascular system	135(83.9)
Gastrointestinal system	77(37.7)	Musculoskeletal system	11 (6.8)
Cardiovascular system	18 (8.8)	Central nervous system	8 (5.0%)
Endocrine system	11 (5.4)	Respiratory system	7 (2.8%)
Respiratory system	11 (5.4)		
Musculoskeletal system	2 (1.0)		
Genitourinary system	1 (0.5)		
Medicines Group		**Medicines Group**	
PPI	76 37.3)	Statins	68 (42.2)
Benzodiazepine	49 (24.0)	ACE inhibitors	32 (19.9)
Neuroleptics	19(19.3)	Aspirin / Anti-platelets	27 (16.8)
Oral antidiabetic drugs	11 (5.4)	Calcium/VitD_3supplement	11 (6.8)
Beta-blockers	10 (4.9)	Antidepressants	6 (2.4)
Aspirin	10 (4.9)	Warfarin	6 (3.9)
Opiate	10 (4.9)	Beta $_2$ Antagonist	6 (3.9)
NSAID	6 (2.9)	Eta-blockers	2 (1.2)
Antihistamine	4 (2.0)	DMARD	1 (.06)
Alpha blockers	3 (1.5)	L-Dopa	1 (.06)
Diuretic	2 (1.0)	Steroids	1 (.06)
Antidepressants	2 (1.0)		
Warfarin	1 (0.5)		
Broncho dilator	1 (0.5)		

6.4.4 Investigation of factors associated with potentially inappropriate medicines

The results of the univariate and multivariate logistic regression analyses are presented in Table 6.7. In univariate analysis, there was a statistically significant association between number of prescribed medicines and having at least one PIP (p=0.002). Compared with patients with five prescribed medicines or fewer, patients with more than 10 prescribed medicines were more likely to have at least one PIP (OR: 5.89; 95% CI:1.94 to 17.92). No statistically significant associations were found between having at least one PIP and age group

(p=0.948), gender (p=0.120) or activities of daily living group (p=0.202). In multivariate analysis after adjusting for age group, gender and activities of daily living group, the association between number of prescribed medicines and having at least one PIP remained (p=0.003). Compared with patients with five or fewer prescribed medicines, patients with more than 10 prescribed medicines were more likely to have at least one PIP (OR: 6.08; 95% CI:1.84 to 20.12).

TABLE 0-7 UNIVARIATE AND MULTIVARIATE LOGISTIC REGRESSION RESULTS FOR HAVING AT LEAST ONE PIP, N=223

	Univariate		**Multivariate**
	OR (95% CI)	p-value	OR (95% CI)
Age group 62-74 years 75-84 years ≥85 years	 1 (reference) 1.01 (0.51 to 2.02) 0.92 (0.48 to 1.78)	0.948	 1 (reference) 0.88 (0.42 to 1.87) 0.90 (0.42 to 1.93)
Gender Male Female	 1 (reference) 0.65 (0.38 to 1.12)	0.120	 1 (reference) 0.62 (0.34 to 1.14)
Barthel activities of daily living High dependency (0-4) Medium dependency (5-8) Low/medium dependency (9-12) Low dependency (13-20)	 1 (reference) 0.65 (0.27 to 1.54) 1.51 (0.68 to 3.36) 0.85 (0.40 to 1.80)	0.202	 1 (reference) 0.68 (0.28 to 1.68) 1.51 (0.66 to 3.44) 1.08 (0.48 to 2.44)
Number of prescribed medicines 1-5 6-10 >10	 1 (reference) 2.80 (0.95 to 8.29) 5.89 (1.94 to 17.92)	0.002	 1 (reference) 2.84 (0.90 to 8.97) 6.08 (1.84 to 20.12)

6.4.5 Investigation of factors associated with potentially prescribing omissions (at least one PPO)

The results of the univariate and multivariate logistic regression analyses for PPOs are presented in Table 6.8. No statistically significant associations were found between having at least one PPO (n=223) and age group, gender, activities of daily living group or number of prescribed medicines in either the univariate or multivariate analyses.

TABLE 0-8 UNIVARIATE AND MULTIVARIATE LOGISTIC REGRESSION RESULTS FOR HAVING AT LEAST ONE PPO

	Univariate		**Multivariate**
	OR (95% CI)	p-value	OR (95% CI)
Age group		0.911	
62-74 years	1 (reference)		1 (reference)
75-84 years	0.98 (0.49 to 1.95)		0.95 (0.46 to 1.94)
≥85 years	1.11 (0.58 to 2.14)		1.11 (0.54 to 2.31)
Gender		0.658	
Male	1 (reference)		1 (reference)
Female	0.89 (0.52 to 1.51)		0.84 (0.47 to 1.49)
Barthel activities of daily living		0.165	
High dependency (0-4)	1 (reference)		1 (reference)
Medium dependency (5-8)	0.62 (0.26 to 1.50)		0.64 (0.26 to 1.56)
Low/medium dependency (9-12)	1.55 (0.71 to 3.39)		1.56 (0.71 to 3.43)
Low dependency (13-20)	0.91 (0.43 to 1.93)		1.01 (0.46 to 2.23)
Number of prescribed medicines		0.333	
1-5	1 (reference)		1 (reference)
6-10	1.34 (0.49 to 3.65)		1.19 (0.41 to 3.43)
>10	1.87 (0.68 to 5.20)		1.67 (0.56 to 4.96)

6.4.6 Combining START/STOPP

Combining START/STOPP criteria, 184 (74.5%) patients had at least one criterion of potentially inappropriate medicine. There was not a statistically significant association between the prescription of potentially inappropriate medicines and under-prescribing of medicines. However, 72 (29.1%) patients had at least one PIP and 48 (19.4) had at least one PPO (STOPP vs START, p=0.129 Chi squared test).

TABLE 0-9 STOPP AT LEAST ONE MEDICATION * START AT LEAST ONE MEDICATION CROSS TABULATION

		START at least one medication		Total
		0=no	1=yes	
STOPP at least one medication	0 no Count % of Total	63 25.5%	48 19.4%	111 44.9%
	1 yes Count % of Total	64 25.9%	72 29.1%	136 55.1%
Total	Count % of Total	127 51.4%	120 48.6%	247 100%

6.5 Discussion

This is the first study to use STOPP/START criteria to evaluate NPs' prescriptions. The findings report significant levels of potentially inappropriate prescribing to older people. As there are no similar studies among NPs, the findings will be discussed in light of the published data examining the prevalence of PIP using STOPP criteria and PPOs using START criteria for patients in Irish nursing home care settings and hospitals (Byrne *et al*., 2008, Ryan *et al*., 2009c, Ryan *et al*., 2012, O'Sullivan *et al*., 2013).

The PIP findings of 55% for NPs is slightly lower than previously published PIP rates of 59.8% (Ryan *et al*., 2012), 60% (Byrne *et al*., 2008) and 70.8% (O'Sullivan *et al*., 2013). The lower findings in this study may be attributed to the fact that nurse prescribers in the Irish setting have a more limited formulary than their medical counterparts from which to prescribe thereby potentially reducing the incidents in which PIP can occur. Having a collaborative practice agreement (CPA) has the potential to impact on criteria within STOPP/START for which NPs cannot prescribe. Another potential reason for the lower rate of PIP is that nurse prescribers selected which patients were to be included in the study and so selection bias cannot be excluded from the interpretation of the findings.

Tables 6.3 and 6.5 show that both sets of criteria identified an instance of PIP in approximately 54% of the population, with almost three quarters of those patients having at least one criterion of potentially inappropriate medicine defined by either set of criteria. The levels of PIP identified may be attributed to the complex level of chronic co-morbid illness in this section of the population that results in higher levels of polypharmacy (Ryan *et al*., 2012). It was noted in this study that an increase in the number of prescription medicines was associated with the occurrence of PIP using STOPP. Similar to rates described by Ryan *et al.* (2012) and O'Sullivan *et al.* (2013), patients with more than 10 prescribed medicines were more likely to have at least one PIP. A number of studies have used the STOPP criteria to assess PIP prevalence nationally at primary, secondary and long term care. The incidents of PIP identified range from 21% in primary care (Ryan *et al*., 2009c), to 35% in secondary care at the point of admission (Gallagher and O'Mahony, 2008b) and 60% in long term care (Byrne *et al*., 2008). This prevalence correlates with international published work that indicate as the complexity of care and level of patient frailty increases so too does the number of medications prescribed and level of patient co-morbidity that contribute to the prevalence of PIP (Buck *et al*., 2009, Conejos *et al*., 2010). Integrating an evaluation tool such as STOPP/START into the health service audits system could help identify issues

and effect change that needs to be considered to ensure prescribing is appropriate and cost-effective. For instance a significant number of PIP identified in this study were medications acting on the CNS (*n*=84). This is an issue already identified by the Health Information Quality Authority (HIQA) who are at present targeting prescribing for the CNS in older patients in Irish nursing homes as a priority for improvement (HIQA, 2009).

The STOPP criteria are designed to be used in conjunction with START criteria to ensure comprehensiveness of the screening process. As with the STOPP criteria the prevalence of PPOs is substantial in the older adult population (Hamilton *et al*., 2011b). However, there is limited evidence in the literature relating to the prevalence of PPO in older individuals as the majority of the literature has only been published in the last 6 years. These studies indicate that the rate of PPO cover a wide range from 11.2-74.0% (Gallagher et al., 2007, Ryan et al., 2009c, Gallagher, 2011, Dalleur, 2012).

This study also revealed that the majority of patients (n=227) were taking five or more medications routinely which according to Viktil *et al.* (2007) exposes them to polypharmacy and increases the risk of ADEs (Barry, 2008). To understand the impact of ADEs it was important to review the baseline diagnostic information over a three month period (Table 6.1). This revealed the number of patients identified as having a diagnosis of falls was low under current diagnoses but the additional data gathered under baseline information disclosed a considerably higher proportion of patients having sustained a fall in that period. This finding requires additional research to understand if the falls are related specifically to ADEs.

The median number of medications in the three studies conducted using STOPP/START in long-term care facilities in the Republic of Ireland is between eight (Ryan *et al*., 2012) and 11 (O'Sullivan *et al*., 2013) with the present study

having a median of 10. Current evidence-based guidelines that recommend several drugs in the treatment of a single condition make drug prescribing particularly challenging. Steinman *et al.* (2006) discussed the relationship between inappropriate prescribing, medication underuse and the number of medicines used by older people in that patients with fewer than six regular medications were more likely to be missing a potentially beneficial medicine than to be taking a medication considered inappropriate. Results however revealed there was no significant association between the prescriptions of potentially inappropriate medications and under-prescribing of indicated medicines STOPP vs START (p=0.129). Similar findings were reported by Gallagher *et al*. (2011).

In this study, application of the START criteria identified a total of 161 (48.5%) PPOs in a similar number of patients (Table 6.5). These findings are in line with the published data in the Irish setting whereby PPO rates of 44% (Gallagher and O'Mahony, 2008b) and 57.9% (Barry, 2008) have been reported. While the current study did not find any association between demographics and the occurrence of PPO, Barry and colleagues (2008) identified a higher probability of not receiving an appropriate medicine in female patients over 85 years. The current study identified that 68 patients of the 120 identified by the START criteria did not receive the necessary statin therapy which may reflect an assumption that there is not sufficient time for the older person to benefit from the therapeutic intervention i.e. 5 yeas life expectancy. Reinforcing findings by Lang *et al.* (2010), the primary factor associated with the presence of START criteria (medicine under use) is a lack of medication knowledge concerning geriatric conditions in those caring for patients in long term care facilities. In addition, a number of studies have also reported that polypharmacy can result in the under-prescribing of clinically beneficial medications; this may be due to nurses having reservations about initiating additional medications to already potentially complex regimes (Cahir et al., 2010b).

There continues to be a significant problem in relation to PIP and PPO in this vulnerable population that needs to be addressed. Explicit indicators identified in STOPP/START (Gallagher and O'Mahony, 2008a) are a powerful tool to address PIP at the point of issuing a prescription and help contain the increasing cost of medications for the health service (Gallagher, 2011). However, prescribing decisions in older people are often complex and STOPP/START is not a substitute for clinical judgment but encourages prescribers to consider medications as a possible cause for presenting symptoms. To date, there has not been no adverse reported incident to the Nurses and Midwives Board of Ireland regarding a nurse prescriber, which would suggest there are not serious issues with nurse prescribers in practice. The experience, training, and familiarity with the working environment of the nurse prescribers may also influence this situation. Nonetheless, the researcher has to be mindful that there can be a cultural and organisational resistance to open disclosure of medication discrepancies due to associated legal ramifications (Forjuoh et al., 2005).

6.7 Conclusion

This section of the study highlights the rate of PIP and PPO in older patients who are prescribed medications by nurse prescribers across seventeen Irish long term care facilities. Over three quarters of the patients medications reviewed had at least one incident of PIP and/or PPO. The rates of PIP and PPO in patients aged ≥65 years prescribed for by NPs are in line with previously published data on prescribing by clinicians. These finding have a direct relevance for NPs working in older care settings given that recent data has shown a significant causal relationship between PIP and or PPO and ADEs (O'Sullivan et al., 2013). Considering the potential impact of using a medication

evaluation tool in practice, the practical application of STOPP/START in daily practice is not yet established. However, the STOPP/START research group is currently developing an electronic version of STOPP/START criteria for this purpose. The aim of the project is to develop a highly-powered and efficient software engine (SENATOR) capable of individually screening the clinical status and pharmacological and non-pharmacological therapy of older people with multi-morbidity in order to define optimal drug therapy, highlight ADE risk, indicate best value drug brand for selection and provide advice on appropriate non-pharmacological therapy.

In addition, further research is warranted to determine the utilisation of the feedback given following the application of the STOPP/START criteria.

STOPP/START Qualitative Study – Stage 2

6.8 Introduction

In stage one of the research, participants were issued with feedback letters regarding PIP and PPO specific to their prescriptions which they had written. This section of Chapter 6 will investigate how the feedback letters from this evaluation tool were utilised, which, to date, is a significant element of the medication evaluation process that remains under-investigated.

6.9 Aim

The aim of the research was to explore NPs' views and experiences of inappropriate prescribing with specific reference to the utilisation of feedback generated following the application from the STOPP/START tool.

6.10 Method

To explore the NPs' utilization of the feedback letters issued following application of the STOPP/START screening tool, a qualitative research approach was undertaken. This decision was based on the belief that human beings continuously interpret and make sense of their environment, and so researchers must take the meaning of events into account. The qualitative approach sought to understand the motivations and perceptions of the research participants allowing the researcher to gain rich knowledge about the participants, their emotions, perceptions and actions, focusing upon the lived experience as they interpret it (Holloway and Wheeler, 2010).

6.10.1 Participants

Twenty five NPs working in care of the older adult that participated in Stage One of this research agreed to participate in Stage Two of the research. Access for the follow-up interviews was negotiated at the time of the quantitative data collection and took place approximately one month after the nurse prescribers received feedback letters generated from the application of the STOPP/START tool. Two sites participated in a pilot of the interviews at which time it was evident that utilisation of the feedback letters were similar within the site because of collaboration. To avoid repetition of interview data which may give the impression of saturation being reached one nurse prescriber from each participating site n=15 was included in the interview process.

6.10.2 Interviews

Qualitative semi-structured interviews were conducted over the telephone with NPs who participated in Stage One of the research. The interviews were organised directly with the nurse prescriber at the time of screening (Stage One of the study) to take place one month following receipt of feedback letters generated by the application of the STOPP/START criteria to NPs prescriptions. It was deemed necessary to conduct telephone interviews for this section of the research because of a number of issues: geographically it was not possible to re-visit each site for follow-up interviews because stage one of the data collection in one site often coincided with stage two the follow–up interviews in another site. Cost-effective issues were also a consideration for the researcher, securing time from work to re-visit the different sites including over-night accommodation was problematic. Furthermore, local considerations and workloads issues needed to be taken into account. Telephone interviews therefore, facilitated flexibility to conduct interviews for participants during and outside of work hours.

Pilot interviews were conducted with two NPs representing different nursing grades with prescribing authority and different sites to ensure the process to be followed was correct. Prior to initiating telephone calls, a number of efforts were made to facilitate ease of communication with prospective interviewees. The pilot interviews facilitated testing to ensure appropriate structure and accurate preparation. The process was divided into three: a) before, b) during and c) after the interview (see Table 6.10).

TABLE 0-10 TELEPHONE INTERVIEW PROTOCOL

Before the interview
• Appropriate information was communicated to the potential participant and questions answered. • Interviews were scheduled with free time allocated by the researcher prior to and after the interview to accommodate any last minute change to arrangements because of clinical commitments or interruptions. • The interview protocol was pre-tested. • Audiotaping techniques were predetermined and tested. • Appropriate time was allocated for introductions and study overview. • Confidentiality was assured. • Results would be sent to each individual participant via email on completion. • Finally the process was piloted with a research student to ensure the process was smooth, and there were no technical problems.
During the interview
• Initial conversation was light to encourage the participant to relax. Introductions including career background, education and clinical interests of the researcher were discussed. An overview of the study was given and an explanation of how the present research contributes overall. Confidentiality was also reinforced. • Interview questions were structured to vary and allow for the participants opinion. • Themes of interest identified in earlier interviews informed the schedule in later interviews. • At the end of each interview any issues concerning information for a particular question was addressed with the participant and clarification or explanations sought regarding terminology etc. before moving forward.
After the interview
• Each interview was transcribed immediately following the interview while the researcher was still immersed in the essence of the interview. • Ample time was allocated for analysis. • Interviewees agreed to be contacted should validation of any issues in the interview transcripts be deemed necessary.

Telephone interviews were commenced by following an interview schedule that began with some demographic questions and then focused the attention of the participant by asking *'Can you tell me what you understand by the term inappropriate prescribing?'*. However, the participants soon began to deviate from the topic and the researcher found it was important to utilise the

interview schedule as the participants needed the prompts to maintain focus. Therefore, the schedule was followed closely yet, there was opportunity for the participant to give additional information at the end of the interview should they wish to do so. Maintaining focus on appropriate and inappropriate prescribing was important because of specific issue that stemmed from the STOPP/START criteria to establish how feedback was utilised needed to be addressed.

Amendments made to the interview schedules following the pilot interviews were confined to clarity of language. The pilot exercise did however, confirm that a semi-structured interview approach was appropriate as it allowed the participants to move from one topic area to another in a natural way whilst the researcher was able to control the interview overall (Todd et al., 2002). Nevertheless additional issues identified in the literature regarding non-verbal communication needed to be considered when using telephone interviews. Mealer & Jones (2014) identified four types of non-verbal communication that need to be taken into account. 1) Porxemics – related to the way an individual communicates attitude and trust by controlling his/her personal space. 2) Kinesics is the use of posture gesture and facial expressions to communicate rapport and relationship among individuals. 3) Chronemics relates to the use of time such as the length of silence in a conversation and pacing of speech. 4) Paralinguistic communication is the way in which our voice communicates through its tone, speed, pitch and volume which also lends support to rapport during interviews as it can reinforce the message that the words convey. The first two types of conversation are lost in telephone interviews which according to Novick (2008) is a disadvantage. However, Mealer & Jones (2014, p. 35) suggests that *'the lack of visual cues allows for emotional distance, which is perceived as removing judgment and provides the subject with an environment to engage with their reality'.* Additional research conducted by Novick (2008) and Drabble *et al.* (2015) identified specific strategies for success in conducting telephone interviews to include, cultivating rapport and maintaining connection; demonstrating responsiveness to

interviewee content, concerns; and communicating regard for the interviewee and their contribution.

Establishing contact and rapport - the researcher in conducting Stage One of the study had significant contact with the NPs which helped built a rapport. In addition, friendly informal conversation preceded the interview at the time the interviewee was given orientating information to help guide the participant through the interview.

Demonstrating responsiveness to the interviewee content - specific strategies used in this area include active listening, supportive vocalisations and validation and clarification exchanges. Supportive vocalisation was used to convey presence by occasional interjecting phrases such as, *'Please continue', 'You mentioned…', 'Sure', 'Right', 'I know what you mean', 'Yes'.* Clarification was addressed by paraphrasing participant's statements.

Communicating regard for the interviewee and their contribution - the interviewer also demonstrated attention by acknowledging disclosure with comments of appreciation while maintaining a non-judgmental tone at all times.

Notes were taken during the interview to serve as a reminder of the nonverbal communication that was taking place extended such as pauses and change in tone. Note taking was facilitated by structuring the interview questions with comment boxes opposite for convenience (Appendix 16).

The only amendment made to the interview schedules and process following the pilot interviews were confined to clarity of language. On average, the interviews lasted 20-35 minutes and although guided by a predetermined set of questions, permitted the researcher the opportunity to probe the meaning of the experience for that individual, thus facilitating a deeper understanding of the experiences and thoughts of the participant.

6.10.3 Ethics approval

A research proposal was submitted (discussed in Section 6.3.2) and ethics approval for the research was granted from the Clinical Research Ethics Committee of the Cork Teaching Hospitals' (Appendix 13).

6.10.4 Data collection

Telephone interviews were conducted one month following stage one of the research implementation of the screening tool STOPP and START from February to October 2014. From 17 sites, 15 interviews were conducted with NPs employed from staff nurse to advanced nurse practitioner level and having clinical experience of between one and six years participated in the quantitative section of the STOPP/START study. Participants in two sites were unavailable for interview due to an extended illness and maternity leave.

At this stage of the research, participants were again given the opportunity to ask the researcher any questions. Consent was obtained verbally and contained all the elements of informed consent. Confidentiality was assured and the right to withdraw at any time during the investigation, without prejudice, was guaranteed. The interviews were digitally recorded and transcribed as soon as possible following the interview to ensure the experience as described by the participant was accurately captured.

On completion of the research project, the data collected were archived according to University Regulations, and following a policy regarding paper and electronic disposal of data to which the study researchers adhered.

6.10.5 Data analysis

Data analysis was carried out using Colaizzi's (1978) Procedural Steps which provided a framework in keeping with descriptive qualitative research to provide assistance in extracting, organizing, and analysing such narrative Meaning statements were clustered into common themes and referred to the original commentary for validation, thus ensuring that only the participant's perception was captured. In following the principles of data reduction, all themes were included until a description of the experiences of the nurse prescribers as a whole was obtained. It was necessary to recognise overlapping themes and clarify others that were ambiguous by bringing them back to the participant for validation or further elaboration at a later date when necessary. By doing this, the interpretive research moves back and forth between two worlds: that of the understanding and practical dwelling of the participants, and the distancing and questioning world of the researcher. Through analysis and interacting with the data, it is hoped to progress beyond the common sense understanding of the participants' experience in the situation under study to a level of interpretation and critique (Benner, 1994).

6.11 Results

Three areas of interest were identified for discussion from exploration of the interview narrative:

- Nurse prescribers experiences of inappropriate prescribing
- Changing an inappropriate prescription
- Application of STOPP/START feedback

6.11.1 Nurse prescribers' perceptions of inappropriate prescribing

NPs had a concise understanding of the term *'inappropriate prescribing',* explanations which are summarised and presented in Table 6.11.

TABLE 0-11 UNDERSTANDING OF THE TERM PIP (POTENTIAL INAPPROPRIATE PRESCRIBING).

Drug duration too short/long
Drug dosage incorrect
No discontinuation date identified
Prescriptions repeated without suitable review
Interactions with other drugs
Incomplete assessment
Unsuitable combinations of drugs
Incorrect maintenance drugs
Unwanted side effects
Under and over prescribing
High risk drugs unmonitored
Polypharmacy

A broad range of issues were identified as contributing factors to PIP which, according to NPs, could be initiated by the patient, the family or the healthcare professional. For instance, the well documented issues with polypharmacy may also be the result of patient and/or family assuming the role of prescriber.

> *'Sometimes patients will take medications from a relative because a drug worked for them or they combine over the counter medications with prescribed medications…'*
>
> (Participant 3)

If a family is unhappy with treatment for an older person or feel situations are unresolved, they often seek additional help and because of anxiety will visit several doctors for the same problem, especially if the patient has challenging behaviour and is difficult to manage at home.

> *'… when you have several doctors prescribing for the same patient some of them don't understanding the root of the patient's problem or communicate the changes made this can be a big problem for prescribers'….'Families frequently request medications with lack of understanding and patients or families are not properly educated by the GP'.*
>
> (Participant 10)

> *'If the patient does not tell their family doctor they have been to see another doctor out of hours then the changes might not be picked up for some time – access to information is a problem'.*
>
> (Participant 6)

Participants identified a combination of age, multiple co-morbidities and poor history-taking as significant issues that contributed to the complexity of prescribing decisions in older people. Interventions to optimise prescribing appropriateness required support from suitable persons with knowledge to review prescriptions and were influenced strongly by the presence of a clinical pharmacist or access to a geriatrician.

> '*if pharmacists are involved in prescribing and undertaking reviews of drug charts weekly we don't see (experience) problems with inappropriate prescribing'.*
>
> (Participant 4)

In addition, PIP was kept to a minimum if

> *'…GPs in the community worked closely with the community hospital and MDT including our geriatrician we had fewer problems'.*
>
> (Participant 10)

However, there were also issues identified within the nursing care facilities as contributing to PIP.

> *'Sometimes the use of antipsychotics and benzo's (benzodiazepines) are staff rather than GP lead – staff shortages make it difficult to manage some patients'.*
>
> (Participant 7)

Having undertaken the prescribing programme, participants were acutely aware of the responsibility of prescribing medications and underpinning knowledge required. However, circumstances can sometimes contribute negatively to the prescribing process resulting in an inappropriate prescription.

> *'I suppose it (PIP) is something that would be on most prescriber's minds. I feel confident enough but there is always the possibility of prescribing an inappropriate drug, dosage or frequency especially if I am busy and my assessment is rushed I try and make sure it does not happen but there is always the possibility'.*
>
> (Participant 2)

Participants' concerns regarding PIP also extended to the management of patients' medications from the wider perspective of changing conditions to ensure medications prescribed remain appropriate.

'I sometimes need to initiate reduction in dosages for the patient… but I would go back to my assessment and knowledge gained to do this'… 'If the patient has too many underlying problems it is better to discuss the medications with the team rather than prescribe independently'.

(Participant 11)

6.11.2 Changing a PIP

Changing a PIP was either a simple or complex matter depending upon the acceptance of nurse prescribing in the clinical area in question.

'No problem, if I see a drug prescribed inappropriately there is no need to discuss this with anyone unless I have reservations or issues with the assessment'.

(Participant 1)

'It depends on my relationship with the medic (doctor), some are very in favour of nurse prescribing whereas others want to control it'.

(Participant 9)

Even though the NPs appeared to be confident in altering a prescription many indicated that they would be cautious. One particular response within the clinical setting was more severe and debilitating for the NP and her practice.

'I once discontinued an antibiotic prescribed by the GP and had my knuckles wrapped because I had not consulted with him even though it was well documented that the patient was allergic to the drug …I was

told not to prescribe for his patients again. The doctor in fact asked for restrictions to be put in place regarding my role, I haven't prescribed in over a year now'.

(Participant 5)

Working from a CPA was considered somewhat restrictive if a PIP required attention. In clinical practice, NPs must work within the parameters of the agreed drugs list on the CPA. Therefore, nurse prescribers were not comfortable making alterations to drugs that were deemed inappropriate if outside the limit of their CPA.

'It would depend on the drugs listed on my CPA, if it is not listed I would not change it. If it was something simple I would not have a problem stopping or putting the drug on hold while I discussed it with the doctor'.

(Participant 15)

Reported confidence could also be viewed in terms of the CPA however, participants appeared to have outgrown the CPA which they now viewed as restrictive with some participants clearly stating that

'It's wrong to leave an inappropriate drug on a medication chart and do nothing about it because I have to work within my CPA but I'm more competent than that'… 'I will use the feedback letters (from STOPP/START) the next time my CPA is being reviewed'.

(Participant 12)

'Nurse prescribing should be more independent, I find that my CPA is restrictive sometimes and wider access to drugs would be more beneficial'.

(Participant 2)

6.11.3 Utilisation of STOPP/START feedback

Feedback letters given to the nurse prescribers following the application of the STOPP/START tool to their prescriptions were viewed in a very positive light.

'The STOPP/START feedback was good to discuss with the doctors it gives you real evidence'.

(Participant 8)

There was also a growing awareness by participants and the value that the screening tools feedback could play in improving collaborative care.

'Yes, I found them great to get feedback so honest. I like that I get direction from the STOPP/START tool but can still use my clinical judgment'.

(Participant 14)

'Very good for guidance and alerting you to the most appropriate action see underlying problem and how it is being managed especially with PPI (proton pump inhibitors). Makes you think and be more aware

of drugs. I use the feedback when discussing issues with the MDT'.

(Participant 11)

For staff who did not refer to screening tools routinely, they could also see the associated benefit.

'When I got the feedback letters it made me realise how powerful they (screening tools) can be. I used the letters to get some of the patients medications changed and the doctors were responsive for the drugs outside my CPA…I would use the STOPP/ START in the future for guidance'.

(Participant 9)

Participants were also creative in using the feedback as evidence of care and to advance and support ongoing issues in the clinical area that had previously been difficult to advance within the organisation.

'*…the feedback from STOPP/START was used to highlight the importance of having a clinical pharmacist. Forty percent of our patient prescriptions were reviewed and when we had the evidence of the cost savings from the feedback letters our facility agreed to employ a clinical pharmacist three days a week'.*

(Participant 1)

'After the STOPP/START evaluation HIQA (Health Information Quality Authority) were with us we showed them the feedback letters as part of our audit and they thought it was great. We will continue to use the STOPP/START'.

(Participant 4)

'I think it's great to assess prescribing using STOPP/START and have evidence for my audits'.

(Participant 11)

In general having an evaluation tool in place was viewed in a positive light however, there were concerns that an appropriate evaluation tool would be adopted

'Yes, I think the STOPP/START tool is easy to use; the problem here is that they are bringing in a system that is over complicated. I would prefer the STOPP/START tool to work with'.

(Participant 14)

Reservations regarding the need for an evaluation tool centred on insufficient supporting systems in the clinical setting and having a patient-focused approach to medications.

'…we would not have access to updated software. I would like software to help with inappropriate prescribing'.

(Participant 7)

'They are of benefit but I generally don't refer to them I work with the patient ensuring they are well. Listening to patient is the most important part of understanding them and their problems'.

(Participant 13)

6.12 Discussion

Findings indicate that participants were knowledgeable regarding inappropriate prescribing and were positive regarding the feedback letters given following the STOPP/START medication evaluation. Previous research undertaken in this area concentrated on applying the STOPP/START tool mainly to prescriptions written by doctors. To date, a qualitative follow-up investigation has not been undertaken to explore the impact of the feedback given and if or how it was utilised. Therefore, information available in the literature on the topic to equate directly with the findings of this Chapter is limited. Consequently, results will be compared with the available data regarding PIP in older adult care and relevant issues identified by the participants.

Participants revealed an insightful understanding of prescribing and that optimizing drug therapy for older adult patients was a challenging multifaceted process that should not be considered a straightforward procedure. The changes in age and multi co-morbidities identified by participants in relation to prescribing are issues discussed by Barry *et al.* (2008) who suggest that frequent exposure to medications in the older adult increases the risk of developing complications from drug therapy. However, participants also identified accurate assessment and history taking as potential additional contributing risk factors if not conducted properly in advance of undertaking the complexity of prescribing decisions in older people. This is, perhaps, due in part to the fact that the core element of the prescribing process centres on decision making which is considered ambiguous (Aronson, 2011) and varies considerably from one prescriber to another. Participants also highlighted the importance of the patient's perspective on medicine-taking within the assessment process that needed to be determined in advance because a compromise was sometimes needed between the view of the prescriber and the patient's informed choice to ensure medications were appropriate. The importance of this consensus is borne out in research undertaken by Frank *et*

al. (2001) who states that 37 per cent of patients take drugs without their doctors' knowledge, and 6 per cent of patients do not take medications prescribed by their doctors. In addition, if several different prescribers are involved in treatment, the risk of receiving an inappropriate drug combination is high and well established (Tamblyn et al., 1996) because the provider of prescriptions may not be fully informed. Findings from this study identified that older patients were contributing unintentionally in the nurses view to the problem of inappropriate prescribing by self-medicating, failing to follow prescribed directions, failing to report all medications or over the counter products used and borrowing or trading medications with friends and family.

PIP prescribing in older Irish people is a well-documented problem (Ryan et al., 2009c, Byrne et al., 2010a, O'Sullivan et al., 2013) that requires a collaborative approach to prescribing to ensure medications are appropriate for patients with complex drug regimens and multiple comorbidities. Specifically the study confirmed that medication management in care of the older adult calls for a greater alignment between nurses' and doctors' prescribing processes if medication management is to improve. Having a two-tiered prescribing system in place fragments prescribing and could be viewed as contributing to the increasing medications problems experienced by the Health Service that now costs the government almost €2bn per year (Barry, 2013). Reflecting this collaboration, possibly the most beneficial modification to the clinical area secured by participants in this study was the addition of a clinical pharmacist to the team which according to Stuijt *et al.* (2008) and Kaczorowski *et al.* (2011) improves older patients' health care outcomes.

Control of prescribing experienced by participants in the study was not reliant on actual authority but was exercised in a number of ways. Firstly, participants recognised that nurses prescribed under restrictive conditions because of the CPA and confidence to change a PIP was heavily reliant on the

relationship between the nurse prescriber and the doctor and whether or not the medication was identified on their CPA. Having rigorous controls in place for NPs raises the question, is it a tool that can be manipulated by the organisation for its own benefit or a role that keeps with a nursing vision of benefiting patients? At present the structures in place are at best, unproductive if each CPA does not accurately reflect the needs of the clinical area and the prescriber. It is suggested the governing body responsible for introducing the CPA needs to reflect on its value. Participants were in favour of having a CPA for the first 12-18 months to help with establishing confidence and competence, however, the majority of participants had moved beyond requiring this support and now found it cumbersome which detracted from the efficiency of their prescribing. Secondly, through the CPA, medical dominance was maintained over NP and, similar to work undertaken by Stein-Parbury & Liaschenko (2007), collaboration broke down when physicians overlooked nurses' clinical assessment and concerns about a patient. On the whole doctors' primary work is concerned with the disease itself and its treatment whereas nurses' work is often concerned with issues that are less physical and therefore poorly understood and perhaps less relevant to doctors. However, the knowledge associated with prescribing is independent of this divide and should connect both nurse and doctors in a shared understanding of prescribing (Kroezen et al., 2012).

My work also found that feedback letters were valued by participants as a source of information to enhance and encourage good prescribing practice but also to support their position within the organisation. Having the information and rationale for change gave them the confidence to question medication regimes which they could now do from an evidence-based perspective. This, they felt, strengthened their position within the multidisciplinary team because they could now discuss relevant issues having appropriate background information and a proposed solution. The security of this knowledge also gave them more confidence presenting cases to the Drugs and Therapeutics Committee specifically in relational to advancing the medications listed on their

CPA, that had in some cases been previously rejected. One particular site had four participants that equated to 40 patients' prescriptions being reviewed. Having been unsuccessful in putting several proposals forward requesting the support of a clinical pharmacist for the hospital, the participants linked the feedback information to cost savings for the organisation and resubmitted their proposal. They were successful and the organisation now has a clinical pharmacist who can assist in a comprehensive appraisal of older patients' medications and who is considered a valuable resource person. According to Ansari (2010) clinical pharmacists have a major role to play in relation to prevention, detection, and reporting ADEs, considering that over 70% of the ADEs are avoidable (Howard et al., 2007). In addition, findings from Howard *et al.* (2007) found that common drug groups associated with preventable ADEs are similar to those identified in this study and identified in Table 6.6 (Stage One of STOPP/START study). The PIP medication groups in Table 6.6 could therefore be considered a priority when addressing polypharmacy for older adults after to inform the ineffective or unnecessary treatment. Working as a multidisciplinary team affords the skill range to meet the increasingly complex needs of older adult patients who require the different skills of different professionals. Finally, another participant presented her feedback letters and changes undertaken to the patient's medication regimes to the Health Information Quality Authority (HIQA) as part of a national audit that included a review of medications. Discussion is underway to incorporate the STOPP/START tool into two clinical sites on a more permanent basis.

STOPP/START should be considered a flexible tool to help balance safety and quality of prescribing with appropriate treatment of all co-morbidities (Gallagher and O'Mahony, 2008b). In some cases, what is considered inappropriate prescribing according to STOPP/START may be appropriate prescribing for an individual patient for various reasons. To address this, guidelines accompanying the STOPP/START tool clearly state that the tool does not replace the clinical judgment of the prescriber. To ensure continued clinical

relevance and applicability, Version 2 of the STOPP/START criteria was published in October 2014 (O'Mahony et al., 2014).

6.13 Conclusion

This is the first studies in the Irish setting to investigate nurse prescribers' views and experiences of PIP and receiving feedback using STOPP/START. Interventions that focused on optimising prescribing by addressing the issues related to the most common instances of PIP is important but understanding how the tool was used constructively in the clinical setting to improve relationships and establish hard evidence for change is vital for the future advancement of nurse prescribing.

All of the participants welcomed the feedback letters following the STOPP/START evaluation and utilised them in various different ways: one particular site used the evidence in the feedback letters to support the introduction of a clinical pharmacist to the team. Other participants regarded the information in the feedback letters as valuable toward strengthening their position within the multidisciplinary team. Perhaps the most important outcome was the confidence the feedback letters gave the participants who challenged and changed medications regimes and presented cases, with self-assurance, to the local Drugs and Therapeutics committee. The letters also gave the participant a broader view of their CPA, which they felt was too restrictive once NPs developed confidence and competence.

Acknowledgments

The researcher wishes to acknowledge Dr. David O'Sullivan who modified the database E-Pharma-Assist CDSS System specifically for this study. In addition, the

researcher would also like to thank the nurse prescribers across the HSE South for their contribution to Stage One and Stage Two of this study.

CHAPTER 7 CANADIAN NURSE PRACTITIONERS UNDERSTANDING OF INAPPROPRIATE PRESCRIBING AND USING A PRESCRIBING EVALUATION TOOL

Chapter 7 – investigates NPs' perceptions of appropriate and inappropriate prescribing and their opinion of using a medication evaluation tool from an international perspective. Canadian nurse practitioners with prescriptive authority and previous experience of using a medication evaluation tool participated in this study.

[10] **Canadian Nurse Practitioners Understanding of Inappropriate Prescribing using a Prescribing Evaluation Tool.** Creedon R., Byrne S., Sketris I., Kennedy J. & McCarthy S. (2016) Journal of Nursing Education and Practice, 6(4) 1-11

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

7.1 Introduction

Nurse practitioner has no universal definition (Worster et al., 2005) but it is generally accepted that nurse practitioners provide services to individuals and families across the lifespan and work in a variety of community-based settings (DiCenso *et al*. 2003, 2007). The title is frequently used to identify advanced practice nursing in Canada, the United States (US), Australia and the United Kingdom (UK). In Ireland, the position is referred to as an Advanced Nurse Practitioner (ANP). Historically, the nurse practitioner role was introduced in the US in the mid-1960s (McIntosh et al., 2003) and Canada in 1967 (DiCenso et al., 2003) to meet increasing health service needs, with the literature describing the first reported nurse practitioner's role as 'a contentious issue that produced a good deal of conflict and anxiety' at the time (Schober and Affara, 2006 p. 37). Today however, the role encompasses an evidence-informed holistic approach that emphasises health promotion and partnership development, that complements rather than replace other healthcare providers (Donald et al., 2010). More recent events of physician shortage, together with the aging population and the associated increase in healthcare demands that has exerted considerable pressure on the Canadian health care system (Gould et al., 2007b) and so nurse practitioners have become increasingly identified as a resource that can meet the ongoing health need of the Canadian population (Esmail, 2011).

Nurse practitioners' prescriptive authority has therefore evolved in response to pressures from patients, physicians, changing policies and requirements relating to the effectiveness and efficiency of care (Latter and Courtenay, 2004, Kaplan and Brown, 2006). Prescribing authority for Canadian nurse practitioners is particularly important because health services cover large geographical regions that are remote, sparsely populated and where medical practitioners are not readily available (Forchuk and Kohr, 2009a). However, prescriptive authority for nurse prescribers in the Canadian context is complex and may vary due to provincial and territorial governance systems within the

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

country (Forchuk and Kohr, 2009b). This has resulted in each province and territory having its own approach to nurse practitioner positions with prescriptive authority closely linked to the development of the role within each province. The common ground being the requirement for additional education, training, and regulation to ensure that those functioning in the nurse practitioner role are able to provide safe care to the public (Donald et al., 2010).

Internationally over the past decade nurse practitioners have become part of the long term care system (Jehan and Nelson, 2006, Stolee et al., 2006, Health Service Executive, 2008b) and are now caring for clients with higher prevalence of chronic illness, disability and dependency (Barry, 2009). However, advancing age and exposure to medications increases the risk of developing complications from drug therapy. Consequently, particular care must be taken when determining drugs and dosages for this section of the population to ensure prescribing is appropriate considering the long standing issues and number of older adult clients in receipt of medicines for chronic conditions in the Canadian health service (Sitar *et al*, 1995). While the benefits of pharmacotherapy for the older adult are potentially substantial, the process of choosing the appropriate medicine for the individual older adult patient may be complex. Changes in the patient's medical status over time can cause long-term medicines to become unsafe or ineffective, therefore part of the nurse practitioner's role is regular medication review to ensure continuing positive benefit for each medicine prescribed for the older adult. To ensure medication benefits are maintained several validated tools have been developed to help prescribers identify potential inappropriate prescribing in older adult care (Beers, 1997, Cantrill et al., 1998, Gallagher et al., 2008c). The significance of appropriate prescribing can be viewed in the context of the financial cost to the health service which has been identified by the Canadian Institute of Health Information (CIHI). In 2013, an estimated $34.5 billion was spent on drugs, the majority of which $29.3 billion (85.0%) was spent on prescribed drugs (Canadian Institute of Health Information, 2013). Within the priority research

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

area of Drug Policy, the Canadian Institute of Health Research has identified effectiveness, safety and adverse events as key areas to be addressed, their vision being to *'transform from a reactive, one-size-fits all approach to a more personalized system of predictive, preventive, and precision healthcare that is tailored to a population or an individual'* (Canadian Institute of Health information, 2014, p. 64). Incorporating nurse practitioners to provide direct care by way of 'initial diagnosis of problems/concerns, establishing of diagnosis following appropriate diagnostic tests if required and formulation of a management plan, which may include prescriptions of medications' (Lowe et al., 2012) has the ability to provide personalised appropriate care the initiative requires. Furthermore, the competence of nurse practitioners to manage patient care in a comparable manner to physicians, with high levels of patient satisfaction, combined with increased advice on education and health promotion has been well reported in the international literature (Snowden and Martin, 2010, Courtenay et al., 2011, Bowskill et al., 2012, Latter et al., 2012, Ben Natan et al., 2013). However, the literature in relation to nurse practitioners understanding of appropriate or inappropriate prescribing is limited; leaving a void in the understanding of the impact nurse practitioners with prescriptive authority may have on patients' drug regimes. The difficulty however, can be local governance policy that limits the number of products available in the prescribing formulary for nurse practitioners (Wilson and Bunnell, 2007) causing restrictions on prescribing that impact on their ability to prescribe appropriately. Therefore, it is important to gain a better appreciation of Canadian nurse practitioners' understanding of appropriate and inappropriate prescribing and their views of using a prescription evaluation tool in practice to ensure prescribing is optimal and can support the planned national change.

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

7.2 Aim

The aim of the study was to explore Canadian nurse practitioners (with prescriptive authority) understanding of appropriate and inappropriate prescribing and their experience of using a prescribing evaluation tool.

7.3 Method

Similar to the qualitative descriptive methodology discussed in chapter 3 (section 3.3) this study adopted a qualitative descriptive, approach to the research. Data were collected in May 2015 during a research travel bursary visit of four weeks to Dalhousie University, in Halifax, Using a descriptive phenomenology approach is the most appropriate way to develop an understanding of nurse practitioners' experience of appropriate and inappropriate prescribing and the importance placed on a prescribing evaluation tool as interpreted by nurse practitioners who have lived the experience.

7.3.1 Participants

Participants in a Husserlian phenomenology study must have experienced the phenomenon and be able to articulate what it is like to have lived that experience (Lopez and Willis, 2004) of using a medication evaluation tool in practice. Therefore, a purposive sample of nurse practitioners with prescriptive authority working in older adult care in the greater Halifax region and the wider area of Nova Scotia, Canada were asked to participant. Sampling continued until no new themes emerged, this occurred after eight interviews. All participants except one were female having an educational level of either MSc or PhD, the participants also had experience as nurse practitioners with

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

prescriptive authority ranging from 2 to 14 years and clinical experience of 8 to 28 years. All of the nurse practitioners interviewed were primary healthcare practitioners, with seven of them currently working in community health centres and one in private practice supported by a health care team.

7.3.2 Interviews

All eight participants were first contacted by the researcher via email to establish their interest in participating in the research. Positive responses were followed up with personal emails that included interview details and requesting that the participant identify a date and time suitable to carry out a telephone interview. Telephone interviews were necessary because of the diverse geographical location of participants across the state of Nova Scotia, Canada and the timeframe available to the researcher to collect the data. Interviews followed a semi-similar structure to the telephone interviews undertaken in Chapter 6 stage 2 (section 6.10.3) of the study to ensure appropriate structure and accurate preparation for the interviews, the process was divided into three: a) before, b) during and c) after the interview, details of which are set out in Table 6.10

7.3.3 Data collection

Interviews were conducted by telephone with each practitioner for approximately 25-35 min. A predetermined set of open questions were used to maintain focus on appropriate and inappropriate prescribing and the value of using a prescription evaluation tool (Appendix 16). This topic guide was developed by the author for a previous study using STOPP/START and piloted to ensure the guide maintained focus on appropriate and inappropriate prescribing. This structure provided an outline for the interview however, additional questions were allowed to emerge naturally from the dialogue. Due

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

to the lack of visual cues the researcher took notes as a reminder of the non-verbal communication such as pauses or hesitations that took place during the interview and to facilitate transcription.

The interviews were digitally recorded and transcribed immediately following the interview to ensure the experience as described by the participant was accurately captured. Using the telephone for data collection interviews may also reduce some forms of response bias (facial expressions) as the interviewer and participant are potentially less affected by each other's presence. This, in turn, may increase the level of comfort for both parties and result in a more relaxed interview (Smith, 2005).

7.3.4 Ethics considerations

Ethical approval was not granted for data collection in Canada by the Clinical Research Ethic Committee Cork (Appendix 17). Access to potential participants for the study in Canada was facilitated by the Pharmacy Department at Dalhousie University who arranged the appropriate meeting and introduction to the Senior Advanced Nurse Practitioner in Nova Scotia to discuss the study and potential participants. Before the interview process commenced, research participants were given the opportunity to ask the researcher questions regarding the study. Verbal consent was obtained and the possibility of re-negotiating consent was also discussed. Confidentiality was assured and the right to withdraw at any time during the investigation, without prejudice, was guaranteed.

7.3.5 Data analysis

Data analysis was carried out using Colaizzi's (1978) Procedural Steps which provided a framework in keeping with qualitative descriptive research (see

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

table 4.3). Similar to the structures undertaken in chapter 4, meaning statements were clustered into common themes and again referred back to the original commentary for validation, thus ensuring that only the participant's perception was captured.

In following the principles of data reduction all themes were included until a textural-structural description of the experiences of the nurse prescribers as a whole was obtained. It was necessary to recognise overlapping themes and clarify others that were ambiguous by bringing them back to the participant for validation or further elaboration, when necessary. In doing this, the interpretive research moved back and forth between two worlds: that of the understanding and resourceful dwelling of the participants, and the distancing and questioning world of the researcher. Through analyses and interaction with the data, it is hoped to progress beyond the common sense understanding of the participants' experience in the situation under study to a level of interpretation and critique (Benner, 1994).

7.4 Results

Following analysis of the narrative data, findings were grouped under the following headings for reporting:

- Level of confidence and competence described by nurse practitioners in their role as prescriber.
- Understanding and consequences of inappropriate prescribing.
- The role screening tools play in prescribing for older people.

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

7.4.1 Confidence and competence

Participants acknowledged that having prescribing rights had improved their self-esteem, and autonomy in practice. When asked specifically to rate their confidence in prescribing on a scale of 1-10, 1 being the least and 10 the most confident the majority of participants rated themselves between 8 and 10. These participants were well established having the most experience in their specialty area, kept up to date and understood their professional boundaries. However, one participant did not share this view awarding themselves a 6. This participant had the least experience having qualified as a nurse prescriber two year previously and attributed this to not having had the opportunity to prescribe as part of the education process.

> *You know I found when you get in a course you can teach about the disease and learn about a particular drug but we don't know how to prescribe or how to titrate or discontinue it (medication) really I find you learn by using the drug or talking to colleagues…I didn't know how to, start it (prescribing) and I always 'start low and go slow'. But what is low and what is slow?'*
>
> (Participant 2)

Additional issues concerning confidence and competence surfaced when asked if there was anything they should know more about when prescribing for older adults. CPD was identified by all participants as important to maintain awareness of medication issues and better placing them to question or challenge medication changes or adjustments required.

> *'I won't prescribe anything new unless I have absolute understanding of what patients are on and taking in addition, like herbal, over the counter or any complementary therapies…because a lot of them don't even think that an enteric coated aspirin they take for*

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

heart disease is even a medication because they don't get a prescription for it… patients adding over the counter medications can be a big problem'

(Participant 7)

Accurate assessment was also identified as important for competent prescribing. However, several participants highlighted that developing nursing expertise in a particular area can focus your knowledge so finely that limitations can occur.

'I'm comfortable assessing my patients, my background is renal but my patients don't just come with renal problems they have vascular problems, diabetes the whole list. I'm not an expert in some of those other areas'.

(Participant 6)

Participants felt that their role was not to primarily generate prescriptions instead they were keen to communication and interact with patients as part of an accurate assessment and competent prescribing process. Understanding the characteristics of the patient's requirements, strengths and weaknesses that facilitated a more holistic approach to prescribing was identified as important.

'Having a conversation is important because you can have patients with strange reactions to their medicines and if you don't explore it properly you won't know. I find that sometimes the gaps I identify during conversation give me the most information'.

(Participant 7)

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

7.4.2 Understanding and consequences of inappropriate prescribing

The level of understanding regarding inappropriate prescribing was broad and has been condensed into the main areas identified in table 7.1.

TABLE 0-1 DESCRIPTION OF INAPPROPRIATE PRESCRIBING

1. Medications not appropriate for the client in terms of diagnosis or health status at the moment.
2. Prescribing without a good cause or reason.
3. Making a choice of medications for patients that either don't follow best practice or are not in the patient's best interest.
4. Prescribing outside my scope of practice. Wrong dose for the wrong patient.
5. Medications prescribed that are not clinically relevant.
6. Prescribing something that is not based on evidence based rationale from a clinical assessment point of view that fits the actual condition.
7. Prescribing a medication that may not be warranted or effective.
8. Wrong medication for the wrong patient.

Although not referred to directly, prescribing by omission was addressed indirectly within answers questions.

It is an established fact that medication use increases with advancing age. This in turn requires that prescribing for older people represents a range of options and values that attempt to optimize prescribing quality for individual patients.

> *'Prescribers do not use frailty as a predictor when prescribing. A lot of the medication of older folk are family driven because they want Mom or Dad or whoever to have the same level of care that they have not recognising the physiological changes that occur with aging may not make those medications appropriate'.*

(Participant 4)

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

Also depending on the level of care, therapies can be viewed from different perspectives.

> *'Sometimes treatment in hospitals would be a little more aggressive than what we would consider appropriate in primary care'.*

(Participant 7)

All participants identified they had a substantial role to ensure medicines were appropriate. Specifically, interactive approaches were used to combat problems.

> *'I have a direct involvement because I am educating the residents myself and nursing staff plus allied staff. I also review charts as part of the process.*

(Participant 4)

> *'I have direct involvement in making sure medications are appropriate we do hundreds of med reviews every year and we do med reconciliation also. I explain to the families and staff the physical and medications review results'.*

(Participant 3)

Participants linked proper assessment to appropriate prescribing through individualised care assessment thereby, ensuring the drug–patient interaction is implicitly included in the prescriptive process.

> *'I've seen families who were primary care givers for older adults struggling to manage with what appeared to be deteriorating conditions*

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

which were actually side effects of medications when assessed'.

(Participant 7)

Several characteristics of ageing and geriatric medicine affect medication prescribing for older adult people and render the selection of appropriate pharmacotherapy a challenging and complex process that may not result in the desired effect.

'I really don't think there is a black and white answer to prescribing sometimes the patient does not keep up to date with the changes to medications it's not always about the medicines sometimes its human error that causes the problems. We try to do our best, but sometimes problems just happen'.

(Participant 4)

Inappropriate prescribing remains a problem in day-to-day practice and despite increased awareness; the dynamic nature of the problem requires updating solutions that address constant changing patterns.

'I try to focus on what I do well… and individualise care to reduce risk'

(Participant 6)

For prescribing in general it is important that the patient has trust in the prescriber. Trust is also essential for establishing collegial relationships with other healthcare professionals and patients.

'There is human error in everything we do. What people deserve to know is whether it was an error or an omission and the biggest thing people want to know is what are we going to do differently, or if we are

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

going to do anything differently. That's how we tend to manage most everything here'.

(Participant 5)

Participants were confident that the consequences of inappropriate prescribing could be addressed

'I think it would be education for all involved but there is a barrier to that because it costs money'

(Participant 2)

'So in order to make change we really have to have a complete culture shift and make the prescribers and the whole system aware that seniors require unique care and they are uniquely different form the adult population when it comes to prescribing'.

(Participant 4)

'I'm the only nurse practitioner within a huge facility (485 beds) in my opinion there is work for three in the facility then we could cover and support each other and share the workload and have cover at the weekends. Yes we need more prescribing nurse practitioners'.

(Participant 3)

Address polypharmacy we've been talking about it for years but we are only starting to take some action now'.

(Participant 1)

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

Polypharmacy was identified as very common among older adults and is often adopted as a strategy to address symptoms, reducing disease-related problems and improving quality of life in the older adult.

> *'When we look at underlying causes for problematic symptoms it is sometimes due to too many drugs. We have to strip them back to the essential drugs so that the team can get in and treat the patient in a meaningful way'.*

(Participant 5)

Polypharmacy may also be the result of patient and/or family assuming the role of prescriber.

> *If over the counter drugs are added (to the medication regime) the patients may present to us with problems that can be difficult to figure out. Education is important and even salads in the summer for someone on warfarin can cause problems'*

(Participant 8)

It is unrealistic to expect that the majority of clinicians have enough knowledge about drug-related appropriateness and interactions when prescribing for older people with multi-morbidity to avoid errors. However, participants felt that they could err on the side of caution.

> *'If there is ever a problem I write my cell number on all my prescriptions so if the pharmacist ever has a question they can contact me directly to discuss any possible error'.*

(Participant 5)

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

The most effective benefits of prescriptive drug therapy for older adults can only be derived if drugs are prescribed and used appropriately. Participants voiced that combining expert opinions was also an option.

> *'…attention to detail is required and if I have a problem I will take it to my collaborative practice partner to discuss. I work in a collaborative team so I don't work in isolation it's always good to have colleague around for advice.*
>
> (Participant 6)

7.4.3 The role screening tools play in prescribing for older people.

All participants had experience of using a prescribing appropriate evaluation tool and were familiar with the STOPP/START evaluation tool in particular.

> *'I used the STOPP/START criteria in my work and clearly identified areas where there is inappropriate prescribing and the need for re-evaluation depending on the stage of life'.*
>
> (Participant 4)

Time appeared to be an issue when applying a screening tool with some participants identifying it as cumbersome to apply in the clinical setting. Many practical issues were raised.

> *'I can really see the benefit of using a medication evaluation tool especially if we had the database that you (the researcher) use. It would save us time and we would get immediate results. Using STOPP/START*

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

and applying the criteria manually is just not practical'.

(Participant 3)

'I think it would play an important role especially if the nurses and doctors were using the same computer based system. We would follow the same structure and have a better result for the patient using the evaluation tool'.

(Participant 2)

Participants' concerns regarding PIP also extended to the management of patients' medications from the wider perspective of changing conditions to ensure medications prescribed remain appropriate.

'I love the STOPP/START tool because the research is there in the literature and so easy to share the information and findings. They make us think about leaving people on medications for extended periods of time simply because they saw a cardiologist 15 years ago'.

(Participant 3)

Other participants could see possibilities beyond the initial identification of PIP.

'They are not necessarily looking at just prescribing but gathering data on your patient about their diagnosis, past history, medications, lab tests and activities of daily living a concise history and assessment on each patent documented and easily accessible'.

(Participant 8)

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

7.5 Discussion

All participants were knowledgeable regarding inappropriate prescribing and had information about or worked with a prescribing evaluation tool in the past. As with previous research, participants highly rated the use of a prescribing medication evaluation tool, understanding that medication appropriateness can be measured by evaluating the content or quality of a prescribing decision and or the outcome of that decision (O'Connor et al., 2012). Even though there was a number of prescribing evaluation tools available for detecting inappropriate prescribing, the participants had a very good working knowledge of the STOPP/START criteria. This was attributed to the ongoing research using the STOPP/START criteria undertaken by the Pharmacy Department in Dalhousie University, Halifax, in collaboration with the School of Pharmacy in University College Cork, Ireland.

All participants endorsed regular reviews of older adults prescriptions, a practice that is supported by the literature to reduce medications prescribed (Loganathan et al., 2001). Nurse practitioners were aware of the issues surrounding the aging population in their region especially the growing number of older adults that face challenging treatment decisions. This trend makes it even more critical to develop interventions that can improve the decision-making process to ensure appropriate medications are prescribed (Tariman et al., 2012). In order to facilitate good decision making and depending on cognitive awareness of patient's nurse practitioners included families when necessary through organised family conferences. Including the family in the assessment process opened communication to ensure that patients concerns and wishes regarding medications and treatments are elicited and understood. This is an important additional component of managing medications considering physicians' and patients' perspectives on treatment and associated decisions can sometimes differ. Such differences were identified by Kutner *et*

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

al. (2000) who recognised physicians rank co-morbid conditions and the medical literature as important factors in treatment decision-making, while patients rank family preference, family burden, and physician's opinion as important factors in making treatment decisions. Nurse practitioners with prescriptive authority are adequately placed in practice to promote informed treatment choices that are consistent with the patients' personal preference and based on informed decision making. Nonetheless, the balance is fine between medications that improve quality of life for the older adult and medication related problems that place them at risk (Rocchiccioli et al., 2007).

Nurse practitioners identified that selecting appropriate medications for use in older adult patients is often complicated by multiple illnesses and multiple medications. The potential is high for drug-drug and drug-disease interactions which the nurse practitioner must bear in mind when choosing a medication or assessing its effectiveness or side effects (Herr, 2002). The primary factor associated with medicine under use was a lack of knowledge. In particular lack of access to the expert knowledge of a geriatrician impact on medications concerning geriatric conditions in those caring for older adult findings similar to Lang *et al.* (2010). Even though participants indicated that specialisation improved their knowledge, it was focused on a specific condition or system depending on nurse practitioners area of expertise. This posed a considerable challenge for nurse practitioners, because patients who usually presented with problems require a wider understanding of individual diagnosis and differential diagnosis in order to make appropriate medication decisions for them. To ensure patients with multiple problems were appropriately assessed the nurse prescriber utilised the expertise of the multidisciplinary team which according to the literature 'utilises individuals from different disciplines working in a team toward a common goal' (Thylefors et al., 2005 p. 112). Such collaboration has led to improved client outcomes such as decreased hospital admissions and timely interventions for older adults (Arbon et al., 2008, Health Service Executive, 2010). However, participants also expressed the importance

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

of combining multidisciplinary care with a medication evaluation tool especially STOPP/START was significant because of its correlation with ADEs (Hamilton et al., 2011a).

Much attention has been paid to over-prescribing for older adults nonetheless participants recognised that under-prescribing of appropriate medications was also a concern. This is a seriously misdirected practice according to Rochon (2015) because seeking to simply limit the overall number of drugs prescribed to older adults in the name of improving quality of care is incorrect practice. Therefore, a medication evaluation tool used in practice needs to encompass the appropriateness of prescribing which according to Spinewine *et al.* (2007) embraces three values, 1) the preferences of the patient, 2) the scientific and technical rationale of prescribing; and 3) the interests of the community. However, quantifying what the patient wants and serving the best interests of the community can be quite challenging as they can be influenced by societal, economic and family factors (Lam and Cheung, 2012).

The literature reveals that numerous studies using STOPP/START criteria have been conducted in various patient-care settings to assess prescribing appropriateness (Gallagher and O'Mahony, 2008b, Ryan et al., 2009c, Cahir et al., 2010b, Gallagher, 2011, Ryan et al., 2012, O'Sullivan et al., 2013). However, when using a prescribing evaluation tool, it is important to consider that explicit criteria such as that of STOPP/START do not take into account all factors that define high quality health care for the individuals. The START screening tool for PPOs does not allow for factors such as life expectancy, time needed to derive clinical benefit and patient preference as legitimate reasons for under-prescribing (Spinewine et al., 2007). It is the nurse practitioners responsibility to understand the burden of comorbid disease and patient preference which are then taken into account and required to reconcile decisions with the evaluation

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

tool. Applying the STOPP/START evaluation tool may require flexibility, in some cases, what is considered inappropriate according to STOPP/START may not be appropriate for an individual patient for various reasons (Jansen and Jacobus, 2012). To address this, guidelines accompanying the STOPP/START evaluation tool clearly state that the tool does not replace the clinical judgment of the prescriber (Gallagher and O'Mahony, 2008b). There were however, concerns expressed about inconsistent implementations of the evaluation tools and the time required to evaluate patient's medications. According to Ryan *et al.* (2009c) this issue was recognised by the research group in the School of Pharmacy, University College Cork and University Hospital Cork who began developing a database to facilitate the use of STOPP/START criteria in day-to-day clinical practice. Furthermore, in 2013 the research group was funded to develop a Software ENgine for the Assessment & optimization of drug and non-drug Therapy in Older peRsons (SENATOR) a highly-powered and efficient software engine capable of individually screening the clinical status and pharmacological and non-pharmacological therapy of older adults with multimorbidity. The significance of this software to nurse practitioner and other prescribers is that it can define optimal drug therapy, highlight adverse drug reaction risk, indicate best value drug brand for selection and provide advice on appropriate non-pharmacological therapy. A very valuable tool considering the majority of older adults with multimorbidity are managed by healthcare professionals that are not specially trained in geriatric medicine and rehabilitation and may not have access to a geriatrician or specialised nurse practitioner to help with assessments.

In this study, nurse practitioners' knowledge and experience was recognised by other health care professionals as supportive within their practices. In addition, the value of nurse practitioners was also considered important because of connection with a range of services and clinical networks that have been emphasised in the literature as primary, speciality and acute services (Conger and Plager, 2008). Participants in this study did not take for

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

granted the referring diagnosis of the GP or hospital department but showed initiative and integrity and acted on their advanced knowledge and experience to independently assess their patients. The nurse practitioner then had the confidence and ability to bring a range of clinicians together to develop a package of care that was focussed on the individual patient needs. Utilising this approach helps the nurse practitioner to look beyond the initial clinical problems that presented to focus on the more holistic plan of care for each patient and provide staff with support and motivation, as described by Garrubba *et al.* (2011). However, building such an integral service required healthcare professionals to broaden their professional standards. According to Veysey *et al.* (2005), this process requires training, discussion, collaboration, and a shared assessment and treatment plan. The fact that the nurse practitioners mentor and are champions for change within organisations is significant for the future development of best practice in elderly care.

The importance of CPD and remaining up to date was an issue identified by all participants that required additional support. Positive comments were tempered with a belief that too many demands placed on the nurse practitioner encroach unacceptably on the opportunity to undertake CPD. Specifically, heavy workload and absence of colleagues to cover the work ('backfill') prevent uptake of CPD, issues already identified in the literature by Gould *et al.* (2007a). Whilst it was acknowledged that a certain amount of learning was achieved 'on the job', it was repeatedly put forward in the interviews that formal education and training was necessary to supplement and enhance such learning. Considering the predicted changes of increasing complexity in elderly care (Canadian Nurses Association, 2008) it is essential that nurse practitioners engage with CPD and are supported throughout their careers to maintain and develop the knowledge and skills to respond effectively to the needs of patients, service users and the wider public (Taylor et al., 2010). Especially when viewed in the context of changing demographic patterns of disease in countries across the world and the subsequent impact on health

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

service delivery, preparatory education can only ever be an initial grounding for nurse practitioners.

7.6 Conclusion

Nurse practitioners have derived both personal and professional benefits from prescribing and feel better equipped to make decisions and challenge changes if necessary. The potential for prescribing nurse practitioners to contribute positively to address the issues with increasing healthcare demands and associated problems and to improve quality of care in the Canadian health system is substantial given their understanding regarding appropriate and inappropriate medication management.

Nurse practitioners in Nova Scotia, Canada are both competent and confident prescribers and have integrated prescribing effectively within their respective roles. In addition, recognition of their role and contribution to the wider healthcare team is acknowledged but there are still some cautious responses from a number of doctors in practice. Another tangible issues identified is the importance and support required for ongoing CPD. More specifically CPD was identified as a substantial prerequisite for maintaining knowledge and keeping up-to-date with the ever changing pharmaceutical industry and medications available in practice. Management strategies employed in practice were communication, collaboration and collegial relationships to effectively safeguard medications prescribed and reviewed as appropriate for the older adult population. However, the issues surrounding the consequences of inappropriate prescribing were more complex requiring an organisational approach to the interactive management of medications prescribed and reviewed to ensure maximum benefit.

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

Acknowledgments

This study was undertaken as part of a PhD travel bursary facilitated by University College Cork. The researcher would like to thank Professor Ingrid Sketris, Dalhousie University, for her help in accessing nurse practitioners in Nova Scotia, Canada. Thanks also go to the nurse practitioners who generously gave of their time and agreed to be interviewed for this study.

Publication of this chapter can be viewed in appendix 18.

Footnote - Ethical approval was not granted for data collection in Canada by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

CHAPTER 8 DISCUSSION

Chapter 8 – collates the issues, findings and relevant important information from the studies for discussion in more depth.

8.1 Discussion

There is general consensus both nationally and internationally among demographers that improvements in life expectancy will continue for the foreseeable future (CSO, 2014). In Ireland at present older individuals account for a large portion of the population with numbers expected to almost double in the next 40 years. The most significant increase within this timeframe will occur in those aged 80 years and above with numbers increasing from 128,000 to 484,000 (CSO, 2014). This life expansion will undoubtable be helped by medicine which will allow people to live longer however, they will do so with needs, difficulties, disabilities and illnesses. Such changes challenge all of us to re-think models of care delivery, and poses real challenges to health services to ensure that the highest quality of clinical care is guaranteed (Phelan and McCormack, 2012). Therefore, many countries are transferring tasks, such as the prescribing of medicines, from doctors to nurses in order to improve healthcare quality, efficiency and effectiveness (Buchan and Calman, 2000, Sibbald et al., 2004, McKee et al., 2006). The evolving role of the nurse is also at the forefront of service development in Ireland. For example the HSE Corporate Plan (2015-2017) specifically refers to the development of a national coordinated plan to include the continued expansion of nurse and midwifery led services based on population need and taking account of efficiencies (Health Service Executive, 2015a). This thesis widely acknowledged the contribution of NPs and the important role they now play in service development in Ireland. The role of the NP is clearly an important element of future healthcare (Health Service Executive, 2015a) however this thesis demonstrated that some aspects of nurse prescribing requires change to ensure the initiative continues to improve.

TABLE 2.1 MATRIX TO REFLECT THE STORY OF THE THESIS

Study phase	Data Collection Method	Country	Nurse prescribing culture	Timeframe	Themes identified
Stage 1	Interviews	Ireland	Independent	February-April 2012	Communication Workload and time Attitude and behaviour
Stage 2	Survey	Ireland/UK	Ireland-Independent UK-independent and supplementary	Ireland October-January 2013 UK March-April 2013	Demographic and academic profiles similar in both cohorts Role independence Workload issues CPD requirements were identified by both Ireland/UK Confidence and competence levels were comparable
Stage 3	Database population using nursing and medical documents	Ireland	Independent	February 2013-January2014	STOPP and START medications identified for participants and systems most commonly affected
Stage 4	Interviews	Ireland	Independent	March 2013 – February 2014	NPs experiences of inappropriate prescribing Changing an inappropriate prescription Application of STOPP/START feedback
Stage 5	Interviews	Canada	Independent	May 2015	Confidence and competence Understanding and consequences of inappropriate prescribing He role screening tools plan in prescribing for older adults

8.2 Core findings

- The Irish foundational structures of nurse prescribing from the educational requirements, registration, and assessment criteria are similar to that of the UK and Canada.

- Evidence form the literature suggests that the impact of nurse prescribing on clinical practice is positive from a patient, healthcare professional and organisational perspective. A significant number of nurse prescribers are unwilling to register as nurse prescribers following completion of the education programme. The organisational support for nurse prescribing needs to improve if the initiative is to continue evolving.

- The nurse prescribing role is ambiguous because it does not have a specific role description to embed the initiative in practice and is now regarded as an add-on to an already busy workload.

- The data collected through the MDS are restricted, incomplete and inaccurate especially pertaining to nurse prescriber's workloads which have significantly increased. In addition, the MDS has also contributed to a two-tiered prescribing system in Ireland making nurse prescribing more labour intensive to complete than their medical counterparts.

- The competence and confidence levels of nurse prescribers in Ireland are comparable to their counterparts in the UK and Canada. Similar issues regarding continuing professional development were identified in all countries.

- The collaborative practice agreement is proving to be restrictive in practice and reaffirms that overall responsibility for nurse prescribing remains with the doctor because their signatures are required to complete this document.

- The STOPP/START evaluation tool has the potential to improve safety and quality of prescribing that has an immediate effect on patient care. Although the incidents of potentially inappropriate prescribing for nurses prescribers appears high the results are slightly lower than previous studies undertaken with doctors

8.3 The impact of nurse prescribing in practice

There are several aspects of the study findings which hold relevance towards existing nurse prescribing evidence. The literature review (Chapter 3) re-affirms that nurse prescribing is beneficial for the patient (Courtenay et al., 2010b, Drennan et al., 2011), the organisation (Carey et al., 2009b, Darvishpour et al., 2014) and the healthcare professional (Dunn et al., 2010, Dobel-Ober et al., 2013) and is viewed as one of the most stimulating initiatives by the nursing profession in the recent advancements of nursing. In Chapters 4, 5 and 6 it is evident that nurses clearly understand the requirements of the prescribing role at different levels of care delivery which makes better use of their skills. Nevertheless, the degree to which this has been described and acknowledged has not been fully supported at organisational level for the initiative to evolve as planned. Perhaps one of the most important concerns that require immediate attention is the data generated by the prescribing process because of the integral connection it has to clinical decision making, nursing research, professional development, and operational effectiveness. At present, nurse prescribing data published are incomplete and inaccurate causing frustration for the nurse prescriber on two levels that of under representing workloads and lack of communication (active involvement in decision making). Chapter 5 establishes that NPs recognise the integral connection of prescribing data to evidence-based practice, findings similar to those of Cashin *et al.* (2009), Courtney *et al.* (2011), Drennan *et al*. (2011) and Coull *et al.* (2013). Improved communication between the HSE and NPs is necessary to capitalise on this insight in order to reduce the risk of poorly structured plans for nurse prescribing in the future. Lack of consultation/communication regarding mandatory requirements in the form of the MDS had proven to be burdensome for NPs who find they are working with repetitive processes that impede their practice. Chapter 4 revealed that initially the NPs response to the MDS was limited compliance but due to continued lack of communication between the HSE and the NPs, the response has increased to non-compliance and in some cases escalated even further reducing their willingness to engage with the

nurse prescribing process. Also compounding this issue is the generation and publication of incomplete reports and audits from the MDS at a national level (Health Service Executive, 2014c). This has further contributed to the lack of confidence in the system and has resulted in the gradual withdrawal of NP involvement with the data in practice (table 5.8). Considering the negativity now associated with MDS the NPs had the ability to look beyond the problems encountered with the system, to view contributions from prescribing data as having value for nurse prescribing if collated and reported with accuracy. However, this would require a restructuring of the MDS to ensure appropriate data was captured and connectivity of the database be improved. Thereby allowing nurse prescribing data to be managed more effectively and with clarity to influence nursing practice about a range of strategic issues such as quality and patient safety, finance, human resources, risk management and national services plans (Moen and Mæland-Knudsen, 2013, Cusack et al., 2014).

Restructuring of the MDS is required to ensure NPs are active participants in the data gathering and utilisation of the system moving away from the undervalued passive role they now hold. Draft recommendations from a recent and as yet unpublished review (September 2015) of nurse prescribing have suggested removing the national mandatory requirement for NPs to input all prescriptions to the MDS. The review also suggested that MDS be considered as a template for electronic prescribing (Health Service Executive, 2015a). This final recommendation should be discussed more extensively with NPs in practice, outside of the nurse prescribing representatives on the review committee to establish if working from an imperfect system is an appropriate start point for electronic prescribing. If nurse prescribing is to maintain continued clinical significance, changes should be driven from the perspective of all concerned; patients, NPs and the organisation and not controlled by the interests of one specific perspective.

A more revealing insight is disclosed in chapter 6 (Stage 2) of the Thesis regarding many of the issues highlighted by nurse prescribers as obstacles to the advancement of the nurse prescribing initiative. In addition, to increased workloads, medical dominance, restrictive CPA, and fluctuating degrees of support from colleagues and the organisation were also identified as an impediment to the role advancement. These findings are supported by Earle *et al.* (2011a), Bowskill *et al*. (2012) and Carey *et al.* (2013). Although workload issues also featured prominently in Chapter 4 information was limited to the Irish nurse prescriber's perspective in this section. The issue of workloads was further investigated to incorporate the views of both Irish and UK nurse prescribers in Chapter 5 (Table 5.4 together with Figures 5.2 and 5.3) with the unrecognised 'hidden workload' identified as the biggest concern for both Irish and UK nurse prescribers.

Irish nurses that undertake the role of nurse prescribing do so without adjustment to their already busy clinical workload requiring the NP to negotiate their new role within the current system. Success as a nurse prescriber therefore depends not only on their prescribing skills but also on how they manage their time, prioritise workloads and effective merging of their prescribing and nursing roles. Compounding this issue there is no job description associated with nurse prescribing to help the NP negotiate the difficult task of integrating their new role in practice. Nurses repeatedly identified the benefits of the nurse prescribing role throughout this Thesis in Chapters 4, 5, 6 and 7 however, they struggle with the nursing and prescribing role an issue identified by (Bowskill et al., 2012) that is not clearly defined. This role ambiguity was also trying for NPs because the role was described as not embedded in practice but was regarded as an 'add on' to an already busy workload. Furthermore, a wider issue associated with this add on role was the perceptions of other staff who did not understand the responsibilities associated with the prescribing role and sometimes viewed prescribing as taking time away from patient care and clinical work rather than

complementing the care delivery of the unit/ward as a whole. This issue was addressed in Chapters 4, and 5 which revealed that the clinical aspects of nurse prescribing required adequate time and resources to be invested at practice level which was outside the remit of the NP.

Irish NPs also verbalised that the CPA and its role in practice needs to be reviewed. The issues identified concerning CPAs were restrictive prescribing, and delays in processing the CPA both initially and on renewal of the document. Although the CPA is specific to Irish nurse prescribing, similar limits on prescribing exist in The Netherlands, Spain, Australia, Georgia and Missouri in the USA (Kroezen et al., 2012) using formularies. Even though the NP has accountability for their prescribing decision, engaging in permission seeking to complete their CPA acknowledged that overall responsibility for the patient remained with the doctor. Similar to findings by Bowskill *et al*. (2012) who suggested that engaging in such behaviour permits the NP to exhibit professional respect and avoid any potential conflict of agreement about the division of labour with the doctor to secure their prescribing position within the team. In addition this thesis revealed that cooperation and support between nurses and doctors allowed them to move from a compliant relationship towards one of collaboration but difficulties did arise in the workplace when prescribing for the same patient. Nonetheless, nurse prescribing makes care slightly more complex, which required that those involved be conscious of the fact that this increases the need for consultation between physicians and nurses. In particular, the qualitative interviews (Chapters 4 and 6) were useful for exploring some of the possible factors that influenced perceptions of control.

Specifically, discontinuation of inappropriate medications was identified as an issue if the medication in question was not identified on the CPA. This has led to a two-tiered approach to prescribing (Chapter 5) in the Irish setting

causing conflict between the nurses' perceived role and the role the organisation imposes on them. The inflexibility of the CPA was addressed by NPs by not adding new drugs or simply not prescribing and transferring the responsibility for prescribing to junior doctors who do not experience similar restrictions with prescribing. A more effective way of addressing these issues could be the establishment of a national medicines formulary for use by all prescribers that would contribute to an overall governance framework for medicines management activities. Having a national formulary to replace the CPA would also address the two tiered prescribing system now in place and allow prescribing by NPs and medical practitioners that is evidence based and cost effective.

Given the autonomy to choose independent prescribing nurse prescribers have shown a preference to limit the CPA to a one year period at which time there was a consensus that confidence and competence had developed sufficiently to allow for independent prescribing and continued use of the CPA proved restrictive. Thus, defeating the essence of nurse prescribing which allows nurse to take on a more rounded complete role that facilitates better patient care. Having a CPA can be argued that the medical profession have authorised, coached and overseen the development of non-medical prescribing in practice. Using such structures has advantages which include progress reviews and demonstration of critical understanding. However, findings in Chapters 4 and 7 identify formularies as cumbersome and needing regular review to take into account prescribers needs and continued competence development. In addition, over-reliance on protocols or personal formularies (CPA) has the potential to decrease opportunity to independently prescribe in practice a situation that will eventually impact on confidence levels and the development and maintenance of competence.

Based on the sample of nurse prescribers in this thesis, Irish nurse prescribers are as confident in their ability to prescribe as their counterparts in the UK and Canada (Chapters 5 and 7). Self-reported confidence and competence is measured specifically in relation to the Irish/UK nurse prescribers in Chapter 5. Through applying the same topic guide to Irish and Canadian nurse prescribers in (Chapters 6 and 7), knowledge in relation to appropriate and inappropriate prescribing and the use of a medication evaluation tool is also comparable. The role is set to expand further and nurses need to be aware of phrases such as, 'extended or expanded scope of nursing practice' that could be argued includes camouflaged medical care (Lyon, 2005). Recent developments in Ireland, that has put the health service under pressure to retain doctors (Humphries et al., 2015) which has resulted in the associated shouldering of medical responsibility by other healthcare professionals including nurses, is of note here.

Both Irish and Canadian cohorts of prescribers identified similar issues in relation to optimising prescribing and recognised the feedback from the application of the STOPP/START criteria as enriching their confidence to discuss medication issues within the care team. Patient assessment and regular medication reviews were considered the cornerstone of the prescribing process by both cohorts. Canadian nurse prescribers had the element of medication review well established and utilised doctors, clinical pharmacists and nurses in the process. In the Irish setting the medication review process although recognised as important was not as well established in the clinical sites that participated in this research and in addition lacked input from a pharmacist at the point of prescribing. A missed opportunity considering the emphasis placed on the importance of medications management by the health service and associated financial output. Encouragingly, there is increased involvement of geriatricians and clinical pharmacists in a limited number of sites which is in keeping with best practice (Weedle et al., 2008).

There was evidence of increased confidence displayed by the NPs following receipt of the medication evaluation tool feedback which gave them the underpinning information required to challenge or question medication and prescriptive decisions in practice (Chapter 6). Having the appropriate knowledge promotes an environment whereby nurses and doctors collaborate more efficiently on medication management through questioning and discussion as opposed to imposed restrictions on prescribing privileges.

Perhaps the introduction of nurse prescribing to the Irish healthcare setting in 2007 was somewhat ill timed. Considering the first NPs finished the education programme in September 2007 and entered the work force at the start of the recession and introduction of the moratorium by the HSE in 2008. This challenging and rapidly changing environment of health service reform, austerity and political change, put particular pressures not only on service managers but also on front line delivery staff. During this very difficult period prescribers continued to evolve in practice, they adapted, reconfigured or replace specific fundamentals (Chapter 4 - findings) to meet the changes imposed on them by the health service or organisation. These adjustments impacted on professional engagement in decision-making behaviours and practice and guidance was shaped more by workplace policies, values, norms and resources than by scientific evidence for the nurse prescribing initiative. This situation has resulted in limited opportunity and support for prescribers to make sense of and learn from their collective experiences and knowledge during this time (Chapters 4, 5 and 6). The thesis has also given us an understanding of what NPs require from the HSE to meet their commitment to the prescriptive process in practice (Chapter 5). In addition, to supportive organisational structures access to relevant CPD is also essential (Chapters 4, 5, 6 and 7). Having such support would help overcome the barriers appearing in the form of reduced applications for the education programme and lack of

commitment to register as a prescriber once the education programme has been completed. CPD for nurse prescribers is relevant from the perspective of the individual, organisation and profession. However, the added dimension of having CPD requirements imbedded in the Nurses Act (2011) firmly transfers the responsibility for CPD to the individual that may or may not have support from the organisation in which they work. The difficulty in arranging appropriate CPD for NPs is 1) the diversity of specialties associated with the role and 2) the pharmacology knowledge associated with that specialty. The present system in place of attendance at study days, conferences and presentation only addressed CPD at a basic level and not the specifics of what is required by NPs. The difficulties of structuring appropriate CPD is making it specific to each NPs area of practice that to date has proven to be expensive and labour intensive to formulate.

The issue of non-registered 337 NPs (Health Service Executive, 2015) that have completed the education programme also needs to be addressed. Having qualified and remaining unregistered perhaps needs to be viewed in the context of fitness to register and practice. Considering the importance placed on CPD by registered practicing NPs to maintain competence a timeframe should be place on non-registered NPs within which they must register to ensure safety.

An overall impression from the findings in this thesis suggest that management of nurse prescribing by the HSE and hospital organisations is viewed from two perspectives that of a tool that can be manipulated by the organisation when suitable, or a role that keeps with a nursing vision of benefiting patients. Evidence of this coincidental finding can be seen in the broader understanding of nurse prescribing in practice Chapter 4 that becomes more focused in Chapter 5 which reveals the confidence and competence of NPs and additional supports required to advance the initiative. Chapter 6

refines the reality of nurse prescribing in practice through the application of the STOPP/START criteria to NPs' prescriptions and the qualitative element of the study that shows the role of NPs in practice and the alternation of the initiative between a role and a tool depending on the clinical situation Figure 8.1 shows an overview.

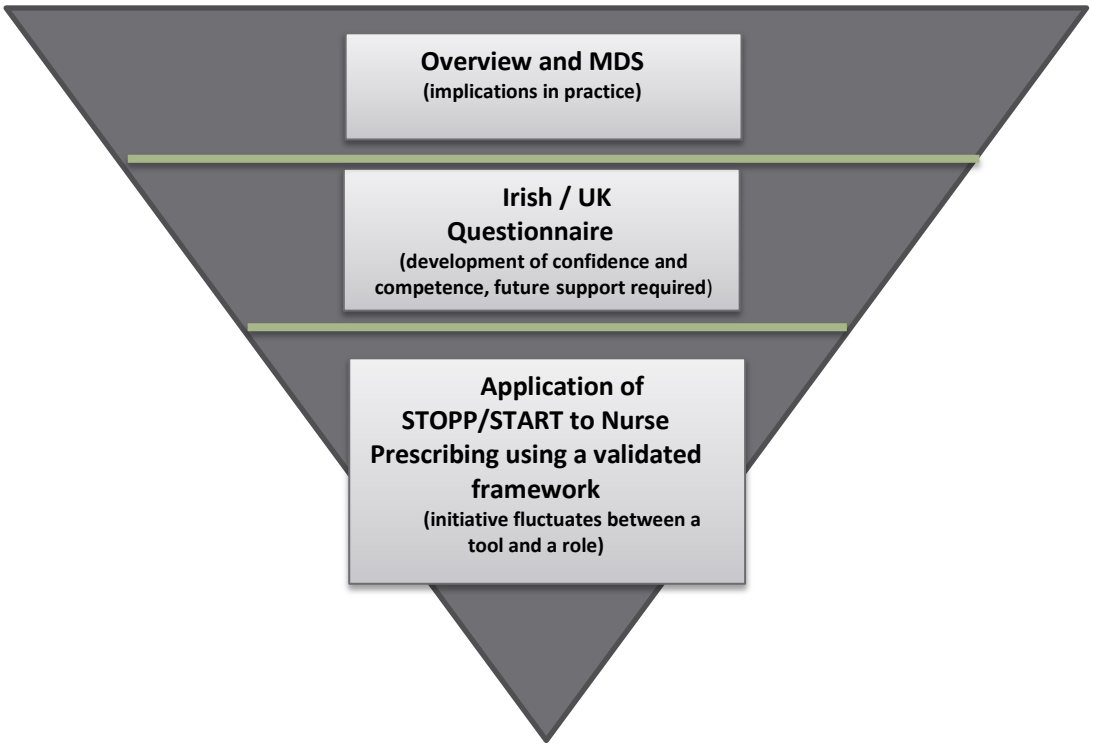


Figure 8.1 Nurse prescribing a Tool or a Role

Further research is required to address this coincidental finding and its implications for practice and role development before it can be discussed with confidence.

8.4 Prescriptive process

Economic aspects of prescribing have become increasingly important in healthcare systems with finite resources and increasing medicine costs. The prescribing process can offer important data in relation to the costs of training together with prescribing trends and expenditures.

The application of the STOPP/START criteria (Chapter 6) to the role (prescriptions) of NPs has demonstrated the importance of such data revealing that NPs PIP rates in this sample although high are consistent with previous research undertaken in the area (Ryan et al., 2012, O'Sullivan et al., 2013). Prior to undertaken this research nurse prescribers did not have evidence regarding PIP and without this evidence were reluctant to alter prescriptions with confidence. More specifically, without a medication evaluation process there is an absence of association on how medications impact on morbidity, mortality and quality of life. However, the distinct way in which nurse prescribers utilised the feedback and implemented the majority of the recommendations resolved this disassociation and revealed increased awareness. Prescribers' genuine interest in the role was apparent when the NPs within clinical settings peer-reviewed the feedback letters given to them following the application of the STOPP/START evaluation tool. This was evident from the pilot interviews (Chapter 6 Stage 2) undertaken in one site where the nurse prescribers reviewed the feedback as a group and utilised the information collectively.

STOPP/START has a potential contribution to make in terms of issues such as shared decision making, working as a team, improved safety and quality of prescribing that has an immediate and positive effect on patient care. Similar findings were identified in the Canadian setting (Chapter 7) implying that the STOPP/START criteria may provide an effective framework for assessment of PIP and PPOs in older adults for nurse prescribers. In particular, their position is

strategic in the clinical setting between the resources of medication requirements and the logistics of medication management for the patient and organisation.

As with any new role difficulties have been identified requiring further management and structuring of its integration. Nurse prescribing looks set to play a part in continuing to transform our health services in the future because of the identified improve health-care efficiencies and reduce costs of health-care delivery directly related to date.

8.4.1 Potentially inappropriate prescribing

This thesis indicates that the rate of potentially inappropriate prescriptions in the South of Ireland is substantial (Chapter 6). Across the seventeen Irish long term care facilities included in the study, 55% of the patients medications reviewed had at least one incident of PIP. However, the findings are consistent with previous studies undertaken in the Irish setting (Byrne et al., 2010b, Ryan et al., 2012, O'Sullivan et al., 2013). These finding have a direct relevance for nurse prescribers working in this setting given that recent data have shown a significant causal relationship between PIP and or PPO and ADEs (O'Sullivan et al., 2013). Application of the STOPP/START screening tools to prescribing decisions may reduce unnecessary medication, related adverse events, healthcare utilisation and cost.

The most common PIP medications were those associated with the CNS (41.2%) i.e. benzodiazepines, neuroleptics, opioids and antidepressants. A number of studies have raised concerns relating to the appropriateness of benzodiazepines in older individuals. Despite these documented risks of falls, confusion, as well as psychological and physical dependency (Gallagher et al.,

2008, Ryan et al., 2009a, Ryan et al., 2009c), benzodiazepines continue to be prescribed for older individuals, nationally and internationally across all settings of healthcare (Parr et al., 2009, Ryan et al., 2009c). Additionally mediations relating to the gastrointestinal system followed closely at 37.7% (proton pump inhibitors) that were mostly prescribed at the wrong dosage for maintenance therapy. The last significant group were the cardiovascular system but at a much lower figure of 8.8%. These figures need to be considered in context as older patients admitted to hospital are sicker and frailer than those in the community.

Reducing PIP in older people will require implementation of more robust methods of medication reviews to routinely assess drug effectiveness, dosage, duration, interactions and adverse effects. There is a need therefore to install PIP prevention measures for patient in long term care facilities, as a means of preventing ADEs and minimising avoidable expenditure on medications. Although mooted in the literature since 2009, the practical application of STOPP/START in daily general practice has not yet been established. However, the study highlights that the STOPP/START criteria could be used to develop a prescribing intervention led by nurses who have constant and close contact with patients to significantly reduce PIP and in addition associated health care utilisation costs. The cost of PIP was not considered in this study but a previous national study estimated the cost of PIP to be in excess of €45 million using a subset of 30 STOPP criteria (Cahir et al., 2010b)

8.4.2 Potential prescribing omissions

PPO is another important aspect of PIP that often goes under-reported considering a recent randomised controlled trial demonstrated that the application of the STOPP criteria significantly improved medication appropriateness when compared with the usual pharmaceutical care in 400

hospital inpatients (Gallagher et al., 2011). However, one research article in the Irish healthcare setting reports on PPO in older adults identifying a prevalence of 42.2% (Ryan et al., 2012). This thesis identified PPOs at 48.5% (Chapter 5) of patients who had one or more clinically indicated medicines omitted from their regular prescriptions without a valid reason and PPO previously reported for older hospitalised patients in the literature of 11.2-72.7 (Barry *et al.* 2008, Gallagher *et al.* 2011. Dalleur *et al.* 2012). The majority of these omissions involved statins, ACE inhibitors, aspirin and calcium with vitamin D_3 supplements (Table 5.6). These drugs are generally well tolerated in older people however the prescribers may be of the view that the practical value of the medication is limited given that the life expectancy in many of the patients is shorter than the average time for clinical benefit.

8.4.3 E-Pharm Assist CDSS System

The E-Pharm-Assist CDSS system standardised the data collection and review process within this thesis, while also allowing the researcher access to additional clinically relevant information such as drug-drug interactions, hepatic and renal dosage adjustment at the point of review. Nurse prescribers were very interested in the system and could see the value of having such a tool available to them in practice. At present, for NPs addressing PIP and PPO in frail older people is a considerable challenge and time-consuming process that the prescriber may not have the skills to undertake with confidence. The commercial version of the CDSS system SENATOR will significantly assist all prescribers with the practical application of STOPP/START in everyday use in order to optimise drug therapy as a routine. The SENATOR project is focused on developing software that can individually screen the clinical status and pharmacological and non-pharmacological therapy of older people with multimorbidity in order to define optimal drug therapy, highlight adverse drug reaction (ADR) risk, indicate best value drug brand for selection and provide

advice on appropriate non-pharmacological therapy. Valuable feedback, previously unavailable to prescribers can now be delivered in an electronic format and in a timely manner changing the dynamics of how prescribing is approached in practice for the countries involved. Clinical trials are underway at present with a much anticipated data system to be available in 2017.

8.5 Reflection on using a mixed method design using the SPEC guidelines

The SPEC guidelines were used to identify the value added components of using a mixed method research design details of which are set out in Table 8.1

TABLE 8.2 SPEC GUIDELINES FOR MIXED METHOD RESEARCH

SPEC Letters	Value added component	Relevant supporting authors
S	Builds on strength and minimises weaknesses	Jick (1979), Erzberg & Prien (1997), Boyd (2001), Thurmond (2001), Johnson & Onwuegbuzie (2004), Teddie & Tashakkori (2009), Weisner & Fiese (2011)
P	Offers a comprehensive complete picture of the phenomena	O'Cathain *et al* (2008), Campbell & Rodenn (2010), Kettles *et al* (2010), Östlund *et al* (2011), Wagner *et al* (2012)
E	Builds research capacity and expertise	Johnson & Onwuegbuzie (2004),Creswell & Plano Clark (2007), Dillinger & Leech (2007), Happ (2009), Teddie & Tashakkori (2009), Maudsley (2011)
C	Offers funders and policy makers convincing results	Jick (1979), Creswell *et al* (2004), Kettels *et al* (2010)

Murphy *et al* (2014)

S: Building on the strengths of single research designs to overcome weaknesses.

In stage one and two of the research, data were collected sequentially commencing with the interviews aimed at identifying what nurse prescribers considered to be the impact of the minimum data set in practice. Findings from these interviews informed the improvement of the questionnaire in stage two of the research, the Irish/UK questionnaire. I was able to explore issues concerning competence development, independence of prescribing, hidden workloads and relevant value of nurse prescribing to the practice setting. However, no research had been conducted on whether nurse prescribing was appropriate or inappropriate or how the process compared with their medical counterparts who had been assessed using STOPP/START. Stage three and four of the research allowed me to generalise results between nurse prescribers and doctors, and the research undertaken also included a qualitative element where previous studies had been limited to quantative research only (Table 2.1). Mixed method research enabled in-depth identification and exploration if nurse prescribing in practice that allowed generalisation of results to the relevant population.

Using mixed methods research, both quantitative and qualitative, in my Thesis added value as the strengths and weakness of each method were realised. This allowed comparison and interrogation of findings throughout the different stages of the research which sharpened the overall understanding and integrity of results.

P: Comprehensive and complete picture of the phenomenon

To understand the impact of nurse prescribing on practice and to ensure a fair evaluation, multiple sources of evidence were gathered. This evidence was gathered from interviews, surveys, and documents that included both nursing and medical notes. As the researcher, I was able to carry out a focused evaluation based on the comprehensive data gathered from multiple sources. Mixed methods research enabled a complete picture to be constructed using quantative

and qualitative data, and this could only be achieved by comparing outcomes gathered in each approach. This comparison would not have been as inclusive or complete with a standalone research method, as it was the combining of data that enabled the holistic picture of nurse prescribing in practice to emerge.

E: Building research capacity and expertise

This was a challenging study that required knowledge and guidance in quantitative, qualitative and mixed method designs. A number of challenges have been highlighted in the research identified under E in Table 8.1

The supervision support for this thesis required methodological expertise across methods which were essential for rigor. While it was the responsibility of the PhD student to gather, structure and analyse the data; guidance though discussion and debate from the supervision team facilitated understanding of the data enabling the integration of the components of the study.

The added value of mixed methods research in this section was the expansion of my research knowledge. However, to build capacity and explore complex nurse prescribing issues in the future requires wider collaboration.

C: Convincing and powerful results for funders and policy makers

The range of evidence from the nurse prescribers was substantial but the power of the findings came from the integration of the data collected. Outcomes gathered from each method of collecting data were matched across the five stages of the study to give strength to the outcomes. Integrating the findings from both a qualitative and quantitative perspective gave evidence to policy makers regarding the results of the research which, to date, has been used in a national review of the currently used minimum dataset. Therefore, it is important to frame recommendations in a way that would be most relevant to future Health Service policy reviews and beneficial to nurse prescribers in practice.

8.6 Limitations

The researcher identified limitations that impacted upon the reporting of study results or would impact on other researchers should any individual want to replicate any aspect of this study. The limitations identified in this study will be discussed relevant to each chapter.

Chapter 3 although database and manual searching was protracted and extensive for the systematic review, the majority of relevant studies identified for inclusion in the review were conducted in the UK. This could be interpreted as a limitation however, the research process is not only to discover new knowledge but to also to confront assumptions to explore what we don't know. For instance the views of NPs themselves, although useful, need to be balanced with the views of the medical profession and/or other healthcare professionals.

Chapter 4 as a qualitative study on the minimum data set (MDS), acknowledges that the findings may not reflect the views of all nurse prescribers. However, there is confidence that the sample included enough variation in participant roles and settings to provide a comprehensive picture of nurse prescribing phenomena under investigation. Nurse prescribers who agreed to be involved may have done so because they have particular concerns and issues with the MDS.

While efforts were made to maximise recruitment for the study in chapter 5 , it could have been strengthened if more nurse prescribers in both Ireland and the UK had been recruited. I cannot ignore the possibility of bias, in particular responder bias, mostly due to selective participation by respondents who are interested and/or more positive about the subjects of nurse prescribing. Thus the participants may not be representative of the population of NPs in both countries. Despite the limitations there has been no comparative analysis between NPs in Ireland and the UK to date. Therefore, the authors are confident that the sample provides enough variation to give an initial overview of the parallels between both cohorts of participants.

In chapter 6 Stage 1 selection bias may have been introduced as NPs selected the ten patients for inclusion in the study. However, it should be noted that a variety of cases in terms of medical conditions and medications were identified. While this study identified PIP, it did not study whether this resulted in ADEs to the patients. In addition, there were a significant number of patients categorised according to the Barthel score as poorly mobile (Table 6.1). Prescribing drugs that effected balance and mobility may not have warranted the same concerns as for the mobile patients which may have resulted in a higher PIP rate. Data collected was mostly by extraction form case notes and in some instances discussion with NPs therefore the precise reason for PIP in this study could not always be clarified with precision.

In chapter 6 Stage 2 the reduced sample size of NPs from 40 to 25 in a restricted geographical area of Ireland limits the generalisability of the findings. Similar to stage one of this research limitations identified for this section of the study included generalisability of the findings considering the limited geographical location of the HSE South. Conducting follow up interviews by telephone may have had limitations. However, due to time constraints, ongoing data collection, geographical spread of participants and the cost involved, it appeared to be the best option. It also ensured, given the nurses busy schedules, all follow-up interviews were conducted one month following the application of the STOPP/START criteria to nurses' prescriptions. The clinical and financial benefits from routine application of STOPP/START criteria to prescriptions in care of the older adult are as yet unknown. Further research is required to establish if there is a tangible benefit to introducing such an initiative into practice.

In Chapter 7 a possible limitation is the low number and source of the participants drawn from a specific area in Canada, who are not necessarily

representative of all Canadian nurse practitioners, restricting the study's generalisability to other areas or countries. In addition, recruitment of participants for this study was the responsibility of the senior nurse practitioner for the Nova Scotia Region, Canada. All of the participants had previously heard about STOPP/START criteria, because of involvement with research in the clinical practice, which is not representative of the general nurse practitioner population. The sample size of eight although small is acceptable for qualitative research and reached saturation.

8.6 Conclusion

Nurses appear to be very confident and competent in their prescribing considering the restrictions placed on Irish nurse prescribers by the Nurses and Midwives Board of Ireland (formally ABA) and the Office of Nurses and Midwives Services Department. Perhaps a cautious approach to nurse prescribing was warranted initially however, there has not been one adverse reported incident to the Nurses and Midwives Board of Ireland regarding a nurse prescriber therefore it is timely that structures in place are reviewed and revised or removed accordingly. Of note throughout this thesis is NPs have repeatedly shown an in-depth understanding and commitment to the nurse prescribing process including an understanding of their limitations. NPs structures in place requiring review to improve relevance to practice are:

1) The MDS and its contribution to the overall process of nurse prescribing is required, especially the connectivity of the database and how it can be restructured to facilitate cross-referencing for similar specialties or prescribers with similar issues regarding a particular medication. Having a data gathering system in place is very valuable but not when it stops the nurse from prescribing or it contributes to a two tiered prescribing system between the nurses and doctors.

2) The CPA needs to be removed or restructured and used for a timeframe so that it supports the development of confidence and competence for new nurse prescribers. Removing the CPA would give nurses better access to medications similar to their UK counterparts which in turn facilitates better involvement with the prescribing process and multidisciplinary team approach to care. To date, nurses have been cautious in identifying medications for their first CPA perhaps an indication of their caution when it comes to prescribing in general that is evident to date of no reported incidents to NMBI regarding nurse prescribers.

3) Documentation regarding prescribing needs to be reviewed for appropriateness and duplication eliminated.

4) Professional barriers between nurses and physicians i.e. physicians may be less likely to accept recommendations made by the nurse still exist but appear to be improving the more doctors are exposed to nurse prescribing. However, if nurses have evidence from the application of a medication evaluation tool regarding medications to be commenced, changed or discontinued then there appears to be a better acceptance of the partnership in prescribing.

5) Nurse prescribers refusing to register once the education programme has been successfully completed have grown in numbers. Nurse prescribing is a very responsible role to undertake and nurse prescriber's need such responsibility acknowledged through appropriate evaluation of workloads and remuneration for the additional responsibilities this is supported by the strong response to these issues Chapter 6.

6) The importance of incorporating a medication evaluation tool in practice cannot be overstated considering the predicted Irish population trends for the next 20 years of a 300% increase in the population ≥ 65 years. Using a medication evaluation tool to regularly review medications for PIPs and or PPOs in older adult care has the potential to improve care cost effectiveness in the health service. Although not available as yet SENATOR will be an impressive resource to support and improve appropriate prescribing for nurse prescribers

in practice. However, it is important to remember that although the CDSS enables the user to perform a detailed review of medications in a timely fashion its effectiveness is dependent on data input. Therefore, CDSS is designed to complement not replace clinical judgment.

7) A more structured approach to CPD to ensure practice is relevant and up to date is required.

8) A timeframe for registration needs to be in place to ensure nurses that have completed the education programme are safe and fit for practice.

8.7 Further research

- Research is required into what appears to be the interchangeable use of NP as a tool or a role by the HSE and/or hospital organisation.
- Further research is required if the data management system is to be streamlined and restructured for efficient use. All consultations in research/evaluations and not just those that end in a medication being prescribed.
- Information on trust in nurse prescribers working relationships is very limited this warrants further investigation.
- A number of nurse prescribers approached to participate in the research could not do so because they had not registered with the Nursing and Midwifery Board of Ireland. Further investigation is required to understand why nurse prescribers that have successfully completed the education programme do not register with the governing body to prescribe in practice.
- Structured collaborative research is required to assess nurses' implementation of prescribing process nationally and requirements to improve inappropriate prescribing in practice.

REFERENCES

ABU SHOSHA, G. 2012. Employment of Colaizzi's strategy in descriptive phenemenology: a reflection of a researcher. *European Scientific Journal,* 8**,** 31-43.

ADAMS, E., CUDDY, A., FLYNN, M., LORENZ, R. & MACGABHANN, C. 2010. Nurse and midwife prescribing in Ireland: the minimum dataset. *Nurse Prescribing,* 8**,** 234-241.

AGE ACTION 2013. Age Action for All Older People pre-Budget Submission 2014. Struggling To Make Ends Meet – The Cumulative Effect Of Austerity On Older People. http://www.thehealthwell.info/node/518329 [Accessed 14th October 2014].

AHERN, K. 1999. 'Pearls, Pith, and Provocation: Ten Tips for Reflexive Bracketing'. *Qualitative Health Research,* 9**,** 407–11.

AN BORD ALTRANAIS 2000. Revision of the Scope of Practice for Nursing and Midwifery Final Report. *In:* AN BORD ALTRANAIS (ed.). Dublin: Stationary Press.

AN BORD ALTRANAIS 2007a. Nurses Rules. An Bord Altranais, Dublin: Stationary Press.

AN BORD ALTRANAIS 2007b. Requirements and Standards for Education for Nurses and Midwives with Prescriptive Authority. *In:* AN BORD ALTRANAIS (ed.) 1st ed. Dublin Stationary Press.

AN BORD ALTRANAIS 2007c. Decision-making Framework for Nurses and Midwives with Prescriptive Authority. 1st ed. Dublin: Stationary Press.

AN BORD ALTRANAIS 2007d. Collaborative practice agreement guidelines for nurse and midwives with prescriptive authority 1st ed. An Bord Altranais, Dublin,: Government press.

AN BORD ALTRANAIS 2007e. Collaborative Practice Agreement (CPA) for Nurses and Midwives with Prescriptive Authority 3rd ed. An Bord Altranais, Dublin, : Stationary Press.

AN BORD ALTRANAIS 2009. Evaluation of An Bord Altranais Regulatory Framework for Prescriptive Authority. Dublin: Stationary Press.

AN BORD ALTRANAIS 2010a. Practice Standards for Nurses and Midwives with Prescriptive Authority. 2nd ed. An Bord Altranais, Dublin: Stationary Office.

AN BORD ALTRANAIS 2012a. Collaborative practice agreement guidelines for nurses and midwives with prescriptive authority 3rd ed. *In:* HEALTH SERVICE EXECUTIVE (ed.). Dublin: Stationary Press.

AN BORD ALTRANAIS & NMPDU 2005. Review of Nurses and Midwives in the Prescribing and Administration of Medicinal Products. *In:* AN BORD ALTRANAIS (ed.). Dublin: Stationary Press.

ANSARI, J. 2010. Drug Interaction and Pharmacist *Journal of Young Pharmacists,* 2**,** 326-331.

ARBON, P., BAIL, K., EGGERT, M., GARDNER, A., HOGAN, S., PHILLIPS, C., VAN DIEMAN, N. & WADDINGTON, G. 2008. Reporting a research project on the potential of aged care in the Australian capital territory. *Journal of Clinical Nursing,* 18**,** 155-162.

ARONSON, J. 2011. Reducing prescribing errors through medical education. *Prescriber,* April**,** 6-7.

AVERY, A., SAVELYICH, B. & WRIGHT, L. 2004. Doctors' Views on Supervising Nurse Prescribers. *Prescriber,* 15**,** 56-61.

BANICEK, J. 2012. Attitudes of postoperative patients towards hospital nurse prescribing. *Nurse Prescribing,* 10**,** 612-618.

BARROSO, J. 2010. Qualitative Approaches to Research. *In:* LOBIONDO-WOOD G., H. J. (ed.) *Nursing Research Methods and Critical Appraisal for Evidence-Based Practice* 7th ed. St. Louis: Mosby Elsevier.

BARRY, M. 2013. Head of HSE drug-buying programme: 'It's difficult to defend current prices' *The Journal.* http://www.thejournal.ie/hse-responds-generic-drug-prices-817882-Mar2013/ *[Accessed 2nd December 2013]*.

BARRY, M., BENNETT, K., BRICK, A., MORGENROTH, E., NORMAND, C., O'REILLY, J., THOMAS, S., TILSON, L., WILEY, M., WREN, MA. 2009. Projecting the Impact of Demographic Change on the Demand for and Delivery of Health Care in Ireland (pp. 1-178). *In:* LAYTE, R. (ed.). DUBLIN: The Economic and Social Research Institute

BARRY, P., GALLAGHER, P. & RYAN, C. 2008. Inappropriate Prescribing in Geriatric Patients. *Current Psychiatric Report* 10**,** 4.

BATES, D. & BITTON, A. 2010. The Future Of Health Information Technology In The Patient-Centered Medical Home. *Health Affairs,* 29**,** 614-621.

BEERS, M. 1997. Explicit criteria for determining potentially inappropriate medication use by the elderly. An update. *Archives of Internal Medicine,* 157**,** 1531-1536.

BEGLEY, C. 1996. Using Triangulation in Nursing Research. *Journal of Advanced Nursing,* 24**,** 122-128.

BEN NATAN, M., KABAHA, A., JACKOB, N., ATALLAH, R. & SHARON, I. 2013. The attitudes of patients with chronic conditions towards nurse prescribing medications. *International Nursing Review,* 60**,** 469-476.

BENNER, P. 1994. *Interpretive phenomenology: embodiment, caring, and ethics in health and illness,* Thousand Oaks, CA, Sage Publications.

BERRY, D., BRADLOW, A. & COURTENAY, M. 2008. Patients' attitudes towards, and information needs in relation to, nurse prescribing in rheumatology. *Journal of Clinical Nursing,* 17**,** 266-273.

BERRY, D., COURTENAY, M. & BERSELLINI, E. 2006. Attitudes towards, and information needs in relation to, supplementary nurse prescribing in the UK: an empirical study. *Journal of Clinical Nursing,* 15**,** 22-28.

BETTANY-SALTIKOV, J. 2012. *How to do a Systematic Literature Review in Nursing A step-by-step guide*, McGraw-Hill.

BLACK, A. 2013. Non-medical prescribing by nurse practitioners in accident & emergency and sexual health: a comparative study. *Journal of Advanced Nursing,* 69**,** 535-545.

BOSE, R. 2003. Knowledge management-enabled health care management systems: capabilities, infrastructure, and decision-support. *Expert Systems with Applications,* 24**,** 59.

BOWSKILL, D., TIMMONS, S. & JAMES, V. 2012. How do nurse prescribers integrate prescribing in practice: case studies in primary and secondary care. *Journal of Clinical Nursing,* 22**,** 2077-2086.

BRADLEY, E., CAMPBELL, P. & NOLAN, P. 2005. Nurse prescribers: who are they and how do they perceive their role? *J Adv Nurs,* 51**,** 439 - 448.

BRADLEY, E., HYNAM, B. & NOLAN, P. 2007. Nurse prescribing: reflections on safety in practice. *Social Science & Medicine,* 65**,** 599-609.

BRAUN, V. & CLARKE, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology,* 3**,** 77-101.

BRITTEN, N. 1999. *Qualitative Interviews in Healthcare. In: Qualitative Research in Health Care (2nd edn), London- BMJ Books.*

BROOKS, N., OTWAY, C., RASHID, C., KILTY, E. & MAGGS, C. 2001. The patient's view: the benefits and limitations of nurse prescribing. *British Journal of Community Nursing,* 6**,** 342-348.

BUCHAN & CALMAN 2004. Skill-Mix and Policy Change in the Health Workforce: Nurses in Advanced Roles. OECD Health Working Papers, No. 17, OECD Publishing. http://dx.doi.org/10.1787/743610272486 [Accessed 20th October 2014].

BUCHAN, J. & CALMAN, L. 2000. Implementing nurse prescribing: a review of current practice internationally. *International Council of Nurses, Geneva.*

BUCK, M. D., ATREJA, A., BRUNKER, C. P., JAIN, A., SUH, T. T. & PALMER, R. M., ET AL. 2009. Potentially inappropriate medication prescribing in outpatient practices: prevalence and patient characteristics based on electronic health records. *Am J Geriatr Pharmacother,* 7**,** 84-92.

BURNS, N. & GROVE, S. 2005. *The Practice of Nursing Research,* St. Louis, Missouri., Elsevier.

BURNS, N. & GROVE, S. 2011. *The Practice of Nursing Research,* St. Louis, Missouri, Saunders Elsevier.

BYRNE, S., O'MAHONY, D., HUGHES, C., PARSONS, C., PATTERSON, S., MCCORMACK, B. & FINN, F. 2010a. An evaluation of the inappropriate prescribing in older residents in long term care facilities in the greater Cork and Northern Ireland regions using the STOPP and Beers' criteria. . Centre for Ageing Research and Development in Ireland.

BYRNE, S., O'MAHONY, D., HUGHES, C., PARSONS, C., PATTERSON, S., MCCORMACK, B., FINN, F. & O'SULLIVAN, D. 2010b. An evaluation of the inappropriate prescribing in older residents in long term care facilities in the greater Cork and Northern Ireland regions using the STOPP and Beers' criteria. Dublin: Centre for Ageing Research and Development in Ireland (CARDI).

BYRNE, S., RYAN, C., O'MAHONY, D., WEEDLE, P., KENNEDY, J. & AHERN, E. 2008. Inappropriate prescribing in the elderly: a review of primary care and nursing home prescriptions. *Int. J Pharm Practice,* Suppl 1: **,** A36-37.

CAHIR, C., FAHEY, T., TEELING, M., TELJEUR, C., FEELY, J. & BENNETT, K. 2010a. Potentially inappropriate prescribing and cost outcomes for older people: a national population study. *British Journal of Clinical Pharmacology,* 69**,** 543-552.

CAHIR, C., FAHEY, T., TEELING, M., TELJEUR, C., FEELY, J. & BENNETT, K. 2010b. Potentially inappropriate prescribing and cost outcomes for older people: a national population study. *British Journal of Clinical Pharmacology,* 69**,** 543–552.

CALDWELL, K., HENSHAW, L. & TAYLOR, G. 2011. Developing a framework for critiquing health research: An early evaluation. *Nurse Education Today,* 31**,** e1-e7.

CANADIAN INSTITUTE OF HEALTH INFORMATION 2013. National Health Expenditure Trends, 1975 to 2013. https://secure.cihi.ca/estore/productFamily.htm?locale=en&pf=PFC2400 [Accessed 20th May 2015].

CANADIAN INSTITUTE OF HEALTH INFORMATION 2014. Annual Report, 2013-2014. https://secure.cihi.ca/estore/productFamily.htm?pf=PFC2647&lang=en&media=0 [Accessed 20th May 2015].

CANADIAN NURSES ASSOCIATION. 2008. *Advanced Nursing Practice A National Framework* [Online]. Available: https://www.cna-aiic.ca/~/media/cna/page-content/pdf-en/anp_national_framework_e.pdf [Accessed June 4th 2015].

CANTRILL, J., SIBBALD, B. & BUETOW, S. 1998. Indicators of the appropriateness of long-term prescribing in general practice in the United Kingdom: consensus development, face and content validity, feasibility, and reliability. *Qual Health Care,* 7**,** 130-135.

CAREY, N. & COURTENAY, M. 2010. An exploration of the continuing professional development needs of nurse independent prescribers and nurse supplementary prescribers who prescribe medicines for patients with diabetes. *Journal of Clinical Nursing,* 19**,** 208-216.

CAREY, N., COURTENAY, M. & STENNER, K. 2013. The prescribing practices of nurses who care for patients with skin conditions: a questionnaire survey. *Journal of Clinical Nursing,* 22**,** 2064-2076.

CAREY, N., STENNER, K. & COURTENAY, M. 2009a. Stakeholder views on the impact of nurse prescribing on dermatology services. *Journal of Clinical Nursing,* 19**,** 498-506.

CAREY, N., STENNER, K. & COURTENAY, M. 2009b. Views on implementing nurse prescribing in a specialist children's hospital. *Nurse Prescribing,* 7**,** 205-210.

CAREY, N., STENNER, K. & COURTENAY, M. 2014. An exploration of how nurse prescribing is being used for patients with respiratory conditions across the east of England. *BMC Health Services Research,* 14**,** 27-27.

CASHIN, A., BUCKLEY, T., NEWMAN, C. & DUNN, S. 2009. Nurse Practitioner provision of patient education related to medicine. *Australian Journal of Advanced Nursing,* 27**,** 12-18.

CHAUDHRY, B., WANG, J., WU, S., MAGLIONE, M., MOJICA, W., ROTH, E., MORTON, S. & SHEKELLE, P. 2006. Systematic Review: Impact of Health Information Technology on Quality, Efficiency, and Costs of Medical Care. *Annals of Internal Medicine,* 144**,** 742-752.

CIPHER, D. J., HOOKER, R. S. & GUERRA, P. 2006. Prescribing trends by nurse practitioners and physician assistants in the United States. *Journal of the American Academy of Nurse Practitioners,* 18**,** 291-296.

CLANCY, C. & EISENBERG, J. 1998. Outcomes research: measuring the end results of health care. *Science, 282***,** *245–246.*

COLAIZZI, P. F. 1978. *Psychological research as the phenomenologist views it. In:Valle RS, King M (eds) Existential phenomenological alternatives for psychology (pp. 48-70),* New York., Oxford University Press,.

CONEJOS, M., SÁNCHEZ, C., SILVEIRA, D., MACHUCA, S., GONZÁLEZ-BLAZQUEZ, S., MONTERO, E. & CRUZ-JENTOFT, A. J. 2010. Potentially inappropriate drug prescription in older subjects across health care settings. *European Geriatric Medicine,* 1**,** 9-14.

CONGER, M. & PLAGER, K. 2008. 'Advanced nursing practice in rural areas: connectedness versus disconnectedness'. *Online Journal of Rural Nursing & Health Care,* 8**,** 24-38.

COOPER, R., ANDERSON, C., AVERY, T., BISSELL, P., GUILLAUME, L., HUTCHINSON, A., LYMN, J., MURPHY, E., RATCLIFFE, J. & WARD, P. 2008. Stakeholders' views of UK nurse and pharmacist supplementary prescribing. *Journal of Health Services Research & Policy,* 13**,** 215-221.

COOPER, R. J., BISSELL, P., WARD, P., MURPHY, E., ANDERSON, C., AVERY, T., JAMES, V., LYMN, J., GUILLAUME, L., HUTCHINSON, A. & RATCLIFFE, J. 2013. Further challenges to medical dominance? The case of nurse and pharmacist supplementary prescribing. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness & Medicine,* 16**,** 115-133.

CORBEN, V. 1999. Misusing phenomenology in nursing research: identifying the issues. *Nursing Researcher,* 6(3)**,** 52-66.

COULL, A., MURRAY, I., TURNER-HALLIDAY, F. & WATTERSON, A. 2013. The expansion of nurse prescribing in Scotland: an evaluation. *British Journal of Community Nursing,* 18**,** 234-242.

COURTENAY, M. 2013. Interprofessional education between nurse prescribing and medical students: A qualitative study. *Journal of Interprofessional Care,* 27**,** 93-95.

COURTENAY, M. & BERRY, D. 2007a. Comparing nurses' and doctors' views of nurse prescribing: a questionnaire survey. *Nurse Prescribing,* 5**,** 205-210.

COURTENAY, M. & CAREY, N. 2008b. Preparing nurses to prescribe medicines for patients with diabetes: a national questionnaire survey. *Journal of Advanced Nursing,* 61**,** 403-412.

COURTENAY, M., CAREY, N. & BURKE, J. 2007. Independent extended nurse prescribing for patients with skin conditions: a national questionnaire survey. *Journal Of Clinical Nursing,* 16**,** 1247-1255.

COURTENAY, M., CAREY, N. & BURKE, J. 2007c. Independent extended and supplementary nurse prescribing practice in the UK: a national questionnaire survey. *International Journal of Nursing Studies,* 44**,** 1093-1101.

COURTENAY, M., CAREY, N. & BURKE, J. 2007d. Independent extended supplementary nurse prescribers, their prescribing practice and confidence to educate and assess prescribing students. *Nurse Education Today,* 27**,** 739-747.

COURTENAY, M., CAREY, N., STENNER, K., LAWTON, S. & PETERS, J. 2011. Patients' views of nurse prescribing: effects on care, concordance and medicine taking. *The British Journal Of Dermatology,* 164**,** 396-401.

COURTENAY, M. & GORDON, J. 2009. A survey of therapy areas in which nurses prescribe and CPD needs. *Nurse Prescribing,* 7**,** 255-262.

COURTENAY, M., STENNER, K. & CAREY, N. 2010b. The views of patients with diabetes about nurse prescribing. *Diabetic Medicine,* 27**,** 1049-1054.

COURTNEY, M. & BUTLER, M. 1999. *Nurse Prescribing: Principles and Practice by Courtenay, Molly, Butler, Michele (1999) Paperback*, Greenwich Medical Media.

CREEDON, R. 2010a. Nurse Prescribing and Continuing Professional Development. *Irish Journal of Anaesthetic and Recovery Nursing,* 5**,** 10-11.

CREEDON, R. 2010b. Nurse prescribing and the need for CPD: an Irish perspective. *Nurse Prescribing,* 8**,** 445-448.

CREEDON, R., MCCARTHY, S. & KENNEDY, J. 2014. Nurse prescribers' experiences of recording prescribing data to the Minimum Data Set in Ireland. *British Journal of Community Nursing,* 19**,** 594-600.

CREEDON, R. & O'CONNELL, E. 2009. Introducing nurse prescribing:an Irish perspective. *Nurse Prescribing,* 7**,** 507-511.

CREEDON, R., O'CONNELL, E., MCCARTHY, G. & LEHANE, B. 2009c. An evaluation of nurse prescribing. Part 1: a literature review. *British Journal of Nursing,* 18**,** 1322-1327.

CRESWELL, J. 1999. *Mixed method research: Introduction and application. In. Handbook of Educational Policy. (pp. 455-470),* San Diago CA, Academic Press.

CRESWELL, J. & PLANO CLARK, V. 2007. *Designing and conducting mixed method research*, Thousand Oaks, Sage.

CROTTY, M. 1998. *The Foundation of Social Research. Meaning and Perspective in the Research Process*, Sage, Thousand Oaks.

CSO 2014. Population estimates by age group and sex. Central Statistics Office. http://www.cso.ie/multiquicktables/quickTables.aspx?id=pea01 [Accessed 25th October 2015].

CURRY, L., NEMBHARD, I. & BRADLEY, E. 2009. Qualitative and Mixed Methods Provide Unique Contributions to Outcome Research. *Circulation,* 119**,** 1443-1452.

CUSACK, E., DEMPSEY-RYAN, D., KAVANAGH, C. & PITMAN, S. 2014. An Evaluation of the Development and Implementation of a Nursing and Midwifery Metrics System in HSE Dublin North Healthcare Services. Dublin: Nursing & Midwifery Planning & Development Office of the Nurisng Services Director.

CUTCLIFFE, J. & CAMPBELL, P. 2002. Opinion. *Mental Health Practice,* 5**,** 14-17.

DALLEUR, O., SPINEWINE, A., HENRARD, S., LOSSEAU, C., SPEYBROECK, N. & BOLAND, B. 2012. Inappropriate Prescribing and Related Hospital Admissions in Frail Older Persons According to the STOPP and START Criteria. *Drugs & Ageing,* 29**,** 829-837.

DARVISHPOUR, A., SOODABEH, J. & CHERAGHI, M. A. 2014. A meta-synthesis study of literature review and systematic review published in nurse prescribing. *Medical Journal of the Islamic Republic of Iran,* 28**,** 77.

DAVIS, K., DREY, N. & GOULD, D. 2009. What are scoping studies? A review of the nursing literature. *International Journal of Nursing Studies,* 46**,** 1386-1400.

DE WAAL, C. 2004. Peirce's Pragmatism. *Newsletter of the Society for the Advancement of American Philosophy,* 32**,** 40-42.

DELLINGER, A. & LEECH, N. 2007. Towards a unified validation framework in mixed methods research. *Journal of Mixed Methods Research,* 1 (4)**,** 309-332.

DEPARTMENT OF HEALTH AND CHILDREN 1998a. Report of the Commission on Nursing - A Blueprint for the Future. Department of Health and Children, Dublin: Government Stationary Office.

DEPARTMENT OF HEALTH AND CHILDREN 1998b. Report of the Commission on Nursing - A Blueprint for the Future. Department of Health and Children. Dublin: Government Stationary Office.

DEPARTMENT OF HEALTH AND CHILDREN 2000. The National Health Service Plan, Department of Health Government Stationary Office.

DEPARTMENT OF HEALTH AND CHILDREN 2001. Quality and Fairness: A health system for you. Department of Health and Children. Dublin: Government Stationary Office.

DEPARTMENT OF HEALTH AND CHILDREN 2003. Report of the National Taskforce on Medical Staffing. Department of Health and Children. Dublin: Government Stationary Office.

DEPARTMENT OF HEALTH AND CHILDREN 2006. Irish Medicines Board (Miscellaneous Provisions) Act 2006 (pp. 1-39) Department of Health and Children. Number 3 of 2006 ed. Dublin: Government Stationary Office.

DEPARTMENT OF HEALTH AND SOCIAL SECURITY 1986. Neighbourhood Nursing: A Focus for Care (Cumberlege Report). London: HMSO.

DHALIVAAL, J. 2011. Patients' perspectives on prescribing by nurses in general practice. *Practice Nursing,* 22**,** 41-46.

DICENSO, A., PAECH, G. & CORPORATION., I. 2003. *Report on the Integration of Primary Health Care Nurse Practitioners into the Province of Ontario.* Toronto, ON: Ministry of Health and Long-Term Care. <http://www.health.gov.on.ca/english/public/pub/ministry_reports/nurseprac03/nurseprac03_mn.html> [Accessed 20th June 2015].

DOBEL-OBER, D., BRADLEY, E. & BRIMBLECOMBE, N. 2013. An evaluation of team and individual formularies to support independent prescribing in mental health care. *Journal of Psychiatric & Mental Health Nursing,* 20**,** 35-40.

DONALD, F., MARTIN-MISENER, R., BRYANT-LUKOSIUS, D., KILPATRICK, K., KAASALAINEN, S., CARTER, N., HARBMAN, P., I., B. & DICENSO, A. 2010. The Primary Healthcare Nurse Practitioner Role in Canada. *Nursing Leadership,* 23(Special Issue).

DRABBLE, L., TROCKI, K., SALCEDO, B., WALKER, P. & KORCHA, R. 2015. Conducting qualitative interviews by telephone: Lessons learned from a study of alcohol use among sexual minority and heterosexual women. *Qualitative Social Work,* 0**,** 1-16.

DRENNAN, J., NAUGHTON, C., ALLEN, D., HYDE, A., FELLE, P., O'BOYLE, K., TREACY, P. & BUTLER, M. 2009. National Independent Evaluation of the Nurse/Midwife Prescribing Dublin: University College Dublin, Dublin.

DRENNAN, J., NAUGHTON, C., ALLEN, D., HYDE, A., O'BOYLE, K., FELLE, P., TREACY, M. & BUTLER, M. 2011. Patients' level of satisfaction and self-reports of intention to comply following consultation with nurses and midwives with prescriptive authority: A cross-sectional survey. *International Journal of Nursing Studies,* 48**,** 808-817.

DUNN, S. V., CASHIN, A., BUCKLEY, T. & NEWMAN, C. 2010. Nurse practitioner prescribing practice in Australia. *Journal of the American Academy of Nurse Practitioners,* 22**,** 150-155.

EARLE, E. A., TAYLOR, J., PEET, M. & GRANT, G. 2011a. Nurse prescribing in specialist mental health (Part 1): the views and experiences of practising and non-practising nurse prescribers and service users. *Journal of Psychiatric & Mental Health Nursing,* 18**,** 189-197.

EARLE, E. A., TAYLOR, J., PEET, M. & GRANT, G. 2011b. Nurse prescribing in specialist mental health (part 2): the views and experiences of psychiatrists and health professionals. *Journal of Psychiatric & Mental Health Nursing,* 18**,** 281-287.

EMMERTON, L., MARRIOTT, J., BESSELL, T., NISSEN, L. & DEAN, L. 2005. Pharmacists and Prescribing Rights: Review of International Developments. *J Pharm Pharmaceut Sci,* 8**,** 217-25.

ERZBERGER, C. & KELLE, U. 2003. *Making Inferences in Mixed Methods: The Rules of Integration, in Tashakkori, A. & Teddlie, C. (eds.), Handbook of Mixed Methods in Social and Behavioural Research (pp. 457-490),* Thousand Oaks, Sage.

ESMAIL, N. 2011. Canada's physician supply. *Fraser Forum* March/April**,** 12-18.

FEILZER, M. 2010. Doing Mixed Method Research Pragmatically: Implications for the Rediscovery of Pragmatism as a Research Paradigm. *Journal of Mixed Method Research,* 4**,** 6-16.

FICK, D. & SELME, T. 2011. Improving Medication Use in Gerontological Nursing Now Is the Time for Interdisciplinary Collaboration and Translation *Journal of Gerontological Nursing,* 37**,** 3-4.

FISHER, R. 2010. Nurse prescribing: A vehicle for improved collaboration, or a stumbling block to inter-professional working? *International Journal of Nursing Practice,* 16**,** 579-585.

FITZGERALD, L. S., HANLON, J. T., SHELTON, P. S., LANDSMAN, P. B., SCHMADER, K. E., PULLIAM, C. C. & WILLIAMS, M. E. 1997. Reliability of a Modified Medication Appropriateness Index in Ambulatory Older Persons. *Annals of Pharmacotherapy,* 31**,** 543-548.

FONTANA, A. & FREY, J. 2003. *The interview: from structured questions to negotiated text. In: Denzin NK, Lincoln YS Collecting and Interpreting Qualitative Materials (pp. 47-78),* Thousand Oaks C, Sage Publications.

FONTANA, A. & FREY, J. 2005. *The interview: From neutral stance to political involvement. In The Sage handbook of qualitative research (pp. 695-727), Thousand Oaks, CA*, *Sage*.

FORCHUK, C. & KOHR, R. 2009a. Prescriptive authority for nurses: the Canadian perspective. *Perspectives in Psychiatric Care,* 45**,** 3-8.

FORCHUK, C. & KOHR, R. 2009b. Prescriptive authority for nurses: the Canadian perspective. *Perspective Psychiatric Care,* 45**,** 3-8.

FORJUOH, S., REIS, M. & COUCHMAN, G. 2005. Physician response to written feedback on a medication discrepancy found with their elderly ambulatory patients. *J Am Geriatr Soc* 53**,** 2173-7.

FRANK, C., GODWIN, M., VERMA, S., KELLY, A., BIRENBAUM, A., SEGUIN, R. & ANDERSON, J. 2001. 'What drugs are our frail elderly patients taking? Do drugs they take or fail to take put them at increased risk of interactions and inappropriate medication use?' *Canadian Family Physician,* 47**,** 1198-204.

GALLAGHER, P., BARRY, P. & O'MAHONY, D. 2007. Inappropriate prescribing in the elderly. *Journal Of Clinical Pharmacy And Therapeutics,* 32**,** 113-121.

GALLAGHER, P., BARRY, P., RYAN, C., HARTIGAN, I. & O'MAHONY, D. 2008. Inappropriate prescribing in an acutely ill population of elderly patients as determined by Beers' Criteria. *Age Ageing.,* 37**,** 96-101.

GALLAGHER, P., LANG, P., CHERUBINI, A., TOPINKOVÁ, E., CRUZ-JENTOFT, A., MONTERO ERRASQUÍN, B., MÁDLOVÁ, P., GASPERINI, B., BAEYENS, H., BAEYENS, J.P., MICHEL, J.P., O'MAHONY, D. 2011. Prevalence of potentially inappropriate prescribing in an acutely ill population of older patients admitted to six European hospitals. *European Journal of Clinical Pharmacology,* 67**,** 1175-1188.

GALLAGHER, P. & O'MAHONY, D. 2008a. Inappropriate prescribing in older people. *Reviews in Clinical Gerontology,* 18**,** 65-76.

GALLAGHER, P. & O'MAHONY, D. 2008b. STOPP (Screening Tool of Older Persons' potentially inappropriate Prescriptions): application to acutely ill elderly patients and comparison with Beers' criteria. *Age & Ageing,* 37**,** 673-679.

GALLAGHER, P., O'CONNOR, M. & O'MAHONY, D. 2011. Prevention of Potentially Inappropriate Prescribing for Elderly Patients: A Randomized Controlled Trial Using STOPP/START Criteria. *Clinical Pharmacology & Therapeutics,* 89**,** 845-854.

GALLAGHER, P., RYAN, C., BYRNE, S., KENNEDY, J. & O'MAHONY, D. 2008c. Screening tool of Older Persons Prescriptions (STOPP) and Screening tool to Alert doctors to Right Treatments (START). Consensus validation. *Int J Clin Pharmacol Ther,* 46**,** 72-83.

GARRUBBA, M., HARRIS, C. & MELDER, A. 2011. Clinical Leadership: A literature review to investigate concepts, roles and relationships related to clinical leadership *In:* CENTRE FOR CLINICAL EFFECTIVENESS, S. H. (ed.). Centre for Clinical Effectiveness, Southern Health, Melbourne, Australia. <http://www.health.gov.on.ca/english/public/pub/ministry_reports/nurseprac03/nurseprac03_mn.html> [Accessed 21st January 2015].

GERRISH, K. & LACEY, A. 2006. *The Research Process in Nursing. 5th edition,* Oxford, Blackwell Publishing.

GLEICK, J. 1987. *Chaos: Making a new science,* New York, Penguin Books.

GOULD, D., DREY, N. & BERRIDGE, E. 2007a. Nurses' experiences of continuing professional development. *Nurse Education Today,* 27**,** 602-609.

GOULD, O. N., JOHNSTONE, D. & WASYLKIW, L. 2007b. Nurse practitioners in Canada: beginnings, benefits, and barriers. *Journal of the American Academy of Nurse Practitioners,* 19**,** 165-171.

GRANT, M. J. & BOOTH, A. 2009. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal,* 26**,** 91-108.

GRAY, D. 2014. *Doing Resaerch in the Real World,* London, Sage Publication.

GREEN, A., WESTWOOD, O., SMITH, P. A. M., PENISTON-BIRD, F. & HOLLOWAY, D. 2009. Provision of continued professional development for non-medical prescribers within a South of England Strategic Health Authority: a report on a training needs analysis. *Journal of Nursing Management,* 17**,** 603-614.

GREENE, J. & CARACELLI, V. 1993. Data Analysis Strategies for Mixed-Method Evaluation Designs *Educational Evaluation and Policy Analysis,* 15**,** 195-207.

GUBA, E. & LINCON, Y. 1994. Competing Paradigms in Qualitative Research. *In:* DENZIN, N. & LINCOLN, Y. (eds.) *Handbook of qualitative research (pp 105-117).* Thousand Oaks, CA: Sage.

HAIDAR, E. 2007. Role of the advanced nurse practitioner in prescribing and general practice. *Nurse Prescribing,* 5**,** 74-78.

HALL, B. & HOWARD, K. 2008. A synergistic approach: conducting mixed methods research with typological and systemic design considerations. *Journal of Mixed Methods Research,* 2**,** 248-269.

HALL, R. 2011. Mixed Methods: In Search of a Paradigm. The University of New South Wales (pp 1-6). http://auamii.com/proceedings_phuket_2012/hall.pdf [Accesed March 2015].

HAMILTON, H., GALLAGHER, P., RYAN, C., BYRNE, S. & O'MAHONY, D. 2011a. Potentially inappropriate medications defined by STOPP criteria and the risk of adverse drug events in older hospitalized patients. *Arch Intern Med,* 171**,** 1013-1019.

HAMILTON, H., GALLAGHER, P., RYAN, C., BYRNE, S. & O'MAHONY, D. 2011b. Potentially inappropriate medicines defined by STOPP. Criteria and risk of adverse drug events in older hospitalized patients. . *Arch Intern Med,* 171**,** 1013-19.

HEALTH SERVICE EXECUTIVE 2008a. National Service Plan (pp 1-182). Dublin: Department of Health.

HEALTH SERVICE EXECUTIVE 2008b. Guiding framework for the implementationof Nurse and Midwifery prescribing in Ireland (pp 1-159). Dublin: Department of Health and Children, Nursing Services Director. http://www.hse.ie [Accessed 2nd June 2013].

HEALTH SERVICE EXECUTIVE 2009. Information for Pharmacists about Nurse and Midwife Medicinal Product Prescribing in Ireland (pp 43-46). Dublin: Department of Health.

HEALTH SERVICE EXECUTIVE 2010. Cost of Care in Approved Facilities. Available Department of Health, Dublin. http://www.hse.ie/eng/services/Find_a_Service/Older_People_Services/nhss/costs.html [Accessed 29th July 2015].

HEALTH SERVICE EXECUTIVE 2012a. Nurse and pharmacist independent prescribing changes announced. London: Department of Health, GOV.UK http://www.dh.gov.uk/health/2012/04/prescribing-change/ [Accessed 10th June 2015].

HEALTH SERVICE EXECUTIVE 2014a. Clinical Nurse/Midwife Specialist Registered nurse prescriber Survey Report. Dublin: Dublin Press. http://www.hse.ie/go/nurseprescribing [Accessed 23rd January 2015].

HEALTH SERVICE EXECUTIVE 2014b. National Implementation Report on the Nurse and Midwife Medicinal Product Prescribing Initiative January to March (pp 1-28). http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/National%20Implementation%20Report%20Nurse%20Midwife%20Prescribing%20Jan-Mar%202014.pdf [Accessed 3rd April 2014].

HEALTH SERVICE EXECUTIVE 2014c. National Implementation Report on the Nurse and Midwife Medicinal Product Prescribing Initiative - December (1-28). http://www.hse.ie/eng/about/Who/ONMSD/practicedevelopment/NursePrescribing/Nurse%20Midwife%20Medicinal%20Product%20Prescribing%20Report%2031%20December%202014.pdf [Accessed 8th January 2015].

HEALTH SERVICE EXECUTIVE 2015. National Report on Nurse and Midwife Medicinal Product prescribing. *In:* DEPARTMENT OF HEALTH (ed.). Dublin: Department of Health,.

HEALTH SERVICE EXECUTIVE 2015a. Building a high quality health service for a healthier Ireland. Health Service Executive Corporate Plan 2015-2017. *In:* DEPARTMENT OF HEALTH (ed.). Dublin: Department of Health, Dublin Press. http://www.hse.ie/eng/services/publications/corporate/corporateplan15-17.pdf [Accessed 26th July 2015].

HERR, K. 2002. "Chronic pain in the older patient: Management strategies" *Journal of Gerontological Nursing,* 28**,** 28-34.

HIDALGO-KEHOE, M. 2012. Complexity Theory and Nursing: Explanation and Application. Available from: https://maryannehidalgokehoehhh.wordpress.com/2012/02/13/complexity-theory-and-nursing-explanation-and-application/ [Accessed 14th August 2015].

HIQA 2009. Health Information and Quality Authority. National Quality Standards for Residential Care Settings for Older People in Ireland (pp 1-89). Health Information Quality Authority.

HOLLOWAY, I. & WHEELER, S. 2010. *Qualitative Research in Nursing Healthcare,* Oxford, Wiley - Blackwell.

HOWARD, R. L., AVERY, A. J., SLAVENBURG, S., ROYAL, S., PIPE, G., LUCASSEN, P. & PIRMOHAMED, M. 2007. Which drugs cause preventable admissions to hospital? A systematic review. *British Journal of Clinical Pharmacology,* 63**,** 136-147.

HUMPHRIES, N., MCALEESE, S., MATTHEWS, A. & BRUGHA, R. 2015. 'Emigration is a matter of self-preservation. The working conditions . . . are killing us slowly': qualitative insights into health professional emigration from Ireland. *Human Resources for Health,* 13**,** pp. 1-13.

HUSSERL, E. 1960. *Cartesian Meditations: An Introduction to Phenomenology,* The Hague, Nijhoff (Publisher).

JAMAL, A., MCKENZIE, K. & CLARK, M. 2009. The impact of health information technology on the quality of medical and health care: a systematic review. *Health Information Management Journal,* 38**,** 26-37.

JANSEN, P. & JACOBUS, R. 2012. Clinical Pharmacology in Old Persons. *Scientifica,* 2012**,** Article ID 723678, 17 pages, 2012. doi:10.6064/2012/723678.

JEHAN, W. & NELSON, C. 2006. Advanced primary nursing: liberating the talent. *Nursing Management,* 12**,** 20-23.

KACZOROWSKI, J., CHAMBERS, L., DOLOVICH, L., PATERSON, M., KARWALAJTYS, T., GIERMAN, T., FARRELL, B., MCDONOUGH, B., THABANE, L., TU, K., ZAGORSKI, B., GOEREE, R., LEVITT, C., HOGG, W., LARYEA, S., CARTER, M., CROSS, D. & SABALDT, R. 2011. Improving cardiovascular health at population level: 39 community cluster randomised trial of Cardiovascular Health Awareness Program (CHAP). *British Medical Journal,* 342.

KAPLAN, L. & BROWN, M. 2006. What is 'true' professional autonomy? *The Nurse Practitioner,* 31**,** pp. 37.

KIEKKAS, P., KARGA, M., LEMONIDOU, C., ARETHA, D. & KARANIKOLAS, M. 2011. Medication errors in critically ill adults: a review of direct observation evidence. *American Journal of Critical Care,* 20**,** 36-44.

KLARIN, I., WIMO, A. & FASTBOM, J. 2005. The association of inappropriate drug use with hospitalisation and mortality: a population-based study of the very old. *Drugs & Ageing,* 22**,** 69-82.

KNAFL, K. & BREITMAYER, B. 1991. Triangulation in qualitative research: Issues of conceptual clarity and purpose (pp 226-239). In Morse JM (ed) Qualitative Nursing Research. A Contemporary Dialogue. Sage Publications: Sage Publications.

KROEZEN, M., FRANCKE, A. L., GROENEWEGEN, P. P. & VAN DIJK, L. 2012. Nurse prescribing of medicines in Western European and Anglo-Saxon countries: A survey on forces, conditions and jurisdictional control. *International Journal of Nursing Studies,* 49**,** 1002-1012.

KROEZEN, M., MISTIAEN, P., VAN DIJK, L., GROENEWEGEN, P. P. & FRANCKE, A. L. 2014. Negotiating jurisdiction in the workplace: A multiple-case study of nurse prescribing in hospital settings. *Social Science & Medicine,* 117**,** 107-115.

KROEZEN, M., VAN DIJK, L., GROENEWEGEN, P. P., DE ROND, M., DE VEER, A. J. E. & FRANCKE, A. L. 2013. Neutral to positive views on the consequences of nurse prescribing: Results of a national survey among registered nurses, nurse specialists and physicians. *International Journal of Nursing Studies,* 51**,** 539-548.

KRUSE, J., O'SULLIVAN, D., HEMPEL, G., O'MAHONY, D. & BYRNE, S. 2010. Inappropriateness of prescribing in geriatric residents of nursing homes - a European comparison between Ireland and Germany. *European Geriatric Medicine,* IS, S82.

KUTNER, J., VU, K., PRINDIVILLE, S. & BYERS, T. 2000. Patient age and cancer treatment decisions. Patient and physician views. *Cancer Pract,* 8**,** 114-119.

LACOBUCD. G 2006. GPs overruled on nurse prescribing. *Pulse,* 66**,** 3-3.

LAM, M. & CHEUNG, B. 2012. The use of STOPP/START criteria as a screening tool for assessing the appropriateness of medications in the elderly population. *Expert Review of Clinical Pharmacology,* 5**,** 187-97.

LANG, P., HASSO, Y., DRAME, M., VOGT-FERRIERS MAX PRUDENT, N., GOLD, G. & MICHEL, J. P. 2010. Potentially inappropriate prescribing including under-use amongst older patients with cognitive or psychiatric co-morbidities. *Age and Ageing,* 39**,** 373-381.

LAPANE, K. L., WARING, M. E., SCHNEIDER, K. L., DUBÉ, C. & QUILLIAM, B. J. 2008. A Mixed Method Study of the Merits of E-Prescribing Drug Alerts in Primary Care. *JGIM: Journal of General Internal Medicine,* 23**,** 442-446.

LAROCHE, M. L., CHARMES, J. P., BOUTHIER, F. & MERLE, L. 2009. Inappropriate Medications in the Elderly. *Clinical Pharmacology & Therapeutics,* 85**,** 94-97.

LATHER, P. 1991. *Getting smart: Feminist research and pedagogy with/in the postmodern,* New York, NY, Routledge.

LATTER, S. & COURTENAY, M. 2004. Effectiveness of nurse prescribing: a review of the literature. *Journal of Clinical Nursing,* 13**,** 26-32.

LATTER, S., MABEN, J., MYALL, M., COURTENAY, M., YOUNG, A. & DUNN, N. 2005. An Evaluation of Extended Formulary Independent Nurse prescribing. Final Report (pp 1-209). Policy resarch Progamme Department of helath & University of Southampton. University of Southampton.

LATTER, S., SIBLEY, A., SKINNER, T. C., CRADOCK, S., ZINKEN, K. M., LUSSIER, M.-T., RICHARD, C. & ROBERGE, D. 2010. The impact of an intervention for nurse prescribers on consultations to promote patient medicine-taking in diabetes: A mixed methods study. *International Journal of Nursing Studies,* 47**,** 1126-1138.

LATTER, S., SMITH, A., BLENKINSOPP, A., NICHOLLS, P., LITTLE, P. & CHAPMAN, S. 2012. Are nurse and pharmacist independent prescribers making clinically appropriate prescribing decisions? An analysis of consultations. *Journal of Health Services Research & Policy,* 17**,** 149-156.

LAWLER, E. K., HEDGE, A. & PAVLOVIC-VESELINOVIC, S. 2011. 'Cognitive ergonomics, socio-technical systems, and the impact of healthcare information technologies'. *International Journal of Industrial Ergonomics,* 41**,** 336-344.

LEDDY, S. 2000. Toward a complementary perspective on worldviews. *Nursing Science Quarterly,* 13**,** 225-229.

LEVINE, R. 1988. Ethics and Regulation of Clinical Research. 2nd ed. Baltimore: Publisher-Urban and Schwarzenberg.

LINCOLN & GUBA 1985. *Naturalistic inquiry,* Beverly Hills, CA:, Sage Publications, Inc.

LOGANATHAN, M., SINGH, S., FRANKLIN, B., BOTTLE, A. & MAJEED, A. 2001. Interventions to optimise prescribing in care home: systematic review. *Age and Ageing,* 40**,** 150-162.

LOPEZ, K. & WILLIS, D. 2004. Descriptive versus interpretive phenomenology: their contributions to nursing knowledge. *Qualitative Health Research,* 14**,** 726-735.

LOWE, G., PLUMMER, V., O'BRIEN, A. P. & BOYD, L. 2012. Time to clarify - the value of advanced practice nursing roles in health care. *Journal of Advanced Nursing,* 68**,** 677-685.

LUKER, K. A., AUSTIN, L., HOGG, C., FERGUSON, B. & SMITH, K. 1998a. Nurse-patient relationships: the context of nurse prescribing. *Journal of Advanced Nursing,* 28**,** 235-242.

LUND, B. C., CARNAHAN, R. M., EGGE, J. A., CHRISCHILLES, E. A. & KABOLI, P. J. 2010. Inappropriate prescribing predicts adverse drug events in older adults. *Annals of Pharmacotherapy,* 44**,** 957-963.

LYON, B. 2005. Getting back on track: Nursing's autonomous scope of practice. *Clinical Nurse Specialist* 19**,** 28-33.

MAXCY, S. 2003. *"Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism" (pp 4-50), in Handbook of Mixed Methods in Social & Behavioral Research, 2003, Sage, California*, Thousand Oaks, Sage.

MCCARTHY G. O'SULLIVAN, D. 2008. Evaluating the Literature. *In:* WATSON, R., MCKENNA, H., COWMAN, S., KEADY, J. (ed.) *Nursing Research Designs and Methods.* Oxford: Churchill Livingstone.

MCINTOSH, E., NAGELKERK, J., VONDERHEID, S., POOLE, M., DONTJE, K. & POHL, J. 2003. Financially viable nurse-managed centres. *The Nurse Practitioner,* 28**,** 46-51.

MCKEE, M., DUBOIS, C. & SIBBALD, B. 2006. *Changing professional boundaries (pp 63-78). Edited by,* Maidenhead, Open University Press.

MCKENNA, H., RICHEY, R., KEENEY, S., HASSON, F., POULTON, B. & SINCLAIR, M. 2008. The managerial and development issues of nurses and midwives in new roles. *Scand J Caring Sci,* 22.

MEALER, M. & JONES, J. 2014. Methodological and ethical issues related to qualitative telephone interviews on sensitive topics. *Nurse Researcher,* 21**,** 32-37.

MICHEL, C. 2008. *Implementing a Forensic Educational Package for Registered Nurses in Two Emergency Departments in Western Australia (pp 40-63).* PhD, University of Notre Dame Australia.

MIGIRO, S. & MAGANGI, B. 2011. Mixed methods: A review of literature and the future of the new research paradigm. *African Journal of Business Management,* 5**,** 3757-3764.

MINISTRY OF SOCIAL AFFAIRS AND HEALTH FINLAND 2010. Health Care Professionals Act (original Issue June 1994 amended 2010) (pp 1-22). *In:* FINLAND, M. O. S. A. A. H. (ed.).

MOEN, A. & MÆLAND-KNUDSEN, L. 2013. Nursing Informatics: Decades of Contribution to Health Informatics. *Healthcare Informatics Research,* 19**,** 86-92.

MOHER, D., LIBERATI, A., TETZLAFF, J. & ALTMAN, D. 2009. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA StatementThe PRISMA Statement. *Annals of Internal Medicine,* 151**,** 264-269.

MONTI, E. & TINGEN, M. 1999. Multiple paradigms of nursing science. *Advanced Nursing Science,* 21**,** 64-80.

MORGAN, D. 1998. Practical strategies for combining qualitative and quantitative methods: Applications to health research. *Qualitative Health Research,* 8**,** 362-367.

MORGAN, D. L. 2007. Paradigms Lost and Pragmatism Regained Methodological Implications of Combining Qualitative and Quantitative Methods. *Journal of Mixed Method Research,* 1**,** 48-76.

MORSE, J. 1991. Approaches to qualitative-quantitative methodological triangulation. *Nursing Research,* 40**,** 120-123.

MUNSCH, C. 2002. Managing the Measurement: A Model of Data Support in an Integrated Delivery System. *Journal of Nursing Care Quarterly,* 16**,** 1-9.

MURPHY, K., CASEY, D., DEVANE, D., MESKELL, P., BEGLEY, C., HIGGINS, A., ELLIOT, N., LALOR, J. 2014. Reflections on using the added value of using Mixed methods in the SCAPE study. *Nurse Researcher,* 21(4) 13-19.

NATIONAL COUNCIL FOR THE PROFESSIONAL DEVELOPMENT OF NURSING MIDWIFERY 2003. Agenda for the future professional development of nursing and midwifery. National Council for the Professional Development of Nursing and Midwifery. http://hdl.handle.net/10147/254014 [Accessed 12th Sept. 2014].

NAUGHTON, C., DRENNAN, J., HYDE, A., ALLEN, D., O'BOYLE, K., FELLE, P. & BUTLER, M. 2012. An evaluation of the appropriateness and safety of nurse and midwife prescribing in Ireland. *Journal of Advanced Nursing,* 69**,** 1478-1488.

NEERGAARD MA, OLESEN F, ANDERSEN RS & J., S. 2009. Qualitative description: the poor cousin of health research? . *BMC Med Resarch Methodology,* 9.

NIESWIADOMY, R. 2008. *Foundations in Nursing Research,* USA, Pearson.

NOLAN, P., HAQUE, M., BADGER, F., DYKE, R. & KHAN, I. 2001. Mental health nurses' perceptions of nurse prescribing. *Journal of Advanced Nursing,* 36**,** 527 - 534.

NOVICK, G. 2008. Is there a bias against telephone interviews in qualitative research? *Research in Nursing & Health,* 31**,** 391-398 8p.

O' CONNELL, E., CREEDON, R., MCCARTHY, G. & LEHANE, B. 2009. An Evaluation of Nurse Prescribing Part 2: a literature review. *British Journal of Nursing,* 18**,** 1398-1402.

O' REGAN, E. 2013. HSE scraps shorter working week in new redundancy plan. *Irish Independent.* *http://www.independent.ie/irish-news/hse-scraps-shorter-working-week-in-new-redundancy-plan-29734217.html* *[Accessed 23rd January 2014]*.

O'CONNOR, M., GALLAGHER, P. & O'MAHONY, D. 2012. Inappropriate Prescribing: Criteria, Detection and Prevention. *Drugs & Ageing,* 29**,** 437-452.

O'HALLORAN, S. 2010. *RE: Meeting between Nurse Prescribing Director O' Halloran, S. and UCC representatives Creedon, R. and McCarthy, S. January 2010. .*

O'MAHONY, D. & GALLAGHER, P. 2008. Inappropriate prescribing in the older population: need for new criteria. *Age and Ageing* 37**,** 138-141.

O'MAHONY, D., O'SULLIVAN, D., BYRNE, S., O'CONNOR, M., RYAN, C. & GALLAGHER, P. 2014. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. *Age and Ageing,* 0**,** 1-6.

O'RIELLY, M. & KIYIMBA, N. 2015. *Advanced qualitative research: A guide to using theory,* London, Sage.

O'SULLIVAN, D., O'MAHONY, D. & BYRNE, S. 2010. Inappropriate prescribing in Irish nursing home residents. *European Geriatric Medicine,* IS, S84.

O'SULLIVAN, D., O'MAHONY, D., PARSONS, C., HUGHES, C., MURPHY, K., PATTERSON, S. & BYRNE, S. 2013. A Prevalence Study of Potentially Inappropriate Prescribing in Irish Long-Term Care Residents. *Drugs & Ageing,* 30**,** 39-49.

O'MAHONY, D., GALLAGHER, P., RYAN, C., BYRNE, S., HAMILTON, H., BARRY, P., O'CONNOR, M. & KENNEDY, J. 2010. STOPP & START criteria: A new approach to detecting potentially inappropriate prescribing in old age. *European Geriatric Medicine,* 1**,** 45-51.

OAKLEY, A. 2013. Interviewing women: a contradiction in terms (Chapter 2). In Roberts H (Ed) Doing Feminist Research. Routledge, London.

OIREACHTAS AND DEPARTMENT OF HEALTH 2011. Nurses and Midwives Act (document 41 of 2011). Dublin: Government Press.

ORTIZ, E. & CLANCY, C. M. 2003. Use of Information Technology to Improve the Quality of Health Care in the United States. *Health Services Research,* 38**,** xi-xxii.

ORTLIPP, M. 2008. Keeping and Using Reflective Journals in the Qualitative Research Process. *The Qualitative Report,* 13**,** 695-705.

OTWAY, C. 2001. Informal peer support: a key to success for nurse prescribers. *British Journal of Community Nursing,* 6**,** 586.

PARAHOO, K. 2006. *Nursing Research Principles, Process and Issues,* United Kingdom, palgrave Macmillin.

PARR, J., KAVANAGH, D., CAHILL, L., MITCHELL, G. & DYR., M. 2009. Effectiveness of current treatment approaches for benzodiazepine discontinuation: a meta-analysis *Addiction,* 104**,** 13-24.

PATTON, M. 1990. Qualitative evaluation and research methods. Beverly Hills, CA: Sage.

PERLESZ, A. & LINDSAY, J. 2001. Methodological triangulation in researching families: making sense of dissonant data. *International Journal of Social Research Methodology,* 6**,** 25-40.

PHELAN, A. & MCCORMACK, B. 2012. Exploring Nursing Expertise in Residential Care for Older People in Ireland. A Report. http://hdl.handle.net/10147/285717 [Accessed July 12th 2015].

PHILLIPS, S. J. 2008. After 20 Years, APNs Are Still Standing Together. *Nurse Practitioner,* 33**,** 10-34.

PLONCZYNSKI, D., OLDENBURG, N. & BUCK, M., 2003. The past, present and future of nurse prescribing in the United States. *Nurse Prescribing,* 1 (4)**,** 170-174.

POLIT & BECK 2012. *Nursing Research Generating and Assessing Evidence for Nursing Practice*, Lippincott Williams & Wilkins,.

POLIT, D. & BECK, C. 2010. *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*, Lippincott Williams & Wilkins,.

POLIT, D. & BECK, C. 2012. *Nursing Research: Principles and Methods.,* Philadelphia, Lippincott, Williams & Wilkins.

PONTIN & & JONES 2007. Children's nurses and nurse prescribing: a case study identifying issues for developing training programmes in the UK. *Journal of Clinical Nursing,* 16**,** 540-548.

POTTER, J. 2002. Two kinds of natural. *Discourse Studies,* 4**,** 539-542.

PRITCHARD, A. & KENDRICK, D. 2001. Practice nurse and health visitor management of acute minor illness in a general practice. *Journal of Advanced Nursing,* 36**,** 556-562.

RANA, T., BADLEY, E. & NOLAN, P. 2009. Survey of psychiatrists' views of nurse prescribing. *Journal of Psychiatric & Mental Health Nursing,* 16**,** 257-262.

RCN 2010. RCN Fact sheet prescribing in the UK Report- Update on growth in prescription volume and cost in the year to March 2010. *In:* NURSING, R. C. O. (ed.). https://www2.rcn.org.uk/__data/assets/pdf_file/0004/462370/15.12_NursePrescribing_in_the_UK_RCN_Factsheet.pdf [Accessed August 2015]

RCN 2012. RCN Fact Sheet nurse prescribing in the UK (pp.1-6). Royal College of Nursing. Available at: https://www.rcn.org.uk/about-us/policy-briefings/pol-1512 [Accessed 24th March 2013].

ROBINSON, F. 2009. Delivering safe and effective nurse prescribing. *Practice Nurse,* 37**,** 22.

ROCCHICCIOLI, J., SANFORD, J. & CAPLINGER, B. 2007. "Polymedicine and Aging: Enhancing Older Adult Care Through Advanced Practitioners". *Journal of Gerontological Nursing,* 33**,** 19-24.

ROCHON, P. 2015. Drug prescribing for older adults. *UpToDate* [Online]. Available: http://www.uptodate.com/contents/drug-prescribing-for-older-adults [Accessed 5th August 2015].

ROLLS, L. & RELF, M. 2006. Bracketing interviews: Addressing methodological challenges in qualitative interviewing in bereavement and palliative care. *Mortality,* 11**,** 286-305.

ROSS, J. 2012. Nurse prescribing in the USA: a nurse prescribing practice report. *Nurse Prescribing,* 10**,** 91-99.

ROSS, J. D. & KETTLES, A. M. 2012. Mental health nurse independent prescribing: what are nurse prescribers' views of the barriers to implementation? *Journal of Psychiatric & Mental Health Nursing,* 19**,** 916-932.

RUSSELL, S., DALY, J., HUGHES, E. & HOOG, C. 2003. Nurses and 'difficult' patients: negotiating non-compliance. *Journal of Advanced Nursing,* 43**,** 281-287.

RYAN, C., O'MAHONY, D., KENNEDY, J., WEEDLE, P., BARRY, P., GALLAGHER, P. & BYRNE, S. 2009a. Appropriate prescribing in the elderly: an investigation of two screening tools, Beers criteria considering diagnosis and independent of diagnosis and improved prescribing in the elderly tool to identify inappropriate use of medicines in the elderly in primary care in Ireland. *Journal of Clinical Pharmacy & Therapeutics,* 34**,** 369-376.

RYAN, C., O'MAHONY, D., KENNEDY, J., WEEDLE, P. & BYRNE, S. 2009c. Potentially inappropriate prescribing in an Irish elderly population in primary care. *British Journal of Clinical Pharmacology,* 68**,** 936-947.

RYAN, C., O'MAHONY, D., KENNEDY, J., WEEDLE, P., COTTRELL, E., HEFFERNAN, M., O'MAHONY, B. & BYRNE, S. 2012. Potentially inappropriate prescribing in older residents in Irish nursing homes. *Age And Ageing,* 42**,** 116-120.

RYAN, F., COUGHLAN, M. & CRONIN, P. 2007. Step-by-step guide to critiquing research. Part 2: qualitative research. *British Journal of Nursing,* 16**,** 738-744

SANDELOWSKI, M. 2000. Whatever Happpened to Qualitative Description? *Research in Nursing and Health,* 23**,** 334-340.

SANDELOWSKI, M. 2010. What's in a name? Qualitative description revisited. *Research in Nursing & Health,* 33**,** 77-84.

SANDERS, C. 2003. Application of Colaizzi's method: Interpretation of an auditable decision trail by a novice researcher. *Contemporary Nurse Journal,* 14**,** 292-302.

SCHOBER, M. & AFFARA, F. 2006. *Advanced practice nursing.,* Oxford, UK, Blackwell Publishing.

SCHON, D. 1991. *The reflective practitioner: how professionals think and act.* , Avebury, Aldershot.

SCRAFTON, J., MCKINNON, J. & KANE, R., 2012. Exploring nurses' experiences of prescribing in secondary care: informing future education and practice. *Journal of Clinical Nursing,* 21**,** 2044-2053.

SEQUIST, T. D., COOK, D. A., HAAS, J. S., HORNER, R. & TIERNEY, W. M. 2008. Moving Health Information Technology Forward. *Journal of General Internal Medicine,* 23**,** 355-357.

SHUM, C., HUMPHREYS, A., WHEELER, D., COCHRANE, M., SKODA, S. & CLEMENT, S. 2000. Nurse management of patients with minor illnesses in general practice: multicentre, randomised controlled trial. *BMJ: British Medical Journal (International Edition),* 320**,** 1038-1043.

SIBBALD, B., SHEN, J. & MCBRIDE 2004. Changing the skill-mix of the health care workforce. *Journal of Health Services Research and Policy,* 9**,** 28-38.

SILVERMAN, D. 2004. *Doing Qualitative Research,* London, Sage Publications.

SITAR ET AL 1995. Prescribing pattern for elderly community-dwelling heavy medicinal drug users in Manitoba, Canada and Jamtland, Sweden. *J Clin Epidemiol,* 48**,** 825-31.

SMITH, E. M. 2005. Telephone interviewing in healthcare research: summary of the evidence. *Nurse Researcher,* 12 32-41.

SNOWDEN, A. & MARTIN, C. R. 2010. Mental health nurse prescribing: a difficult pill to swallow? *Journal of Psychiatric & Mental Health Nursing,* 17**,** 543-553.

SPEZIALE, H. & CARPENTER, D. 2007. *Qualitative Research in Nursing: Advancing the Humanistic Imperative,* Philadelphia, Lippincott, Williams and Wilkins.

SPINEWINE, A., SCHMADER, K. E., BARBER, N., HUGHES, C., LAPANE, K. L., SWINE, C. & HANLON, J. T. 2007. Appropriate prescribing in elderly people: how well can it be measured and optimised? *Lancet,* 370**,** 173-184.

STALLER, K. M. 2013. Epistemological boot camp: The politics of science and what every qualitative researcher needs to know to survive in the academy. *Qualitative Social Work,* 12**,** 395-413.

STEIN-PARBURY, J. & LIASCHENKO, J. 2007. Understanding collaboration between nurses and physisican as knowledge at work *Americal Journal of Critical Care,* 16**,** 440-447.

STEINMAN, M. & HANLON, J. 2010. CARE OF THE AGEING PATIENT: FROM EVIDENCE TO ACTION. Managing Medications in Clinically Complex Elders: "There's Got to Be a Happy Medium". *JAMA: Journal of the American Medical Association,* 304**,** 1592-1601.

STEINMAN, M. A., LANDEFELD, C. S., ROSENTHAL, G. E. & ET AL. 2006. Polypharmacy and prescribing quality in older people. *J Am Geriatr Soc* 54**,** 1516-1523.

STENNER, K., CAREY, N. & COURTENAY, M. 2010a. How nurse prescribing influences the role of nursing. *Nurse Prescribing,* 8**,** 29-34.

STENNER, K., CAREY, N. & COURTENAY, M. 2012. Prescribing for pain - how do nurses contribute? A national questionnaire survey. *Journal of Clinical Nursing,* 21**,** 3335-3345.

STENNER, K. & COURTENAY, M. 2008. Benefits of nurse prescribing for patients in pain: nurses' views. *Journal of Advanced Nursing,* 63**,** 27-35.

STENNER, K. L., COURTENAY, M. & CANNONS, K. 2011. Nurse prescribing for inpatient pain in the United Kingdom: A national questionnaire survey. *International Journal of Nursing Studies,* 48**,** 847-855.

STOLEE, P., HILLIER, L., ESBAUGH, J., GRIFFITHS, N. & BORRIE, M. 2006. "Examining the Nurse Practitioner Role in Long-Term Care: Evaluation of a Pilot Project in Canada". *Journal of Gerontological Nursing,* 32**,** 28-36.

STUIJT, C., FRANSSEN, E., EGBERTS, A. & HUDSON, S. 2008. Appropriateness of prescribing among elderly patients in a Dutch residential home: observational study of outcomes after a pharmacist-led medication review *Drugs Ageing* 25**,** 947-954

TAMBLYN, R. M., MCLEOD, P. J., ABRAHAMOWICZ, M. & LAPRISE, R. 1996. Do too many cooks spoil the broth? Multiple physician involvement in medical management of elderly patients and potentially inappropriate drug combinations. *CMAJ: Canadian Medical Association Journal,* 154**,** 1177-1184.

TARIMAN, J., BERRY, D., COCHRANE, B., DOORENBOS, A. & SCHEPP, K. 2012. Physician, Patient and Contextual Factors Affecting Treatment Decisions in Older Adults with Cancer: A Literature Review. *Oncol Nurs Forum,* 39**,** E70-E83.

TASHAKKORI, A. & TEDDLIE, C. 1998. *Handbook of mixed methods in social and behavioural research,* CA, Thousand Oaks, Sage.

TAYLOR, J., IRVINE, F., BRADBURY-JONES, C. & AL, E. 2010. On the precipice of great things: the current state of UK nurse education. *Nurse Education Today,* 30**,** 239-244.

TEDDLIE, C. & TASHAKKORI, A. 2003. *Major issues and controversies in the use of mixed methods in the social and behavioural sciences. In: Handbook of mixed methods in social and behavioural research.*, Thousand Oaks, Sage.

TEDDLIE, C. & TASHAKKORI, A. 2009. *Foundations of mixed methods research.*, Thousand Oaks, Sage.

THOMAS, D. 2003. A general inductive approach for qualitative data analysis. *American Journal of Evaluation,* 27**,** 237-246.

THYLEFORS, I., PERSSON, O. & HELLSTROM, D. 2005. Team types, perceived efficiency and team climate in Swedish cross-professional teamwork. *Journal of Interprofessional Care,* 19**,** 102-14.

TODD, C., GRANDE, G., BARCLAY, S. & FARQUHAR, M. 2002. General practitioners' and district nurses' views of hospital at home for palliative care. *Palliative Medicine,* 16**,** 251-4.

TODRES, L. & HOLLOWAY, I. 2006. *Phenomenological research. In K. Gerrish, & A. Lacey (Eds.), The research process in nursing (pp. 224-238),* Oxford, United Kingdom, Blackwell.

TONG, A., SAINSBURY, P. & CRAIG, J. 2007. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care,* 19**,** 349-357.

TROCHIM, W. 2006. Research Methods Knowledge Base. Web Centre for Social Centre Research Methods. http://www.socialresearchmethods.net/kb/contents.php [Accessed September 2014].

TRUGLIO-LONDRIGAN, M. 2013. Shared decision-making in home-care from the nurse's perspective: sitting at the kitchen table – a qualitative descriptive study. *Journal of Clinical Nursing,* 22**,** 2883-2895.

TWYCROSS, A., FORGERON, P. & WILLIAMS, A. 2015. Paediatric nurses' postoperative pain management practices in hospital based non-critical care settings: A narrative review. *International Journal of Nursing Studies,* 52**,** 836-863.

VAKOLA, M. & NIKOLAOU, L. 2005. Attitudes towards organisational change: What is the role of employees' stress and commitment? *Employee Relations,* 27**,** 160-174.

VAN MANEN, M. 1990. *Researching lived expereince: Human science for an action sensitive pedgogy*, State University of New York Press.

VEYSEY, B., ANDERSON, R., LEWIS, L., MUELLER, M. & STENIUS, V. 2005. 'Integration of alcohol and other drug, trauma and mental health services'. *Alcoholism Treatment Quarterly,* 22**,** 19-39.

VIKTIL, K., HEGE, B., TRON, M. & AASMUND, R. 2007. Polypharmacy as commonly defined is an indicator of limited value in the assessment of drug-related problems. *British Journal of Clinical Pharmacology,* 63**,** 187-195.

WARMS, C. & SCHROEDER, C. 2012. *Bridging the gulf between science and action: The "new fuzzies" of neopragmatism. In P. G. Reed & N. C. Shearer (Eds.), Perspectives on nursing theory (6th ed., pp. 145-151). Wolters Kluwer Health,* Philadelphia, PA, Lippincott Williams & Wilkins.

WATSON, R., MCKENNA, H., COWMAN, S. & KEADY, J. 2008. *Nursing Research Designs and Methods,* Churchill Livingstone.

WEAVER, K. & OLSON, J. K. 2006. Understanding paradigms used for nursing research. *Journal of Advanced Nursing,* 53**,** 459-469.

WEEDLE, P., LEDWIDGE, M. & KENNEDY, J. 2008. Pharmacy Ireland 2020 Working Group: Advancing Clinical Pharmacy Practice to Deliver Better Patient Care and Added Value Services, Intrim Report (pp. 13-33). Dublin: The Pharmaceutical Society Of Ireland The Pharmacy Regulator. http://www.thepsi.ie/Libraries/Publications/Interim_Report_of_the_Pharmacy_Ireland_2020_Working_Group.sflb.ashx [Accessed 10th February 2015].

WEGLICKI, R. S., REYNOLDS, J. & RIVERS, P. H. 2014. Continuing professional development needs of nursing and allied health professionals with responsibility for prescribing. *Nurse Education Today,* 35**,** 227-231.

WHILE & BIGGS 2004. Benefits and challenges of nurse prescribing. *Journal of Advanced Nursing,* 45**,** 559-567.

WHO 2010. International Statistical Classification of Diseases and Related Health Problems. http://www.who.int/classifications/icd/en/ [Accessed 3rd May 2014].

WHO 2011. Guidelines for ATC classification and DDD assignment 2011. http://www.whocc.no/filearchive/publications/2011guidelines.pdf [Accessed 10th May 2014].

WILHELMSSON, S. & FOLDEVI, M. 2003. Exploring views on Swedish district nurses' prescribing -- a focus group study in primary health care. *Journal of Clinical Nursing,* 12**,** 643-650.

WILSON, J. & BUNNELL, T. 2007. A review of the merits of the nurse practitioner role. *Nursing Standard,* 21**,** 35-40.

WORSTER, A., SARCO, A., THRASHER, C., FERNANDES, C. & CHEMERIS, E. 2005. Understanding the role of the nurse preactitioner in Canada. *Canadian Journal of Rural Medicine,* 10**,** 89-91.

APPENDICES

Appendix 1 - Introduction to Nurse Prescribing Publication (Chapter 1)

Introducing nurse prescribing: an Irish perspective

Rena Creedon and Elizabeth O'Connell

Abstract

This article outlines the introduction of nurse prescribing to the Irish setting by reviewing the changes made to the legislation and the roles played by An Bord Altranais (the regulatory body for the nursing profession in Ireland), the Health Service Executive, and the University in delivering the education programme. The future of nurse prescribing and implications for practice is also addressed.

The introduction of nurse and midwife prescribing to Ireland in 2007 by the Minister of Health and Children is a significant initiative in the Irish Health Service which has implications not only for nurses and midwives, but for the health service system as a whole, and patients and service users in particular. Nurse and midwifery prescribing, it was hoped, would lead to better integrated care for patients, improved delivery in the acute sector and earlier intervention in the community and primary care settings. This article will illustrate how collaboration between regulatory bodies, health service providers and higher education institutions has led to the registration of the first Irish nurse and midwife prescribers in March 2008 and discuss the future of nurse prescribing in Ireland.

Rena Creedon is Nurse Prescribing Programme Coordinator; and Elizabeth O'Connell is Nurse Prescribing Practice Coordinator; School of Nursing and Midwifery, University College Cork, Ireland.

Email: r.creedon@ucc.ie

Background

The present focus on nurse prescribing in Ireland has emerged from two documents: *Report of The Commission on Nursing —A Blueprint for the Future* (Department of Health and Children (DoHC), 1998) and *Review of Scope of Practice for Nursing and Midwifery* (An Bord Altranais, 2000). During the consultative process employed for both of these reports, it emerged that nurses or midwives might need to administer non-prescribed drugs or medicated dressings in the interests of the patient, but in the absence of medical support (An Bord Altranais, 2000). In 1999 the prevailing circumstance therefore resulted in constraints to delivering optimal patient care in a coherent and efficient way. In cognisance of this situation, it was recommended that An Bord Altranais (the regulatory body for the nursing profession in Ireland) urgently review the guidelines in relation to the administration or application of non-prescribed drugs by nurses and midwives. In response, An Bord Altranais and the National Council for the Professional Development of Nursing and Midwifery jointly established 'The Review of Nurses and Midwives in the Prescribing & Administration of Medicinal Products Project' in September 2001. This review took place over a 3.5-year period concluding in a final report in 2005 that examined expansion of practice by nurses and midwives specifically in relation to prescribing and medication management. The Steering Committee of this project was comprised of representatives from An Bord Altranais, the National Council for the Professional Development of Nursing and Midwifery and the Department of Health and Children. Other areas of nursing and midwifery were represented, as were patient and service user groups, the medical and pharmaceutical professions, various agencies and nursing unions.

Nurse and midwife prescribing was introduced to Ireland in 2007.

Their over-riding consideration for the extension of prescribing rights to nurses and midwives was to improve services to patients and deploy the education and expertise of nurses and midwives more efficiently.

The project included a review of international developments in nurse and midwife prescribing which summarised international research studies on the subject and identified the benefits for patients and service users as:

- Appropriate and safe prescribing
- Patient satisfaction
- Convenience and greater accessibility for patients
- Nurses as providers of information
- patients having improved compliance with their medications
- Fewer pharmacological interventions considered
- Appropriate clinical decision making
- Cost effectiveness.

In November 2006, the DoHC, with the approval of the Minister, established a Resource and Implementation Group on Nurse and Midwife Prescribing (RIG). This committee initially advised on the regulations to be drafted and then focused on overseeing the ongoing development of nurse and midwife prescribing at a national level until December 2008.

Overview of legislation framework

To facilitate nurse and midwife prescribing, changes to the legislation were required. The Minister for Health and Children was instrumental in introducing primary legislation to allow prescriptive authority for nurses and midwives (Government of Ireland, 2006). The Minister's rationale for the extension of prescriptive authority to nurses and midwives was to improve services to patients, reduce health service delays and deploy the education and expertise of nurses and midwives more efficiently. This was supported by strong international evidence from the USA, with over 30 years' experience in nurse prescribing, and the UK with practice in this area since 1987. Subsequently, on 1 May 2007 the Minister for Health and Children signed into law:

- The Irish Medicines Board (Miscellaneous Provisions) Act 2006 (Commencement) Order 2007.
- The Medicinal Products (Prescription and Control of supply) (Amendment) Regulations 2007.
- The Misuse of Drugs (Amendment) Regulations 2007.

Education programme

A pilot education programme for nurse and midwife prescribing commenced in the Royal College of Surgeons Ireland (RCSI) at the end of March 2003 and concluded in September 2003. However, although the pilot educational programme was successful, empowering legislation and clinical areas were not sufficiently developed for the full implementation of nurse/midwife prescribing at this time. It was not until April 2007 that the present nurse and midwife prescribing education programme was commenced. In its development and delivery, the education programme builds on the established regulatory documents from An Bord Altranais, the National Council for the Professional Development of Nursing and Midwifery and relevant current legislation pertaining to medicinal products. It is currently offered as a stand-alone programme by the School of Nursing, Royal College of Surgeons, Dublin and the Catherine McAuley School of Nursing and Midwifery, University College Cork. The purpose of this education programme for prescriptive authority is to ensure that upon successful completion the nurse/midwife is equipped with the knowledge, skills and competence to prescribe safely and effectively.

The education programme is designed in response to a direct request from the Health Service Executive and An Bord Altranais which may change in the future depending on best practice.

The role of the Health Service Executive (HSE)

Following the introduction of legislation to allow prescriptive authority for nurses and midwives in May 2007, the remit of RIG was to oversee the introduction of the initiative. With guidance provided by RIG, the role of the HSE included the following:

- Development and implementation of a plan to roll out nurse and midwife prescribing
- Identification of clinical governance structures to support appropriate and safe nurse and midwife prescribing
- Evaluation of nurse and midwife prescribing from a service perspective within two years and development of a structure for ongoing evaluation
- Implementation of an inclusive communication strategy in partnership with the Department of Health and Children, An Bord Altranais and the National Council for the Professional Development of Nursing and Midwifery.

Essential criteria were identified which had to be met by all Health Service Providers (HSPs) in order to participate in the prescribing initiative. Participating HSPs are required to have organizational policies which support the safe management of nurse prescribing and access to a Drugs and Therapeutics Committee. They are also required to develop robust collaborative practice agreements in collaboration with a named medical practitioner as well as a mechanism to audit and evaluate nurse and midwife prescribing practices.

The role of An Bord Altranais

An Bord Altranais is the regulatory body for the nursing profession in Ireland (www.nursingboard.ie). It has played a key role in the regulation, education, clinical governance and professional guidance in the area of prescriptive authority for nurses and midwives. The publication of Nurses' Rules (An Bord Altranais, 2007a) established for nurse and midwife prescriber is a new division of the Register. It also provided for approval of Higher Education Institutes (HEIs) and HSPs to collaboratively deliver education programmes to prepare nurse and midwife prescribers for their expanded role. The development of the Decision-Making Framework for Nurse and Midwife Prescriptive Authority (An Bord Altranais, 2007b) provided guidance for HSPs in regard

to the context and appropriateness of prescribing to their service needs while the Practice Standards for Nurses and Midwives with Prescriptive Authority (An Bord Altranais, 2007c) gave professional guidance on prescriptive authority and medication management. Finally, a guideline for the development of Collaborative Practice Agreements was provided for with the publication of The Collaborative Practice Agreement for Nurses and Midwives with Prescriptive Authority (An Bord Altranais, 2007d). The introduction of this document has restricted prescribing in Ireland from what initially was described as an open formulary to that of a limited formulary, one which is controlled by the drug and therapeutic committee within each clinical organization. However, this is not as restrictive as the supplementary prescribing that was initially introduced in the UK.

Evaluation

The combined information from both the audit (An Bord Altranais, 2009) and the HSE evaluation (HSE, 2009) will be used to inform future changes to the curriculum content and assessment system together with organizational structures in the clinical setting and ongoing professional development requirements.

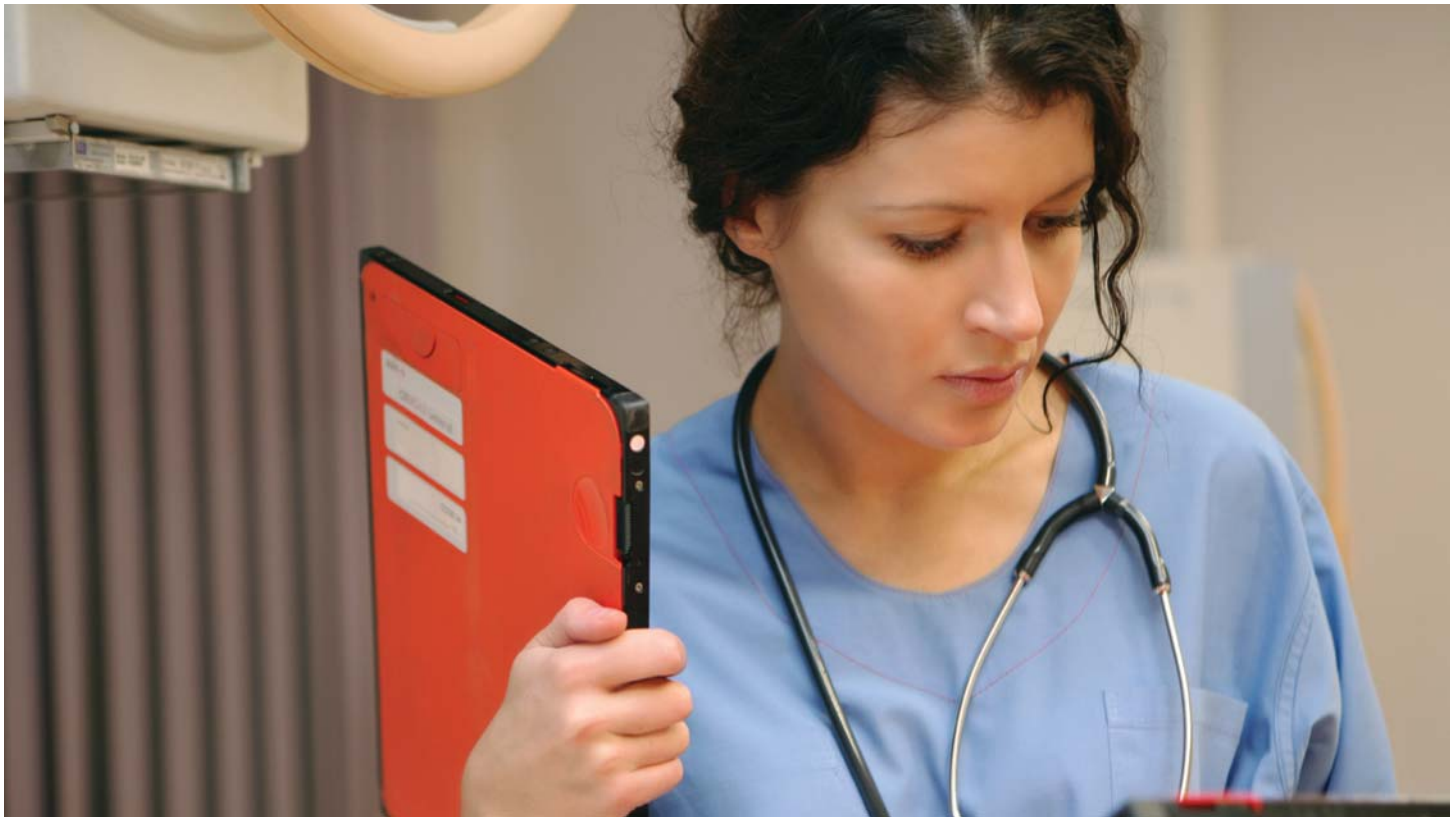
Future of nurse prescribing and implications for practice

The DoHC has conducted a national evaluation of the nurse prescribing programme from an educational and clinical perspective with a report due to be published in August 2009 (An Bord Altranais, 209; HSE, 2009). As part of the evaluation, students have been asked to evaluate the course content and delivery since its inception in April 2007. Informal student feedback regarding nurse prescribing to date identifies the relationship between the nurse and the patient in providing reassurance, continuity of care, information, provision of health promotion, and being approachable (unpublished observations, University College Cork, 2007; 2008; 2009) as the most positive aspects of nurse prescribing. This mirrors the findings of international research where nurse prescribers have been identified as safe and effective practitioners resulting in increased patient satisfaction (Shum et al, 2000; Pritchard and Kendrick, 2001) and a more cost-effective service. However, concerns also exist regarding the acceptance of nurse prescribing in the clinical setting a situation that was previously studied in the US (Bryant and Clark-Graham, 2002) and Sweden (Wilhelmesson and Foldevi, 2003) and which found that some doctors were reluctant to accept non-medical prescribing, despite evidence that nurse prescribers are able to provide safe, effective prescribing care that is popular with service users. Despite these difficulties, nurse prescribing is extending (While and Biggs, 2004) and looks set to play a pivotal part in modernizing health services in Ireland. Discussions held with the various stakeholders during the evaluation undertaken by An Bord Altranais (2009) identified that the success of nurse prescribing is largely dependent on the acceptance, support and understanding of doctors, some of whom have taken a cautious stance. Some students feel that the title of the programme, Certificate in Nurse Prescribing, is somewhat misleading for clinicians and may be a contributory factory in their cautious attitude in that it suggests an insufficient level of qualification for such a responsible role. In light of this, the current title of the programme is under review by the University.

Perhaps an important observation for future policy makers and nurse leaders in this area is the importance of engaging with medical colleagues in planning and supporting nurse prescribing. The nurse prescribers must also take responsibility for consolidating their new role by being assertive in raising awareness among colleagues of their potential and skills while continuing to build positive working relationships for the benefit of their patients. The picture emerging from practice today is that there are a number of benefits from nurse prescribing which include time saving and convenience, a belief that patients receive better information from nurses about prescriptions, earlier intervention and a more holistic approach to care. Nurse prescribers also experience an increased sense of satisfaction, status and autonomy, as well as improved relationships with pharmacists and doctors (An Bord Altranais, 2009).

Although nurses' evaluation of nurse prescribing has generally been positive, some concerns have been identified by mental health nurses, paediatric nurses and community nurses. These concerns include lack of remuneration, adherence to a medical model, use of unlicensed medications, lack of organizational support, and not having clearly defined access to drug and therapeutic committees, in particular for community-based nurses. Although community based nurses are the group best positioned to really see the impact of nurse prescribing in Ireland, it is too soon to identify the full impact on this group of care recipients. Although nurses are being encouraged and liberated to work efficiently and autonomously, they are also in conflict with inadequate resources. The community nurse prescribers clearly recognize the need to enhance existing services by improving access, reducing patient journeys and delays, and ensuring that the focus should always be on improving the patient experience. There is growing support from community based doctors who have worked with nurse prescribers, but they need to be encouraged to talk about their experiences to increase support in the current economic climate. At present, the HSE is experiencing severe budgetary constraints and is looking for alternative ways of providing service to patients. However, at the local macro level of service planning, nurse prescribing may not be a priority because of a failure to understand its impact. From the information captured in the An Bord Altranais report (2009) and the HSE evaluation (2009) it is clear that the extension and further implementation of nurse prescribing is a way forward to provide these quality services at community level and throughout the HSE.

Nurse prescribers see themselves as having increased knowledge that



Newly qualified nurse prescribers have a vital role in consolidating their new position as they are partly responsible for defining the scope of their new role and how to implement it.

contributes to the wider health care team, however, to consolidate this, contribution protected study time and access to continuing professional development is required (An Bord Altranais, 2007). Similar concerns were found in the UK by Latter et al (2007), whose study highlighted that 95% of nurse prescribers engaged in self-directed informal professional development. This concern stems from the fact that the Irish Nurses Act of 1985 does not identify ongoing professional development as a requirement for maintaining best practice, appropriate care delivery and re-registration. However, nurse educators in Ireland are acutely aware of this situation and are providing post graduate programmes to address this deficiency. The high uptake of such courses indicates that nurses in general are aware of the importance of ongoing professional development and the impact it has on confidence and practice. This view is supported by Courtenay et al (2007) when they say 'access to continuing professional development has been shown to increase confidence levels in nurse prescribers'.

To avoid misunderstanding of the newly qualified nurse prescriber's role amongst healthcare providers, education of the multidisciplinary team is also vital. Verbal feedback from the An Bord Altranais report (2009) highlights that newly qualified nurse prescribers have a vital role in consolidating their new position as they are partly responsible for defining the scope of their new role and how they plan to implement it.

An Bord Altranais is reviewing the Nurses' Act (1985), which is due to be published later this year. Because nurse prescribing is still new to the Irish setting, newly qualified nurse prescribers will again have an important role to play in determining their specific professional development needs through ongoing research and audit. One nurse prescriber suggested that it was possible to keep updated for a short time only by self-motivation and the use of journals, but that an official professional development course was needed to fully address their needs. This was reinforced by another participant who clearly stated, 'that the nurse prescribers are in a better position now as newly qualified specialist practitioners having successfully completed the nurse prescribing education programme to critically analyse the research findings offered by pharmaceutical representatives (Programme evaluation UCC, 2009) in order to make an informed decision. However, with constant changes in the pharmaceutical arena this position of security could be short lived.

Conclusions

From an international perspective, and considering the implementation of several different models of prescribing worldwide, nurse prescribing has been evaluated positively to date (An Bord Altranais, 2005a,b). The An Bord Altranais report of 2009 and the HSE evaluation of nurse prescribing (2009) have identified strengths and weaknesses in the education and prescribing process that can be addressed through collaboration with the various stakeholders. As questions arise regarding this new nursing role, research is needed to provide robust evidence about the effectiveness, safety and satisfaction of nurse prescribing. To ensure that

Key points

- The introduction of nurse and midwife prescribing to Ireland in 2007 by the Minister of Health and Children is a significant initiative in the Irish Health Service which has implications not only for nurses and midwives, but for the health service system as a whole, and patients and service users in particular.
- Nurse prescribing has already had a significant impact on medical and hospital costs in Ireland.
- Although nurses' evaluation of nurse prescribing has generally been positive, some concerns have been identified by mental health nurses, paediatric nurses and community nurses.
- These concerns include lack of remuneration, adherence to a medical model, use of unlicensed medications, lack of organizational support, and not having clearly defined access to drug and therapeutic committees, in particular for community-based nurses.

progress continues, support from the Department of Health together with the multidisciplinary team is vital to the continued success of nurse prescribing. The organization has the specific role of ensuring structures are in place and access to appropriate committees is facilitated. The organization is also required to help the nurse prescriber with ongoing professional development by providing protective time to attend study days or specifically designed programmes. Addressing these issues as they arise in collaboration with the various stakeholders will help consolidate nurse prescribing in Ireland in keeping with international best practice.

With the early introduction of the Irish budget in October 2008, the subsequent revision of the budget in March 2009 and the further introduction of a mini-budget, funding for the majority of postgraduate nursing education programmes has been withdrawn although nurse prescribing and the public health programme continues to be funded. However, providing funding may not be sufficient to ensure that nurse prescribing education programmes continue. Staff also need support at an organizational level. Economists have informed the Government that the modern Irish economy needs to rely increasingly on human ingenuity, and agile, frequent innovations to improve its present economic situation (Irish Times, 2009). Nurse prescribing can contribute significantly to the improvements required in the health care system and help it to move forward in these difficult times. Nurse prescribing has already had a significant impact on medical and hospital costs in Ireland, and it is hoped that the Department of Health through its discussions and the findings of the recent evaluations (An Bord Altranais, 2009), will continue to recognize the benefits of nurse prescribing and support its development over the difficult economic period ahead.

An Bord Altranais (1985) The Irish Nurses Act. Dublin Press.

An Bord Altranais (2000) Revision of the Scope of Practice for Nursing and Midwifery. An Bord Altranais, Dublin

An Bord Altranais (2005a) Review of Nurses Midwives in Prescribing and Administration of Medicinal products. An Bord Altranais, Dublin

An Bord Altranais and National Council for the Professional Development of Nursing and Midwifery (2005b) Review of Nurses and Midwives in the prescribing and administration of Medicinal Products. An Bord Altranais, Dublin

An Bord Altranais (2007c) Requirements and Standards for Education for Nurses and Midwives with Prescriptive Authority. An Bord Altranais, Dublin

An Bord Altranais (2007a) Nurses Rules 2007. An Bord Altranais, Dublin

An Bord Altranais (2007b) Decision Making Framework for Nurses and Midwives with Prescriptive Authority. An Bord Altranais, Dublin

An Bord Altranais (2007d) Collaborative Practice Agreement for Nurses and Midwives with Prescriptive Authority. An Bord Altranais, Dublin

An Bord Altranais (2009) Evaluation of An Bord Altranais Regulatory Framework for Prescriptive Authority. An Bord Altranais, Dublin

Bryant R, Clark-Graham M (2002) Advanced Practice Nurse: A study of client satisfaction. *J Am Acad Nurse Prescribers* **14**(2): 88–92

Courteney M, Carey N, Burke J (2007) Independent extended supplementary nurse prescribers, their prescribing practice and confidence to educate and assess prescribing students. *Nurse Educ Today* **27**: 739–47

Department of Health and Children (1998) Report of The Commission on Nursing—a Blueprint for the Future. Government Office, Dublin

Government of Ireland (2006) Irish Medicines Board (Miscellaneous Provisions) Act 2006 (No. 3 of 2006) (Section16 (1)(ii)) Stationery Office, Dublin

Health Service Executive (2009) National independent evaluation of the nurse and midwife prescribing initiative, University College Dublin

Irish Times (2009) Economists contemplates response to downturn. Irish Times Finance Section, Thursday 21 May 2009

Latter S, Maben J, Myall M, Courtenay M, Young A, Dunn N (2007) An evaluation of extended formulary independent nurse prescribing; executive summary of final report. University of Southampton

Pritchard A, Kendrick D (2001) Practice nurse and health visitor management of acute minor illness in general practice. J Adv Nurs 36(4) 556–82

Shum C, Humphries A, Wheeler D, Cochrane M, Skoda S, Clement S (2000) Nurse management of patients with minor illnesses in general practice: multicentered randomized controlled trial. *BMJ* **320**: 1038–43

While AE, Biggs K (2004) Benefits and challenges of nurse prescribing. *J Adv Nurs* **45**(6): 559–67

Wilhelmesson S, Foldevi M (2003) Exploring views of Swedish district nurses' prescribing—a focus group study in primary health care. *J Clin Nurs* **12**: 643–50

Appendix 2 - Explanation and application of Caldwell's Framework including numerical value

Caldwell *et al.* 2011 framework is supported firstly by identifying common features of the research design framework and secondly a detailed explanation of each step of the evaluation process.

Common features

Quantitative	Qualitative
Research design	Philosophical background
Experimental hypothesis	Research design
Operational definitions	Concepts
Population	Context
Sample	Sample
Sampling	Sampling
Validity/reliability of data collection	Auditability of data collection
Data analysis	Credibility/confirmability of data analysis
Generalizability	Transferability

Guidelines that provide an extended explanation of each item

Details of these explanations are set out below including how the questions specifically relevant to qualitative and quantitative are structured.

Does the Title reflect the content? The title should be informative and reflect the focus of the study. It should allow the reader to easily interpret the content of the study. An inaccurate or misleading title can confuse the reader.

Are the authors credible? Researchers should hold appropriate academic qualifications and be linked to a professional field relevant to the research.

Does the abstract summarize the key components? The abstract should provide a short summary of the study. It should include the aim of the study, outline of the methodology and the main findings. The purpose of the abstract is to allow the reader to decide if the study is of interest to them.

Is the rationale for undertaking the research clearly outlined? The author should present a clear rationale for the research, setting it in context of any current issues and knowledge of the topic to date.

Is the literature review comprehensive and up-to-date? The literature review should reflect the current state of knowledge relevant to the study and identify any gaps or conflicts. It should include key or classic studies on the topic as well as up to date literature. There should be a balance of primary and secondary sources.

Is the aim of the research clearly stated? The aim of the study should be clearly stated and should convey what the researcher is setting out to achieve.

Are all ethical issues identified and addressed? Ethical issues pertinent to the study should be discussed. The researcher should identify how the rights of informants have been protected and informed consent obtained. If the research is conducted within the NHS then there should be indication of Local Research Ethics committee approval.

Is the methodology identified and justified? The researcher should make clear which research strategy they are adopting, i.e. qualitative or quantitative. A clear rationale for the choice should also be provided, so that the reader can judge whether the chosen strategy is appropriate for the study.

At this point the researcher look specifically at the questions that apply to the paradigm appropriate to the study they are critiquing. To complete their critique, the final questions students need to address are applied to both quantitative and qualitative studies

Does the title reflect the content?
↓
Are the authors credible?
↓
Does the abstract summarise the key points?
↓
Is the rational for undertaking the research clearly underlined?
↓
Is the literature review comprehensive and up-to- date?
↓
Is the aim of the research clearly stated?
↓
Are all ethical issues identified and addressed?
↓
Is the methodology identified and justified?

Quantitative	Qualitative
↓	↓
Is the study design clearly identified, and is the rationale for choice of design evident?	Are the philosophical background and study design identified and the relational for choice of design evident?
↓	↓
Is there an experimental hypothesis clearly stated? Are the key variables clearly defined	Are the major concepts identified?
↓	↓
Is the population identified?	Is the context of the study outlined?
↓	↓
Is the sample adequately described and reflective of the population? Is the method of data collection valid and reliable?	Is the selection of participants described and sampling method identified? Is the method of data collection auditable?
↓	↓
Is the method of data analysis valid and reliable?	Is the method of data analysis credible and confirmable?

Are the results presented in a way that is appropriate?
↓
Are the results generalizable? ← Is the discussion comprehensive →Are the results transferable?
↓
Is the conclusion comprehensive?

Are the results presented in a way that is appropriate and clear? Presentation of data should be clear, easily interpreted and consistent.

Is the discussion comprehensive? In quantitative studies the results and discussion are presented separately. In qualitative studies these maybe

integrated. Whatever the mode of presentation, the researcher should compare and contrast the findings with that of previous research on the topic. The discussion should be balanced and avoid subjectivity.

Is the conclusion comprehensive? Conclusions must be supported by the findings. The researcher should identify any limitations to the study. There may also be recommendations for further research, or if appropriate, implications for practice in the relevant field.

Diagrammatic Framework

A diagrammatic framework indicates the pathways that are central to both paradigms and those that are different.

Appraisal results for individual reviews using the Caldwell Framework (Caldwell *et al.* 2011) Questions 1-18 based on the Caldwell Framework																				
Studies		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**Total**
Banicek	2012	2	1	1	2	1	2	1	1	0	1	1	1	1	1	1	1	1	1	20
Black	2013	2	1	2	1	1	2	1	1	1	2	2	1	1	2	2	1	2	2	27
Bowskill *et al.*	2012	2	2	2	2	1	2	1	1	1	1	2	1	2	2	2	2	2	2	30
Carey *et al.*	2009	2	2	2	2	2	2	2	1	2	1	2	1	2	2	2	2	2	2	33
Carey *et al.*	2010	2	2	2	2	2	2	2	1	2	1	2	1	2	2	2	2	2	1	32
Carey *et al.*	2013	2	2	2	2	2	2	1	1	2	2	2	1	2	2	2	2	2	1	32
Carey *et al.*	2014	2	2	2	2	1	2	1	2	2	1	2	1	2	2	2	2	2	1	31
Cashin *et al.*	2009	1	2	2	2	1	2	1	1	1	0	2	1	1	1	2	2	2	1	25
Cooper *et al.*	2013	2	2	1	2	2	2	0	1	2	1	2	2	2	0	2	2	2	1	28
Coull *et al.*	2013	2	2	1	2	2	1	1	1	1	1	1	1	2	1	2	1	2	1	25
Courtney *et al.*	2010	2	2	2	1	1	2	0	2	2	1	2	2	1	2	2	2	2	1	29
Courtney *et al.*	2011	2	2	2	2	2	2	1	2	2	1	2	1	2	2	2	2	2	1	32

Studies	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		Total
Darvishpoor *et al.*	2014	2	2	2	2	2	2	0	2	2	0	2	2	2	2	2	2	2	2	32
Dhalivaali	2011	2	1	2	1	2	2	1	1	1	0	2	2	2	0	1	2	2	2	26
Dobler-Ober *et al.*	2013	1	2	1	2	2	1	0	1	2	0	2	2	2	1	2	2	2	1	26
Drennan *et al.*	2011	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1	34
Dunn *et al.*	2010	1	2	1	1	1	2	1	1	2	0	2	1	1	2	2	2	2	2	26
Earle *et al.*	2011a	1	2	1	2	1	2	1	2	2	1	2	1	2	1	2	2	2	1	28
Earle *et al.*	2011b	2	2	1	2	1	2	1	1	2	0	0	1	2	1	2	2	2	1	25
Fisher	2010	2	2	1	2	2	1	1	2	2	1	2	1	2	1	2	2	2	1	29
Gielen *et al.*	2014	2	2	2	2	2	2	0	2	2	1	2	2	2	2	2	2	2	2	33
Green *et al.*	2009	2	2	2	1	1	2	0	2	2	0	2	1	2	2	2	2	2	1	28
Hobson *et al.*	2010	2	1	2	2	2	2	0	2	2	1	2	1	2	2	2	2	2	1	30
Jones *et al.*	2010	2	2	2	2	2	2	1	1	2	0	2	1	2	2	2	2	2	2	31
Kroezen *et al.*	2012	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	34
Kroezen *et al.*	2013	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	34

Kroezen *et al.*	2014	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	35
Studies	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**		**Total**
Latter *et al.*	2012	2	2	2	2	2	2	0	1	2	1	2	2	2	2	2	2	2	2	32
Naughton *et al.*	2012	2	2	2	2	2	2	1	1	2	1	2	2	2	2	2	2	2	2	33
Natan *et al.*	2012	2	2	2	1	2	2	0	2	2	0	2	2	2	1	2	2	2	2	30
Rana *et al.*	2009	2	2	1	2	2	2	1	1	2	0	2	1	2	2	2	2	2	2	30
Ross& Kettles	2012	2	2	1	1	2	1	2	2	2	1	2	2	1	2	2	2	2	1	30
Scrafton *et al.*	2012	2	2	2	1	1	2	1	2	2	1	2	2	1	2	2	2	2	2	31
Snowden *et al.*	2010	1	2	1	1	2	2	1	1	1	0	2	1	1	1	2	2	2	1	24
Stenner *et al.*	2012	2	2	2	2	2	2	1	1	2	1	2	1	2	2	2	2	2	2	32
Weglicki *et al.*	2014	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2	1	33

NOTES Individual items 1-18 as defined by Caldwell *et al.* 201, **2** = Yes compliant with Caldwell *et al.* 2011, **1** = partially compliant with Caldwell *et al.* 2011 item **0**= Non-compliant with Caldwell *et al.* 2011. **Question Key** Note: Caldwell criteria: (1) title reflects content, (2) authors credible, (3) key points summarised in abstract, (4) rationale outlined, (5) comprehensive up-to-date literature review, (6) aim clearly stated, (7) ethical issues identified, (8) methodology identified and justified, (9) philosophical background and rationale for study design identified, (10) major concepts identified, (11) is the context of the study outlined, (12) selection participants and sample method identified, (13) data collection auditable, (14) method of data analysis credible and confirmable, (15) results presented appropriately and clear, (16) are results transferrable, (17) is the discussion comprehensive, (18) is the conclusion comprehensive.

Appendix 3 - Literature Review Publication (Chapter 3)

The impact of nurse prescribing on the clinical setting

Rena Creedon, Stephen Byrne, Julia Kennedy and Suzanne McCarthy

Abstract

Aim: **To investigate the impact nurse prescribing has on the organisation, patient and health professional, and to identify factors associated with the growth of nurse prescribing.** ***Methods:*** **Systematic search and narrative review. Data obtained through CINAHL, PubMed, Science direct, Online Computer Library Centre (OCLC), databases/websites, and hand searching. English peer-reviewed quantitative, qualitative and mixed-method articles published from September 2009 through to August 2014 exploring nurse prescribing from the perspective of the organisation, health professional and patient were included. Following a systematic selection process, studies identified were also assessed for quality by applying Cardwell's framework.** ***Results:*** **From the initial 443 citations 37 studies were included in the review. Most studies were descriptive in nature. Commonalities addressed were stakeholders' views, prescribing in practice, jurisdiction, education and benefits/barriers.** ***Conclusions:*** **Prescriptive authority for nurses continues to be a positive addition to clinical practice. However, concerns have emerged regarding appropriate support, relationships and jurisdictional issues. A more comprehensive understanding of nurse and midwife prescribing workloads is required to capture the true impact and cost-effectiveness of the initiative.**

Key words: Non-medical prescribing ■ Independent prescriber ■ Advanced practice ■ Role development ■ Multidisciplinary team

Prescribing medications has traditionally been the domain of doctors, but nurse prescribing has been introduced in response to changing service needs and the increasing specialisation of nurses and midwives as they expand and advance their scope of practice. This has resulted in two schools of thought about the potential impact of nurse prescribing; the first is as a backward step, prioritising 'cure' over 'care' (Cutcliff and Campbell, 2002) and the second as formalising the 'informal' prescribing that nurses already undertake (Nolan et al, 2001). The international experience of nurse prescribers (NPs) has demonstrated the associated benefits in terms of increased patient satisfaction and concordance with medication regimes (Berry et al, 2008), cost-effectiveness (Drennan et al, 2009) and increased nurse confidence (Courtenay et al, 2007). Additionally, patients interviewed about NPs identify the relationship between the nurse and the patient in providing reassurance, continuity of care, information and health promotion details, and being approachable as the most positive aspects of nurse prescribing (Russell et al, 2003; Courtenay et al, 2010). The role of NPs continues to grow in the healthcare setting internationally, increasing in both prominence and significance (Cipher et al, 2006). However, international differences between legislative procedures and the professional bodies responsible for the regulation of NPs have resulted in the implementation of several models of prescribing worldwide (Nursing and Midwifery Board of Ireland, 2005; Kroezen et al, 2012). Differences in the definition of nurse prescribing models are controlled independently by each governing body. In general, the independent prescribing model is autonomous, allowing NPs to prescribe and diagnose without direct medical involvement in the process—the nurse has full accountability and responsibility for the diagnosis and prescribing for that patient. In contrast, nurse supplementary prescribing is based on a voluntary prescribing partnership between the doctor and the nurse that facilitates the nurse to prescribe any drug listed in a patient-specific clinical management plan once the patient has been diagnosed by a doctor. A third variation, that of prescribing by a community practitioner nurse, exists in the UK. This model applies to a distinct group of district nurses, health visitors and school nurses and involves a prescribing partnership between the doctor and the nurse to prescribe any drug from a predetermined list once the patient has been diagnosed by the doctor. Medications include over-the-counter drugs, wound dressings and applications. Specific international variations of nurse prescribing models were identified by Kroezen et al (2012) (*Table 1*).

Irrespective of the prescribing model used, nurse prescribers continue to publicise that extending prescribing rights has allowed nurses to make better use of their skills (Wilhelmesson and Foldevi, 2003; Drennan et al, 2009), gain recognition as a profession (While and Biggs, 2004; Latter et al, 2012), increase professional development and enhance self-esteem (Courtenay and Butler, 1999; Cashin et al, 2009). The continued expansion of nurse prescribing, according to Naughton et al (2012) and Scrafton et al (2012), is motivated by an intricate mix of internal and external forces together with changes in societal values and technology. In the UK, such driving forces have also resulted in the extension of

Rena Creedon, Nurse Lecturer and Programme Coordinator, Nurse Prescribing, School of Nursing and Midwifery, University College Cork, Ireland; Stephen Byrne, Head of School of Pharmacy, University College Cork, Ireland; Julia Kennedy, Head of School Pharmacy, University of Auckland, New Zealand; Suzanne McCarthy, Clinical Pharmacy Research Group, School of Pharmacy, University College Cork, Ireland and Research Pharmacist, Cork University Hospital, Ireland

Accepted for publication: August 2015

© 2015 MA Healthcare Ltd

independent prescribing rights to other professions such as pharmacists, optometrists, physiotherapists and podiatrists (Pharmaceutical Journal, 2013).

Current studies have indicated that the introduction of nurse prescribing has blurred professional boundaries with jurisdictional responsibility for prescribing between the medical and nursing profession now unclear (Bowskill et al, 2012; Kroezen et al, 2013; Natan et al, 2013; Kroezen et al, 2014). The consequence of these changes has an impact on the patient (Courtenay et al, 2011), organisation (Banicek, 2012) and health professional (Latter et al, 2012). However, additional concerns have been identified regarding therapeutic relationships, role conflict, and lack of support, which impact on the progress of nurse prescribing (Ross and Kettles, 2012). Building on a literature review conducted in 2009 and published in two parts by the first author and colleagues (Creedon et al, 2009; O'Connell et al, 2009) it is now timely to systematically identify and evaluate available evidence with regard to the impact of nurse prescribing in practice.

Aim

The aim was to review the literature to examine the impact of nurse prescribing in the clinical setting from an organisational, patient and health professional perspective and identify possible factors that may impact on continued growth.

Method

A systematic search and narrative review was undertaken. Given such a broad question, this review type combines the search strategies and inclusion/exclusion criteria associated with systematic reviews as well as the analytical synthesis of a critical review (Twycross et al, 2015) to provide 'best evidence synthesis' (Grant and Booth, 2009). Multiple study designs are incorporated in the review rather than focusing on a single study design with the intention of providing a more complete picture of the research on the topic. Its primary purpose is to offer the reader a comprehensive background for understanding current knowledge and highlighting the significance of new research.

Search strategy

To identify relevant research studies, the following literature databases and websites were searched: CINAHL, PubMed, Online Computer Library Centre (OCLC) and Science Direct. Websites included were the Irish Department of Health (health.gov.ie), the English Department of Health (http://tinyurl.com/c8cqtdj) and Google Scholar (www.scholar.google.com). The search terms (prescribing OR 'prescriptive authority') AND (nurse OR nursing OR non-medical) were repeated across the databases. Articles selected were dated from September 2009 to August 2014 with no restriction on the type of patient group for whom medications were prescribed. Further studies were included if they had a comparative design, e.g. comparing nurse prescribing with physician prescribing or comparing nurse prescribing overall. To ensure relevant papers were not missed in the database search the authors hand searched the reference list of each included article and any grey material identified.

Inclusion criteria were original research designs that were qualitative, quantitative or mixed method in nature and that had nurses, health professionals and service users as participants of research undertaken in the area of nurse prescribing. Articles published in English between September 2009 and August 2014 were eligible for inclusion in the review.

Studies that did not meet the inclusion criteria above were commentaries, editorials, letters and review papers. In addition, studies focusing only on educational institutions, evaluations of theoretical frameworks, practice models, or quality assurance programmes with no research design were not included. *Figure 1* shows the process of identifying and selecting studies for inclusion in the review

Data extraction and synthesis

Data extracted from each study took the following format: study, country, study design, aim, sample (participants and

Table 1: Use of formularies, group protocols, clinical management plans (CMPs) and Collaborative Practice Agreements (CPAs) in nurse prescribing.

	Formularies			Group protocols	CPA	CMP
	Open	Specific	Individual			
Alaska (USA)	IP			IP		
Alberta (Canada)	IP					
Finland			IP SP			
Georgia (USA)					SP	
Ireland					IP	
Missouri (USA)				SP	SP	
The Netherlands		IP SP		IP SP		
New Hampshire (USA)	IP					
New South Wales (Australia)		IP		SP		
New Zealand		IP		IP		
North Carolina (USA)					SP	
Ontario (Canada)	IP					
Quebec (Canada)		IP				
South Australia (Australia)			IP			
Spain		SP				
Sweden		IP				
Victoria (Australia)		IP				
England and Wales	IP SP		CP			SP

IP: independent prescribing; SP: supplementary prescribing; CP: community practitioner nurse prescribing.

Source: Kroezen et al, 2012

© 2015 MA Healthcare Ltd

setting), data collection method, main results and quality of the study. Findings were organised into the following categories: implementation of nurse prescribing (prescribing arrangement, work force planning, treatment protocols, and infrastructure) continuing professional development (CPD), jurisdiction, and remuneration. Information was tabulated allowing identification of prominent themes and offering structured ways of dealing with the data in each item.

Quality of studies

The qualities of the final 37 studies were further assessed using a framework designed by Caldwell et al (2011). The framework consists of an overall approach to study critique using specific items based on the methodology and provides a list of criteria for qualitative, quantitative and mixed-method research to assist the reader in assessing the reliability of the study to its stated design and determine the dependability of the results (Twycross et al, 2015). The items include such elements as: is there a hypothesis? are key variables defined? is the selection of participants described and sample method defined? and are major concepts defined?. Although initially the framework did not produce a single numerical score to represent quality, for the purpose of this review the Caldwell framework consisting of 18 questions was awarded a numerical value (Bettany-Saltikov, 2012). The application of each question in Caldwell's framework had three possible answers; an answer of no=0, partly=1, and yes=2, with the maximum value any study could achieve being 36. On completion of this process all studies scored between 20 and 35 points. Studies were not excluded based on the assessment quality as preconceptions can be inherent in a wide range of research designs included in the review.

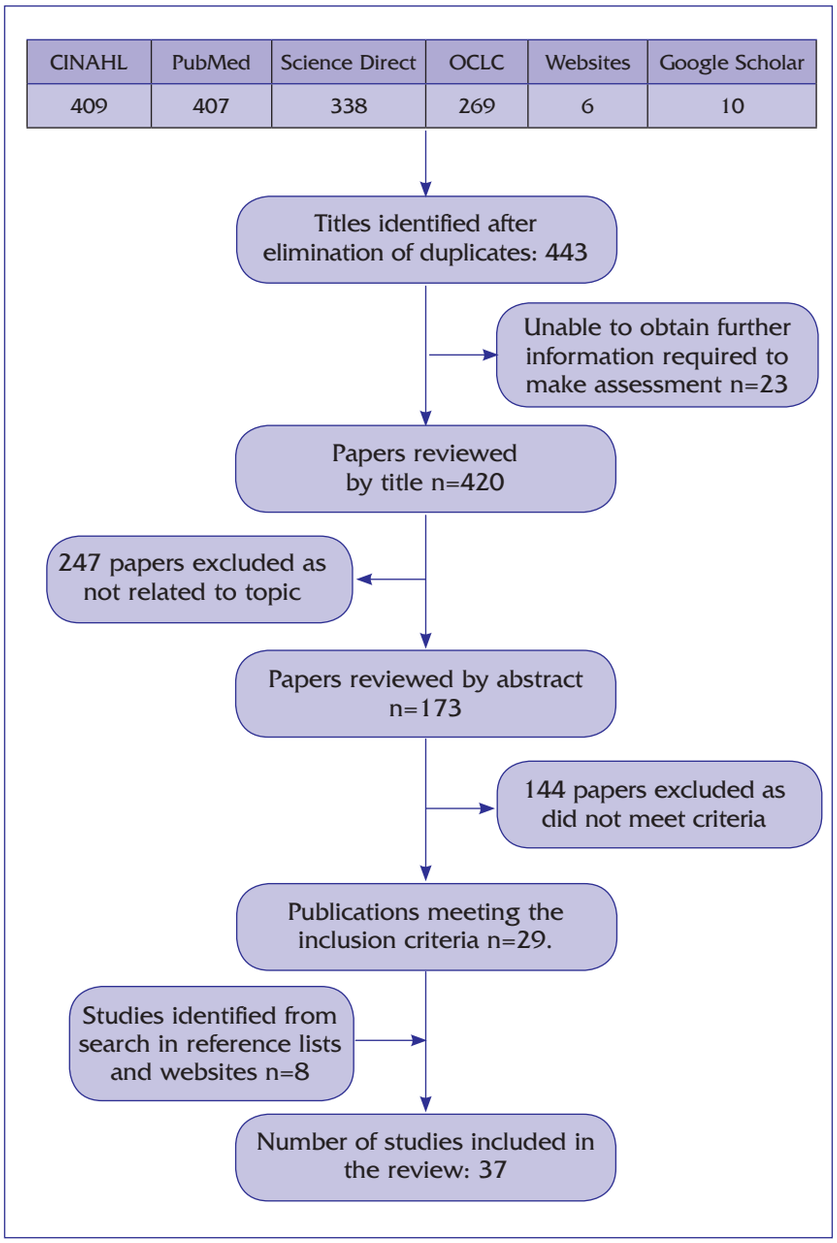


Figure 1. Flow diagram showing how relevant studies were identified for the narrative review

Findings

The literature originated from Britain, Scotland, Australia, The Netherlands, Israel, Iran and Ireland. All data extracted from the studies were based on the results and discussion sections, not the study conclusion. Outcomes were classified according to the categories identified. Categories were then grouped according to the research question to reveal the effects of nurse prescribing on the organisation, patient and health professional for discussion.

Study details

Of the 37 studies reviewed 31 included data on prescribing in practice, frequently from the viewpoint of prescribers and clients. Seven studies included data about CPD, four directly and three indirectly. Five studies reported on issues of jurisdiction with two focusing specifically on this issue. Although there were no studies that reported precisely on financial issues, four mentioned financial incentives as significant.

There were a mixture of quantitative (n=15), qualitative (n=20) and mixed methods (n=2) studies sourced using a range of data collection methods.

Prescribing in practice

Even though nurses prescribe medicines on an independent or supplementary basis, their scope of practice varies considerably depending on whether or not protocols, formularies or clinical management plans are in place and how restrictive they are. The model of prescribing applied directly impacts on the extent to which NPs make use of their prescriptive authority in everyday practice (Kroezen et al, 2014). Although the majority of studies referred to issues about prescribing in practice, seven focused specifically on this area. Overall, findings agreed that nurse prescribing increases effectiveness and autonomy in practice, which in turn raises many issues concerning confidence, workload (Earle et al, 2011a), access to ongoing or specialist training (Stenner et al, 2012; Carey et al, 2013), appropriate clinical decision-making (Latter et al, 2012), self-restriction (Bowskill et al, 2012), and safety (Naughton et al, 2012; Black, 2013). NPs in general are aware of their limitations and regularly consult with medical colleagues in an informal way that is agreeable to both nurses and doctors

© 2015 MA Healthcare Ltd

(Kroezen et al, 2014).

Workforce planning

There was a strong feeling that service development must take into account the additional work involved in prescribing. Having the ability to prescribe increased workloads for the NPs (Earle et al, 2011a) who appear to struggle with balancing their new role, particularly where boundaries of the nursing work and prescribing roles are unclear (Bowskill et al, 2012). Earle et al (2011a) suggest that this can be overcome through local negotiation. However, Carey et al (2013: 2073) had a more specific approach, stating that those responsible for service planning need to recognise 'the diverse range of medicines management activities in which NPs are involved' to address the hidden workload. Additional issues of concern identified were budgetary constraints that impacted negatively in terms of prescribing itself, numbers accessing training and the ability to demonstrate the effectiveness of nurse prescribing (Scrafton et al, 2012). Workforce planning in some instances did not support funding arrangements and agreements were not always in place to support nurse prescribing, thereby creating potential inequalities in service provision for patients (Carey et al, 2014).

Continuing professional development

NPs expressed anxiety that they were not 'keeping up to date'. There was also a fear of making incorrect decisions if they could not recall theory learned during the prescribing course (Weglicki et al, 2014). This anxiety and lack of confidence by nurses in their prescribing ability poses a significant challenge for CPD. Contrasting professional backgrounds, individual skill levels, workplace expectations and demands are some of the concerns to be addressed when focusing on CPD needs for nurse prescribers. Four studies reported specifically on CPD for NPs (Courtenay and Gordon, 2009; Green et al, 2009; Carey and Courtenay, 2010; Weglicki et al, 2014). The number is low considering the importance placed on CPD by governing bodies and organisations to ensure NPs' knowledge remains current. However, additional studies included CPD in their findings or discussion as an important element of nurse prescribing to be addressed (Scrafton et al, 2012; Stenner et al, 2012). The pace of change in the area of prescribing presents educators with a new challenge as professionals from a broad range of disciplines pursue ongoing development to prescribe in their specialty area of practice.

Specific difficulties with respect to the provision and access of CPD included cost, time, workload pressure, staffing levels, and workload patterns (Courtenay and Gordon, 2009). In addition, pressure to satisfy mandatory updates (Green et al, 2009); lack of organisational support (Carey and Courtenay, 2010); patient safety, workforce planning and education of line managers, support from employer or the professional body, reduced education budgets, anxiety and lack of confidence in non-medical prescribing, and individual skill levels (Weglicki et al, 2014) all impact on CPD. From a more encouraging perspective, studies also identified positive outcomes of CPD: consolidation of learning, information on new skills, an opportunity to share with colleagues (Green et al, 2009); organisational benefits, improved patient care, knowledge and confidence (Carey and Courtenay 2010); networking between practice settings, colleagues learning from informal debate, and reduced anxiety (Weglicki et al, 2014). The main barriers to CPD were consolidated by Stenner et al (2012) as financial and time/staff shortage, availability of training at an appropriate level and lack of organisational support for role development.

Pharmacology knowledge is the most important CPD need identified by nurse prescribers, a situation that Carey and Courtenay (2010) acknowledged as warranting further investigation. However, additional studies identified assessment and diagnostic skills updates as taking priority (Courtenay and Gordon, 2009; Green et al, 2009; Carey and Courtenay 2010). Weglicki et al (2014) did, however, voice concern that an adequate CPD strategy is not yet in place considering the advancements in prescribing over the past decade.

Jurisdiction

Until recently the domain of prescribing was exclusive to the medical profession. The expansion of prescriptive authority has affected professional boundaries and in some relationships there has been a struggle for dominance (Fisher, 2010). This affects the relationship between the nursing and medical professions and jurisdictional control over prescribing (Kroezen et al, 2014). The attitudes of doctors to the initiative—in particular, with senior doctors being more supportive of the role than junior doctors—may represent concerns about their future role (Rana et al, 2009). However, findings from Kroezen et al (2013) emphasised that once health professionals have experience with nurse prescribing their views become more positive toward the initiative. This is an important finding because a 'lack of peer support and/or objections from physicians can hamper progress' (Kroezen et al, 2012). Health professionals are now re-negotiating these blurred boundaries by addressing the issues through formal workplace policies (Kroezen et al, 2013) that require clear organisational structures (Earle et al, 2011b). For NPs the acquisition of prescribing rights is not considered a challenge to medicine but the 'evolution' of nursing to meet practice demands (Kroezen et al, 2013). Only in the UK, where nurses prescribe independently from the national formulary, is jurisdiction over prescribing considered equal to that of the medical profession (Kroezen et al, 2012).

Prescribing arrangements and treatment protocols

Protocols and formularies for prescribing developed and approved by medial staff restricts the process and places nurse prescribers in a subordinate position to the medical staff. Even though medical specialists are confident of nurse prescribing they still feel that they have 'final responsibility for the nurse and the patient' (Kroezen et al, 2012). The impact of nurse prescribing on professional relationships may differ depending on whether supplementary or independent prescribing is practised. Continued medical authority is expected with supplementary prescribing given that the doctor makes the initial diagnosis and is involved in agreeing a clinical management plan for the patient (Cooper et al, 2013). The independent prescribing model is more autonomous allowing NPs to prescribe and diagnose without direct medical involvement in the process—the nurse has full accountability

© 2015 MA Healthcare Ltd

and responsibility for the diagnosis and prescribing for that diagnosis. Independent prescribing therefore poses a different challenge to medical authority and the role associated with prescribing (Fisher, 2010; Earle et al, 2011b). More recently in the UK, nurse prescribers were granted the same prescribing rights as doctors.

There are positive aspects to using formularies such as reviewing progress in terms of critical evaluation, analysis of potential conflict, demonstration of critical understanding and justification of the NP's approach to medication management (Dobel-Ober et al, 2013).

Financial incentive

Nurse prescribers were of the opinion that recognition and support should take the form of financial incentives for taking on additional non-medical prescribing responsibilities (Green et al, 2009). In reality, nurses struggle with balancing their role as prescriber and nurse and may harbour resentment about extra work and responsibility without extra pay (Earle et al, 2011a). Kroezen et al (2012) did find that nurse prescribers in most countries who earned more than nurses without prescribing qualifications did so because of advanced qualifications unrelated to prescribing qualifications. A lack of pay incentive was also recognised by Earle et al (2011a) as an issue that may slow the development of nurse prescribing.

Factors relating to the patient

The patients' perspective of nurse prescribing was at the core of six studies; two studies used the term 'views of patients', three studies the term 'patients' attitude' and one study 'patients' satisfaction' with nurse prescribing (Courtenay et al, 2010; Drennan et al, 2011; Dhalivaal, 2011; Courtenay et al, 2011; Banicek, 2012; Natan et al, 2013).

Patients viewed NPs positively with regard to convenience, accessibility, timeliness, knowledge, safety, holistic care approach and a good relationship with the nurse. However, an interesting concern identified by Dhalivaal (2011) and Banicek (2012) was patients' apprehension in relation to the qualifications and training of nurse prescribers. This is significant because patients' confidence is inspired by the nurse's level of knowledge (Cashin et al, 2009; Courtenay et al, 2011; Drennan et al, 2011; Coull et al, 2013) which is associated with increased levels of patient satisfaction, adherence to medication regimens and a good relationship with the patient (Courtenay et al, 2010). Incidents were also identified where patients compared the NP to the physicians who they perceived as having more extensive knowledge due to their lengthy training (Courtenay et al, 2011) with some patients continuing to think that the role of the nurse is to help the physician (Natan et al, 2013). Initial patient impressions changed and became more positive the more exposure patients have to nurse prescribers, according to Natan et al (2013). Overall, findings indicated that patients welcomed the addition of the NP to the healthcare team.

Factors relating to the health professional

Development of confidence and competence in practice were significant factors identified by the health professional (Cashin et al, 2009; Snowden and Martin 2010; Dunn et al, 2010; Dobel-Ober et al, 2013). In particular, Snowden and Martin (2010) emphasised that confidence and competence is dependent on knowledge of pharmacology and the quality of the therapeutic relationship. Cashin et al (2009) found that through the provision of patient information, education, discussion, and assisting clients in making informed decisions, confidence and competence were also advanced. Many countries use formularies to support nurse prescribers' confidence. However, when using formularies the health professional may find them cumbersome and regular review is required to take into account prescribers' needs and confidence development (Dobel-Ober et al, 2013). In addition, Dunn et al (2010) cautioned over-reliance on protocols or personal formularies for health professionals, as they may decrease opportunities to independently prescribe in practice and reduce confidence levels. Developing peer and interdisciplinary relationships enables integration of nurse prescribing and promotes competence in patient assessment, clinical decision-making and documentation (Bowskill et al, 2012; Naughton et al, 2012; Black, 2013).

Factors relating to the organisation

Lack of support within the organisation was identified as threefold: lack of supervision, lack of support within the role, and lack of support from other health professionals (Ross and Kettles, 2012). In addition, organisational implementation of practice protocols was identified as restrictive and should not be confused with best practice (Dunn et al, 2010). Organisational confidence is required to ensure the role is recognised and valued, otherwise nurse prescribers do not feel supported and are less likely to prescribe (Ross and Kettles, 2012).

The benefits identified from an organisational level include improved access and care delivery, faster more efficient service, better patient satisfaction, cost-effectiveness, and streamlining of staff skills (Carey et al, 2009; Darvishpour et al, 2014). Patient benefits that improve organisational effectiveness are convenience, better patient education, enhanced patient care, easier access to drugs, reduced waiting times, safety, improved satisfaction and compliance, skill mix and flexible working (Carey et al 2009; Ross and Kettle, 2012; Darvishpour et al, 2014). The organisation also profits from the health professional perspective with increased clinical competence, recognition of abilities, professional autonomy, accountability, increased job satisfaction, improved multidisciplinary communication, monitoring and reporting of adverse drug reactions (Coull et al, 2013; Darvishpour et al, 2014).

The barriers to prescribing from an organisational perspective were recognised by Carey et al (2009) as local restrictions, lack of CPD and lack of formal support. At present prescribers are working to capacity and further benefits will not be evident unless resources are put in place. Similar difficulties with infrastructure were acknowledged by Coull et al (2013). In addition, Ross and Kettle (2012) highlighted that organisations required greater commitment to nurse prescribing than appearing to do what was cost-effective and appropriate from the political and policy makers' perspective. A wider perspective is required—as nurse prescribing expands its focus the infrastructure becomes imperative to its development (Coull et al, 2013).

Health professionals, particularly nurses, have anxieties and

© 2015 MA Healthcare Ltd

concerns related to prescribing that have been identified as barriers or potential barriers to prescribing. For instance, remuneration was identified by Ross and Kettles (2012) as a continuing barrier for nurses considering that additional responsibility and increased workload did not equate to financial reward. To date, this situation has not changed with Carey et al (2014) highlighting that structural reorganisation in the health service is now looking at GPs and managers gaining greater control over already stretched resources.

Discussion

Despite differences in prescriptive authority for nurse prescribing in different countries, a review of the literature shows many similarities in relation to the benefits that it provides for patients, carers, nurses, doctors, the organisation and the overall delivery of health care. Compelling advantages for nurse prescribing across healthcare settings include the nurse prescribers' awareness of patient needs, giving more options for patients, giving complete episodes of care, time saving, early intervention, use of advanced practice skills and cost saving for the healthcare system. The advantages come hand in hand with the concerns about patient care, inappropriate prescribing, interprofessional relationships, cost of CPD and the jurisdiction of prescribing. It is important to note that studies included in this review meet specific inclusion and exclusion criteria, which may not allow full exploration of nurse prescribing rooted in other tasks such as consultation, assessment and revision of treatment. It should also be noted that the majority of the studies are undertaken from the UK perspective, which is very progressive in advancing nurse prescribing. Other countries such as Australia, Finland and Canada with larger geographical areas have NP practice spread across state and jurisdictions (it can be hard to find doctors to work in the remote regions) and is often inconsistent, complex and in some cases restrictive (Dunn et al, 2010) to implement.

Impact of nurse prescribing on health professionals

Nurse prescribing is viewed as a valuable addition to existing roles, and expansion of prescribing rights was believed to be a positive step that promoted greater accountability and patient safety (Cashin et al, 2009; Earle et al, 2011a; Naughton et al, 2012; Latter et al, 2012; Carey et al, 2014). This increase in responsibility was not undertaken lightly but was welcomed, as long as it was for patient benefit and not just to fill gaps left by staffing shortfalls. The main factors identified that facilitated effective prescribing in practice include teamwork and peer and doctor support that is accessible and positive regarding nurse prescribing. When present, such support can facilitate prescribing but when absent, they limit nurse prescribing. Therefore, the education of medical practitioners on prescribing and the role of the NPs is of paramount importance to ensure a collegial relationship. Addressing this issue at education level may be an option for the future. Using an interdisciplinary educational approach to preparing both doctors and nurses for prescribing would improve relationships and understanding of both roles.

The views of NPs themselves, although useful, are over-reported, with limited research into the views of the medical profession or other health professionals evident. Supplementary prescribing was credited with improved understanding between the professions because the doctor takes responsibility for the diagnosis; but this is dependent on individual attitudes. Rana et al (2009) stressed the importance of health trusts (organisations) in assisting the transition toward new roles for prescribers with the intention of reducing conflict. A comparison of nurses' and doctors prescribing practices would also be useful to compare the decision-making process by both nurses and doctors, ideally incorporating patient outcomes and cost-effectiveness of prescribing outcomes in the clinical setting.

Impact of nurse prescribing on the organisation

The healthcare environment has changed significantly over the last decade, driven by changing demographics and epidemiology, with organisations now increasingly requiring the services of NPs to help provide a streamlined and timely service for patients. Clinical governance and overall organisational support have been identified repeatedly as important factors for the success of nurse prescribing. Having organisational structures in place also supports NPs to fully integrate into the healthcare team. In addition, current knowledge is an essential element for NPs to work as part of the healthcare team because prescribing knowledge extends beyond the act of consultations for issuing prescription to also encompass education, titration and discontinuation of medication. Inadequate support in the face of heavy work commitments reduces the opportunity for development (Green et al, 2009). Having access to a supportive environment encourages NPs to attend updates and creates opportunities for networking between the different healthcare settings. However, a clear evaluation framework is required to obtain a robust picture of the CPD that works for NPs. The challenge of providing appropriate CPD for experienced nurse prescribers is pharmacology education, which, if appropriately focused, relates to their specialty making it applicable to a small number of prescribers. This focused education creates challenges for providers of CPD who may find it difficult to deliver at an affordable cost. In addressing these issues the organisation needs to consider workforce planning and reviews need to take into account the additional time required to make prescribing decisions, if other aspects of care are not to be compromised.

Having the time to prescribe is also a concern for NPs who suggest they sometimes have to satisfy unrealistic expectations imposed by the organisation. Assessing and meeting the more complex needs of patient medication requires time and the components of stress and workload identified by the NP tend to relate to excessive workloads rather than challenging care situations. The progressive dynamic nature of NP requires shared responsibility with health service providers to develop robust systems to support competence, assurance and safe clinical governance. This requires that the health service expands its narrow view of prescribing, which tends to be focused on a consultation that results in a medication being prescribed (Health Service Executive, 2014). Education, titration and discontinuation of medications are equally

© 2015 MA Healthcare Ltd

KEY POINTS

- Nurse prescribers are active participants in relationship development but role ambiguity can impact negatively on developing a collegial relationship
- Lack of reimbursement for the role may slow development of nurse prescribing
- Little is known regarding the full impact of the nurse prescribing on workloads
- Prescribers are working to capacity and further benefits will not be evident unless resources are put in place
- Using an interdisciplinary educational approach to preparing both doctors and nurses for prescribing is a consideration for the future

important in the cost-conscious and prescribing optimisation environment of today's health service. Understanding the true cost-effectiveness of the NPs' contributions within the organisation could facilitate the redirection of partial funds to address issues such as protected study time and financial support that hinder the access of CPD.

The issue of remuneration, or lack of, was mentioned in several papers and could be identified as a barrier to the implementation of nurse prescribing. This may explain why nurses do not prescribe although remuneration does not factor highly in reported findings on the topic. Nevertheless, it does seem unrealistic to expect nurses to undertake such a skilled independent role that is cost-effective for the organisation without recompense.

Impact of nurse prescribing on the patient

Improved speed and convenience of access to medicines have been consistently reported as key benefits of NP by patients (Drennan et al, 2009). Increasing the number of NPs has a twofold effect: improved patient access to services and relieved pressure on doctors thereby preserving limited medical resources for the most seriously ill patients. However, these efficiency changes are supported with vague evidence from research using case studies.

The nurse–patient relationship is one of the central factors contributing to the success of nurse prescribing because the continuity of care that the NP provides has a positive effect on the patient's level of satisfaction. Patients are highly satisfied and confident in the NPs' ability to prescribe because of their specialist knowledge, experience and a belief that nurses know their own limitations. Patients also consider nurses to be more approachable than doctors, better at communicating and more likely to include them in discussion about their medications. This approach to prescribing makes it easier for patients to share information, ask questions, and address problems and as a result they understand their condition and treatment better. In promoting a good prescribing relationship with the patient, it is important to avoid confusion because there may be limitations imposed on prescribing certain medications depending on the country in which the NP is practising. This can present problem when treating patient with multiple comorbidities. To overcome this, NPs must be clear with patients about what they can and cannot prescribe when embarking on the prescribing relationship. Such clarity is important if the prescribing role is to be developed purposefully.

Conclusion

It is evident from the literature that NP is beneficial for the patient, organisation and health professional and could also be viewed as one of the most exciting initiatives in the recent history of nursing. However, one needs to be careful about drawing comparisons, considering that many nurse prescribers practising outside of the UK are not independent prescribers but rely on supplementary prescribing or a modified version to guide their prescribing in practice. The predominance in the review of English-only articles produced within the UK is a possible limitation to be considered.

Health professionals need to maintain awareness of the issues relating to nurse prescribing to ensure they remain updated and contribute to the development of the role. This may also require them to challenge changes if necessary at a multidisciplinary level. Although difficulties were experienced by nurse prescribers they remain committed to CPD through attending meetings, conferences and stand-alone study days. Their preference for CPD relates to specific pharmacology education relating to their speciality.

From an organisational perspective the review provides evidence that NPs improves the quality of care patients receive and contributes to an improved service that is flexible and accessible. However, a lack of commitment from the organisation to nurse prescribing needs to be addressed from the perspective of workload management and CPD. Organisations appear to view the role of the nurse prescriber as an add-on to an already busy work schedule that is now causing a barrier in the clinical setting for prescribing. BJN

Conflict of interest: none

For a summary of the methods and results of the studies considered in this review, and the authors' assessment of the quality, please contact the editor.

Banicek K (2012) Attitudes of postoperative patients toward hospital nurse prescribing. *Nurse Prescribing* **10**(12): 612-8

Berry D, Bradlow A, Courtenay M (2008) Patients' attitudes toward, and information needs in relation to, nurse prescribing in rheumatology. *J Clin Nurs* **17**(2): 226-73. doi: 10.1111/j.1365-2702.2007.01980.x.

Bettany-Saltikov J (2012) *How to do a Systematic Literature Review in Nursing A step-by-step guide*. Open University Press, London

Black A (2013) Non-medical prescribing by nurse practitioners in accident & emergency and sexual health: a comparative study. *J Adv Nurs* **69**(3): 535-45. doi: 10.1111/j.1365-2648.2012.06028.x

Bowskill D, Timmons S, James V (2012) How do nurse prescribers integrate prescribing in practice: case studies in primary and secondary care. *J Clin Nurs* **22**(13-14): 2077-86. doi: 10.1111/j.1365-2702.2012.04338.x

Caldwell K, Henshaw L, Taylor G (2011) Developing a framework for critiquing health research: An early evaluation. *Nurse Educ Today* **31**(8): e1-7. doi: 10.1016/j.nedt.2010.11.025

Carey N, Courtenay M (2010) An exploration of the continuing professional development needs of nurse independent prescribers and nurse supplementary prescribers who prescribe medicines for patients with diabetes. *J Clin Nurs* **19**(1-2): 208-16. doi: 10.1111/j.1365-2702.2009.02943.x

Carey N, Stenner K, Courtenay M (2009) Stakeholders views on the impact of nurse prescribing on dermatology services. *J Clin Nurs* **19**(3-4): 498-506

Carey N, Courtenay M, Stenner K (2013) The prescribing practices of nurses who care for patients with skin conditions: a questionnaire survey. *J Clin Nurs*, 22, 2064-2076.

Carey N, Stenner K, Courtenay M (2014) An exploration of how nurse prescribing is being used for patients with respiratory conditions across the

© 2015 MA Healthcare Ltd

east of England. *BMC Health Services Research* **14:** 27. doi:10.1186/1472-6963-14-27
Cashin A, Buckley T, Newman C, Dunn S (2009) Nurse practitioner provision of patient education related to medicine. *Australian Journal of Advanced Nursing* **27**(2): 12-8
Cipher DJ, Hooker RS, Guerra P (2006) Prescribing trends by nurse practitioners and physician assistants in the United States. *J Am Acad Nurse Pract* **18**(6): 291-6
Cooper R, Bissell P, Ward P et al (2013) Further challenges to medical dominance? The case of nurse and pharmacy supplementary prescribing. *Health (London)* **16**(2): 115-33. doi: 10.1177/1363459310364159
Coull A, Murray I, Turner-Halliday F, Waterson A (2013) The expansion of nurse prescribing in Scotland: an evaluation. *Br J Community Nurs* **18**(5): 234-42
Courtenay M, Butler M (1999) *Nurse Prescribing: Principles and Practice.* Alden group, Oxford
Courtenay M, Gordon J (2009) A survey of the therapy areas in which nurses prescribe and CPD needs. *Nurse Prescribing* **7**(6): 225-62. doi: http://dx.doi.org/10.12968/npre.2009.7.6.255
Courtenay M, Carey N, Burke J (2007) Independent extended nurse prescribing for patients with skin conditions: a national questionnaire survey. *J Clin Nurs* **16**(7): 1247-55
Courtenay M, Stenner K, Carey N (2010) The views of patients with diabetes about nurse prescribers. *Diabet Med* **27**(9): 1049-54
Courtenay M, Carey N, Stenner K, Lawton S, Peters J (2011) Patients' views of nurse prescribing: effects on care concordance and medicine taking. *Br J Dermatol* **164**(2): 396-401. doi: 10.1111/j.1365-2133.2010.10119.x
Creedon R, O'Connell E, McCarthy G, Lehane B (2009) An evaluation of nurse prescribing. Part 1: a literature review. *Br J Nurs* **18**(21): 1322-7
Creedon R, McCarthy S, Kennedy J (2014) Nurse prescribers' experiences of recording prescribing data to the Minimum Data Set in Ireland. *Br J Community Nurs* **19**(12): 594-600. doi: 10.12968/bjcn.2014.19.12.594
Cutcliffe J, Campbell P (2002) Opinion. *Mental Health Practice* **5:** 14–7
Darvishpour A, Joolaee S, Cheraghi M (2014) A meta synthesis study of literature review and systemic review published in nurse prescribing. *Med J Islam Repub Iran* **28:** 77
Dhalivaal J (2011) Patients' perspectives on prescribing by nurses in general practice. *Practice Nursing* **22**(1): 41-6
Dobel-Ober D, Bradley E, Brimblecombe M (2013) An evaluation of team and individual formularies to support independent prescribing in mental health care. *J Psychiatr Ment Health Nurs* **20**(1): 35-40. doi: 10.1111/j.1365-2850.2012.01885.x
Drennan J, Naughton C, Allen D et al (2009) *Independent Evaluation of the Nurse and Midwife Prescribing Initiative.* University College Dublin, Dublin. http://tinyurl.com/p7mv5kw (accessed 7 September 2015)
Drennan J, Naughton C, Allen D et al (2011) Patients' level of satisfaction and self-reports of intention to comply following consultation with nurses and midwives with prescriptive authority: A cross-sectional survey. *Int J Nurs Stud* **48**(7): 808-17
Dunn S, Cashin A, Buckley T, Newman C (2010) Nurse Practitioners prescribing practice in Australia. *Journal of the American Academy of Nurse Practitioners* **22**(3): 150-5
Earle E, Taylor J, Grant G (2011a) Nurse prescribing in specialist mental health (Part 1): views and experiences of practicing and non-practicing nurse prescribers and service users. *J Psychiatr Ment Health Nurs* **18**(3): 189-97. doi: 10.1111/j.1365-2850.2010.01672.x
Earle E, Taylor J, Peet M, Grant G (2011b) Nurse prescribing in specialist mental health (Part 2): views and experiences of psychiatrists and health professionals. *J Psychiatr Ment Health Nurs* **18**(4): 281-7. doi: 10.1111/j.1365-2850.2009.01517.x
Fisher R (2010) Nurse prescribing: A vehicle for improving collaboration, or a stumbling block to inter-professional working? *Int J Nurs Pract* **16**(6): 579-85
Grant M, Booth A (2009) A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J* **26**(2): 91-108. doi: 10.1111/j.1471-1842.2009.00848.x
Green A, Westwood O, Smith P, Peniston-Bird F, Holliway D (2009) Provision of continued professional development for non-medical prescribers within the South of England Strategic health Authority: a report on training needs analysis. *J Nurs Manag* **17**(5): 603-14
Health Service Executive (Ireland) (2014) *National Implementation Report on the Nurse and Midwife Medicinal Product Prescribing Initiative.* http://tinyurl.com/p8yovox (accessed 7 September 2015)
Kroezen M, Frencke A, Groenewegen P, van Dijk L (2012) Nurse prescribing of medicines in Western Europe and Anglo-Saxon countries: A survey of forces, conditions and jurisdictional control. *Int J Nurs Stud* **49**(8): 1002-12. doi: 10.1016/j.ijnurstu.2012.02.002
Kroezen M, van Dijk L, Groenewegen P, deRond M, de Veer A, Frencke A (2013) Neutral to positive views on the consequences of nurse prescribing: Results of an national survey among registered nurses, nurse specialists and physicians. *Int J Nurs Stud* **51**(4): 539-48
Kroezen M, Mistiaen P, van Dijk L, Groenewegen P, Frencke A (2014) Negotiating jurisdiction in the workplace: A multiple case study of nurse prescribing in hospital settings. *Soc Sci Med* **117:** 107-15. doi: 10.1016/j.socscimed.2014.07.042
Latter S, Smith A, Blenkinsopp A, Nichollas P, Little P, Chapman S (2012) Are nurses and pharmacists independent prescribers making clinically appropriate prescribing decisions? An analysis of consultations.*J Health Serv Res Policy* **17**(3): 149-56. doi: 10.1258/jhsrp.2012.011090
Naughton C, Drennan J, Hyde H et al (2012) An evaluation of the appropriateness and safety of nurse prescribing in Ireland. *J Adv Nurs* **69**(7): 1478-88 doi: 10.1111/jan.12004.
Natan B, Kabaha A, Jackab N, Atallah R, Sharon I (2013) The attitudes of patients with chronic conditions toward nurse prescribing medications. *International Nursing Review* **60**(4): 469-76. doi: 10.1111/inr.12043
Nolan P, Haque MS, Badge F, Dyke R, Khan I (2001) Mental health nurses' perceptions of nurse prescribing. *J Adv Nurs* **36**(4): 527-34
Nursing and Midwifery Board of Ireland (as An Bord Altranais) (2005) *Review of Nurses and Midwives in the Prescribing and Administration of Medicinal Products*. Government Press, Dublin
O'Connell E, Creedon R, McCarthy G, Lehane B (2009) An evaluation of nurse prescribing. Part 2: a literature review. *Br J Nurs* **18**(22): 1398-1402
Pharmaceutical Journal (2013) Physiotherapists and podiatrists join ranks of independent prescribers. *The Pharmaceutical Journal* **291:** 174. http://tinyurl.com/pnljdxc (accessed 8 September 2015)
Rana T, Bradley E, Nolan P (2009) Survey of psychiatrists' views of nurse prescribing,*J Psychiatr Ment Health Nurs* **16**(3): 257-62. doi: 10.1111/j.1365-2850.2008.01351.x.
Ross J, Kettles A (2012) Mental Health nurse independent prescribing: what are nurse prescribers' views of barriers to implementation. *J Psychiatr Ment Health Nurs* **19**: 916-32
Russell S, Daly J, Hughes E, Hoog C (2003) Nurses and 'difficult' patients: negotiating non-compliance. *J Adv Nurs* **43**(3): 281-7
Scrafton J, McKinnon J, Kane R (2012) Exploring nurses' experiences of prescribing in secondary care: informing future education and practice. *J Clin Nurs* **21**(12-14): 2044-53
Snowden A, Martin C (2010) Mental health nurse prescribing: a difficult pill to swallow. *J Psychiatr Ment Health Nurs* **17**(6): 543-53
Stenner K, Carey N, Courtenay M (2012) Prescribing for pain – How do nurses contribute? A national questionnaire survey. *J Clin Nurs* **21**(23-24): 3335-45
Twycross A, Forgeron P, Williams A.(2015) Paediatric nurses' postoperative pain management practices in hospital based non-critical care settings: A narrative review. *Int J Nurs Stud* **52**(4): 836-63. doi: 10.1016/j.ijnurstu.2015.01.009.
Weglicki R, Reynolds J, Rivers P (2014) Continuous Professional Development needs of Nursing and Allied Health Professionals with responsibility for prescribing. *Nurse Educ Today* **35**(1): 227-31. doi: 10.1016/j.nedt.2014.08.009
While AE, Biggs K (2004) Benefits and challenges of nurse prescribing. *J Adv Nurs* **45**(6): 559-67
Wilhelmesson M, Foldevi M (2003) Exploring views of Swedish district nurses' prescribing—a focus group study in health care. *J Clin Nurs* **12**(5): 643-50

Fundamental Aspects of Infection Prevention and Control

- Provides healthcare practitioners with fundamental understanding of infection control and its management in a healthcare setting
- Presents the general principles of infection control in a clear, concise and highly practical format
- Each chapter includes a summary or list of key points and case studies throughout
- An invaluable tool to help staff reduce avoidable health care associated infections

ISBN-13: 978-1-85642-415-8; 234 x 156 mm; paperback; 250 pages; publication 2010; £24.99

Fundamental Aspects of
Infection Prevention and Control
Edited by Vinice Thomas

Order your copies by visiting
www.quaybooks.co.uk
or call our Hotline
+44(0)1722 716 935

© 2015 MA Healthcare Ltd

Appendix 4 - Ethics approval for the Minimum Data Set Study

UCC

Tel: + 353-21-490 1901
Fax: + 353-21-490 1919

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Our ref: ECM 4 (eee) 10/01/12

5th January 2012

Dr Rena Creedon
Department of Pharmacy
Cavanagh Building
University College Cork
College Road
Cork

Re: What impact does the minimum data set have on the process of nurse prescribing in the clinical setting?

Dear Dr Creedon

Full approval is granted to carry out the above study in:

- Cork University Hospital
- Cork Maternity University Hospital
- Mercy University Hospital.

The following documents were approved:

- Application Form
- Study Protocol
- Interview Questions
- Consent Form.

We note that the co-investigators involved in the above study will be:

- Dr Suzanne McCarthy and Professor Julia Kennedy.

Yours sincerely

Dr Michael Hyland
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

Appendix 5 - Interview question guide for the Minimum Data Set Study

Question set for the MDS study

Overarching question

1. What is your experience of the using MDS in practice?

Participants did not need additional prompting after asking the first question. They self-selected the important issues to be discussed which included all of the additional areas identified below. Question were utilised from this list on occasion to ensure clarity.

Additional questions if required

2. Do you record all your prescriptions written in the MDS?

3. Do you input prescription information to the minimum data immediately after writing each prescription or at another time?

4. Do you record prescription information in any way other than the MDS?

5. Do you utilise the information in the MDS?

6. Considering the HSE uses the information in the MDS to produce a bi-annual report on prescribing activity, do you think the MDS captures your prescribing work load?

7. Have you been involved in a review of the MD

Appendix 6 - Minimum Data Set Interview Consent Form

Consent form

Participants Name: _____ Clinical Specialty:_____

Title of Study: What impact does the minimum data set have on the process of prescribing in the clinical setting?

Researcher: Rena Creedon, PhD student, School of Pharmacy, University College Cork.

Telephone 021-4901495 E Mail: r.creedon@ucc.ie

You are being asked to participate in a research study. The researcher is a PhD student in the School of Pharmacy, University College Cork and through the use interviews aims to explore the experiences of nurse prescribers in the clinical settings. In order to decide whether or not you want to be a part of this research study, you should understand enough about its risks and benefits to make an informed judgment. This process is known as informed consent. This consent form gives detailed information about the research study, which will be discussed with you. Once you understand the study, you will be asked to sign this form if you wish to participate.

The purpose of this study is to explore the impact the minimum data set has on the prescribing process in the clinical setting. Interviews will be set up to explore the views and experiences of nurse prescribers with the minimum data set. We do not foresee any risk for you in taking part in this study. The results will however help to establish a structure on the information generated by you when prescribing.

Participation in the study is purely on a voluntary basis.Results of the study will be shared with the participants and practice development coordinators in each participating organization. The results will also be published in the PhD thesis, academic journals and presented at conferences.

AGREEMENT TO CONSENT

The research project has been fully explained to me. I have had the opportunity to ask questions concerning any and all aspects of the project. I am aware that participation is voluntary and that I may withdraw my consent at any time. I am aware that my decision not to participate or to withdraw will not restrict me. Confidentiality of records concerning my involvement in this project will be maintained in an appropriate manner. When required by law, the records of this research may be reviewed by government agencies and sponsors of the research.

I understand that the sponsors and investigators have such insurance as is required by law in the event of injury resulting from this research.

I, the undersigned, hereby consent to participate as a subject in the above described project conducted at the Cork Teaching Hospitals. I have received a copy of this consent form for my records. I understand that if I have any questions concerning this research, I can contact the researcher listed above. If I have further queries

concerning my rights in connection with the research, I can contact the Clinical Research Ethics Committee of the Cork Teaching Hospitals, Lancaster Hall, 6 Little Hanover Street, Cork.

After reading the entire consent form, if you have no further questions about giving consent, please sign where indicated.

Researcher _____ Participant _____

Date _____

Exploring the Clinical Experience of Nurse Prescribers

(Information sheet for participants)

Purpose of the Research

The purpose of this study is to explore the experiences of nurse prescribers in the clinical setting and to examine and interpret the reality of non-medical prescribing and the resulting data generated from the MDS process. By expanding the nature and way data is gathered and structured there is the potential to facilitate continuing professional development, research, patient care, and organizational processes such as quality assurance, audits, risk management and policies.

Research Procedure

Focus groups will be set up to explore the views and experiences of nurse prescribers prescriptive process and the data that is generated in the clinical setting. Focus groups will be conducted with the participants at a convenient time so that minimal disruption is experienced. It is estimated that the interviews will last 45-60 minutes and will be tape-recorded. You will be free to raise questions at any stage throughout the focus group session.

Confidentiality

Your participation in the research is confidential. Outside of the focus group only the researchers will know you participated. All data gathered during the study will remain strictly confidential you will be allocated a pseudonym if you agree to participate in the research. Any personal details will not be identifiable and the researchers will be the only persons with access to the data. Discussion of the data will be limited to people associated with the research.

Research Timeframe

The research will be conducted over a six month period September 2010 to April 2011. A summary of the findings will be made available to each participant on completion.

Contact Information

In case you may have any questions or concerns regarding the study or its conduct, in the first instance pleased contact the researcher is listed below

Email r.creedon@ucc.ie

Office telephone 021- 4901495

or alternatively Dr. Michael Hyland Chairperson of the Ethics Committee 021-4901901

Researchers

Professor Julia Kennedy Principle Researcher, School of Pharmacy, University College Cork.

Dr. Suzanne McCarthy, PhD Supervisor, School of Pharmacy, University College Cork.

Ms Rena Creedon, PhD Researcher, School of Pharmacy, University College Cork.

Appendix 7 - Minimum Data Set Publication (Chapter 4)

Nurse prescribers' experiences of recording prescribing data to the Minimum Data Set in Ireland

Rena Creedon, Suzanne McCarthy, Julia Kennedy
Rena Creedon, Lecturer and Nurse Prescribing Programme Coordinator, School of Nursing, University College Cork, Ireland; Suzanne McCarthy, Lecturer, School of Pharmacy, University College Cork, Ireland; Julia Kennedy, Professor of Pharmacy, School of Medicine and Health Science, University of Auckland, New Zealand

Email: r.creedon@ucc.ie

Internationally, several health-care systems now permit prescribing by non-medical health professionals, offering potential benefits in terms of increasing patients' continuity of care and access to medicines, better utilisation of economic and human resources, reduction in patient waiting times and less fragmented care (Cooper et al, 2008; Jones et al, 2010; Coull et al, 2013). Prescribing medications has traditionally been the domain of doctors, but nurse and midwife prescribing (NMP) has been introduced in response to changing service needs and the increasing specialisation of nurses and midwives as they expand and advance their scope of practice (McKenna, et al, 2008; Kroezen et al, 2012). However, international differences between legislative procedures and the professional bodies responsible for the regulation of nursing practice has resulted in the implementation of several models of prescribing worldwide (An Bord Altranais, 2005; Kroezen et al, 2013).

ABSTRACT

This study aimed to investigate and enhance understanding of nurse prescribers' experiences of working with the Irish national data gathering system for nurse prescribing: the Minimum Data Set (MDS) in Irish clinical practice. A phenomenological research design was used, collecting data via semi-structured interviews using a purposive sample of practising nurse prescribers. The study identified three recurrent themes: communication, workload/time, and attitudes. The MDS produces only standard national reports (lists) on nurse/midwife prescribing that cannot be utilised efficiently to inform practice or understand health service needs. Nurses have reacted to this situation and evaluate the MDS in the context of their clinical setting, identifying conflicting demands and expectations and an increased workload as factors that correlated negatively with the process of collecting nurse prescribing data. Consultation and evaluation is required, particularly to analyse the nurse prescribers' views of collecting data and working with the MDS in the context of the major adjustments that the Irish health service has experienced over the past 6 years.

KEY WORDS

◆ Data recording ◆ Nurse prescribing ◆ Data utilisation

NMP was introduced to the Republic of Ireland in April 2007 and follows the model of independent nurse prescribing that utilises a limited formulary extending to those medicinal products normally used in a named clinical area. More specifically, the identified medications are 'listed in a collaborative practice agreement and approved by the collaborating medical practitioner and authorised by The Director' (Health Service Executive (HSE), 2012). Encouragingly, NMP in Ireland has continued to grow nationally over the past 5 years, with the role of the nurse prescriber in health-care settings increasing in prominence and significance in keeping with international development (Cipher and Hooker, 2006; Latter et al, 2010). As a result, nurse prescribing is generating an ever-increasing amount of rich clinical and patient information that needs appropriate management and analysis. Collecting and utilising nurse prescribing data correctly is, therefore, of major significance (Munsch, 2002).

Data generated by NMP in Ireland is monitored using data recorded in the National Nurse and Midwife Prescribing Minimum Data Set (MDS), which was funded and introduced to Ireland by the Health Service Executive (HSE) in February 2008 (Adams et al, 2010). The MDS is composed of the 12 items that are set out in *Box 1*.

The MDS is an electronic system that was specifically developed to collect nurse prescribing data and is a web-based application used for retrospective recording of prescribing information. The main purpose of the system is to allow (HSE, 2008):

> ***'Each individual nurse and/or midwife prescriber to report on the number of prescriptions written by them and for which principal clinical indication over any specified time period'.***

Each registered nurse prescriber in clinical practice is required to use the system, the benefits of which are set out in *Box 2* (HSE, 2008).

The system was designed to allow for the immediate answering of questions in relation to the prescribing practice

© 2014 MA Healthcare Ltd

'either by using standard reports or the search and export functions' (HSE, 2008). However, one of the primary barriers to the effective use of health information technology (HIT) remains its successful adoption and implementation (Sequist et al, 2008). Technology may, however, have limited effectiveness because the management of clinical data for supporting patient care/direction is a complex endeavour that is highly dependent on appropriate management and accurate input of information to the system developed (Bose, 2003). Lapane et al (2008) highlight the importance of careful attention to the detail of implementing HIT, including active promotion of the benefits of these technologies, setting the 'appropriate sensitivity and specificity' of the interventions and incorporating them into workflow and clinical activities. Such data can be useful to address the increasing consumer demands for quality care services that are cost effective. These data also guide health services towards the potential of HIT to help 'lower health care cost, improve efficiency, quality and safety of medical care' (Jamal et al, 2009). These optimistic expectations are predicated based on the substantial role HIT already plays in improving health care internationally, along with evidence from research undertaken (Ortiz and Clancy, 2003; Chaudhry et al, 2006; Bates and Britton, 2010).

In November 2011, anecdotal evidence came to light at a meeting with An Bord Altranais that the MDS was having a negative impact on prescribing in the clinical setting and that many sites had stopped inputting data while others were inputting limited data to the system across the HSE South region.

Aim

The aim of this study was to investigate and enhance understanding of nurse prescribers' experiences of using the MDS in clinical practice. Secondly, the study aimed to assess the accuracy of the MDS as a collection tool.

Method

Design

A qualitative approach was taken to allow exploration and examination of the nurse prescriber's experience of the MDS. To achieve this, a phenomenological approach (Munhall, 2012) was selected using the interpretive paradigm as an appropriate tool for data collection and analysis.

The use of a single, broad, open-ended question was believed to provide a good starting point, but additional questions were allowed to emerge naturally from the dialogue. This permitted the researcher the opportunity to probe the meaning of the experience for that individual, thereby facilitating a deeper understanding of the experiences, thoughts and emotions of the participant.

Ethical considerations

A full research proposal was submitted for examination by the Regional Clinical Research Ethics Committee, Cork. The study met the research governance criteria and approval to undertake the study was granted.

Box 1. Composition of the Minimum Data Set

1. Prescribing site
2. Registered nurse prescriber (RNP)—personal identification number
3. Clinical area
4. Date
5. Shift
6. Patient–medical record number (MRN)
7. Prescribing mode
8. Clinical indication
9. Medicinal product
10. Dose
11. Frequency
12. Route

Source: Health Service Executive (2008: 61)

Box 2. Benefits of the Minimum Data Set

- Accessibility in any location with web access
- The system is centrally administered and funded, thereby ensuring that there are no additional requirements on local information communication technology departments
- Security and confidentiality of the system
- Ability to retrieve any aspect of the information entered in the system using the search function
- Ability to run standard reports on prescribing activity over a given time period
- Transparency and comparability in relation to activity of prescribers
- Functionality to prepare, print, export, save or email reports immediately when required
- Capacity to export information, pre-formatted for analysis and research
- A key resource for registered nurse prescribers to demonstrate their continuing competence within their area of prescriptive authority
- An important mechanism for clinical supervision among registered nurse prescribers and the interdisciplinary team
- Access to resources (journal articles and texts related to prescribing) including links to key websites
- A tool for use as the basis for undertaking an audit of prescribing activity
- Links to other registered nurse prescribers and the Office of the Nursing Services Director through the noticeboard section of the system

Source: Health Service Executive (2008: 57)

Participants

Purposive sampling was used to recruit participants who had experience of the phenomenon of interest in order that a rich and dense text might be generated (van Manen, 1990). The participants were reached using the practice development coordinators across a number of organisations in the HSE throughout the south of Ireland. The participants were both male and female, of varying ages, from different clinical backgrounds, and holding positions from staff nurse to advanced nurse practitioner that permitted an in-depth understanding

© 2014 MA Healthcare Ltd

Box 3. Inclusion/exclusion criteria of the study

Inclusion criteria

Selecting participants are nurses who have completed the nurse prescribing programme, are registered with An Bord Altranais and are now prescribing medications independently in the clinical setting

Exclusion criteria

Nurses who have undertaken the nurse prescribing programme but who have not registered with An Bord Altranais to prescribe

of the lived experience of inputting data to the MDS in clinical practice.

Data collection

The interviews were conducted between February and April 2012 with nurse prescribers who met the inclusion criteria (*Box 3*). Data saturation occurred in 10 interviews.

Prior to the interviews, all participants were provided with information sheets detailing the purpose and nature of the research and had the opportunity to ask the researcher any questions. All participants approached agreed to participate in the research. Consent was obtained and the possibility of renegotiating consent was discussed. Confidentiality was assured and the right to withdraw at any time during the investigation, without prejudice, was guaranteed. The interviews were digitally recorded and later transcribed to ensure the experience as described by the participant was accurately captured. The strength of emotion regarding some issues was identified by noting recurrence of key statements and themes.

Data analysis

Data analysis was carried out using Colaizzi's (1978) procedural steps, which provided a framework in keeping with phenomenological research. Meaning statements were clustered into common themes and again referred back to the original commentary for validation, thereby ensuring that only the participant's perception was captured. Following the principles of data reduction, all themes were included until a textural-structural description of the experiences of the nurse prescribers as a whole was obtained. To address rigour, the findings were presented in a report for the participants to examine. Transcripts, codes and themes were reviewed by two researchers with any differences resolved by re-analysing transcripts and discussion.

Results

Of the 10 participants interviewed, two were male and eight were female, holding positions of staff nurse, midwife, clinical nurse specialist and advanced nurse practitioner. Prescribing experience ranged between 2 and 5 years.

Three main themes emerged from the analysis of the data, each of which is elaborated on individually. While the themes are distinctive and demonstrate that the nurse prescribers recognise and identify benefits and challenges to inputting data, they also had reservations about the effectiveness of the MDS and its use in the clinical setting.

Theme 1: communication

The most immediately apparent issue for all participants was a perception that communication between the HSE (decision-makers) and the nurse prescribers (participants) was inadequate. In particular, nurse prescribers explained how the lack of communication regarding the MDS caused frustration because the challenges experienced with inputting data in the clinical setting were not acknowledged or recognised. The situation is further compounded by the fact that when the HSE introduced the MDS in 2008, nurse prescribers were clearly informed that the initiative would be revisited after 1 year. When this did not transpire, participants sought guidance from colleagues within the health service:

> ***'I was under the impression from the first … nurse prescribing course that it would be a year that we would have to input the information on the MDS then it would be reviewed … and I or my colleagues never heard anything about it being reviewed since then … So, I stopped inputting data in 2010. I did contact the HSE via email and tried to make phone contact but I got no reply. …. The nurse practice development coordinator fed it back nationally that there were issues with the Minimum Data Set and prescribers in her site were stopping inputting data for that reason … we heard nothing'.*** (Nurse Prescriber 1)

> ***'I made phone calls and sent emails to the HSE regarding issues I had with the MDS but I got no reply … I just didn't have the time to keep contacting them'.*** (Nurse Prescriber 6)

In addition, the lack of response to emails and phone queries by the HSE raised even more questions from the nurse prescribers:

> ***'Why be monitored so closely … we are autonomous in our practice and we are able to make decisions that we can stand by and there are no mistakes being made by nurse prescribers?'*** (Nurse Prescriber 8)

Failure by the HSE to respond to direct queries by the participants is interpreted as the HSE having a limited understanding of the nurse prescriber's role and additional workload. The task of reporting on each prescription written by inputting the information into the MDS is questioned by the majority of participants regarding its value and accuracy considering four of the participants do not input any data and five of the participants only input data on a proportion of prescriptions written. In fact, nurse prescribers voiced concerns that the end user and technology did not interact to achieve a common goal:

> ***'I discussed it*** [the MDS] ***with colleagues and other advanced nurse practitioners—everybody had the same gripe, that it was of little value to the clinical area and patient'.*** (Nurse Prescriber 2)

© 2014 MA Healthcare Ltd

'Prescribing is really valuable to my work … I absolutely don't input data to the MDS and I cannot say it's even accurate, or up to date. I think the last time I inputted data on it was nearly 8 months ago … I know from talking to other nurse prescribers I am not the only one not inputting data'. (Nurse Prescriber 7)

It was important for nurse prescribers to trust and have confidence in the nurse prescribing structures (particularly communication) managed by the HSE. As the role of nurse prescribing develops, it has become clear to participants that the absence of established structures for exchanging information constitutes a one-way communication structure that does not facilitate the communication of clinical issues which impacts on nurse prescribing and the HSE as a whole in practice:

'The MDS is causing a terrible bottleneck … the unfortunate thing about it is that it is actually affecting patients and prescribing'. (Nurse Prescriber 6)

Theme 2: workload and time

Having the time to prescribe was a concern for all participants because of the impact of the moratorium on recruitment introduced by the HSE in 2009. Resulting problems identified by the participants include frontline disorder, staff shortages, rising patient waiting lists, ward and bed closures, and increased trolley numbers in emergency departments. The research participants' views suggest that they have to satisfy unrealistic expectations by coping with an unacceptable working environment to meet the HSE's financial targets. Assessing and meeting the more complex health needs of patient medication requires time. Participants reported difficulties because of increasing reductions in staffing levels and time available to complete their work in the clinical setting:

'When I do prescribe it's time is an issue … I can't spend a whole lot of time with the patient because the next patient is waiting'. (Nurse Prescriber 2)

'If I have 10 minutes to spare, inputting data to the MDS is not a priority by no means'. (Nurse Prescriber 3)

The components of stress and workload balance highlighted by participants tend to relate to excessive work, rather than challenging care situations. The participants' cognizance of their workloads was defined in terms of time spent on conducting assessment, administration issues (documentation) and patient communication and education. Several issues were identified as increasing workload problems; however, the single most highlighted issue was duplication of documented information regarding prescribing:

'There is a lot of repetition—like, I would have to document in the medication chart first, then the nursing notes, then the medical notes and by the time you get to the MDS it comes down to whether or not I have time to input data'. (Nurse Prescriber 3)

'The MDS is not a true representation of the prescriptions written here so we keep our own records of prescribing … I don't like the MDS because I don't use the information for anything'. (Nurse Prescriber 3)

Because of time and workload constraints, narrow parameters of the data system and incomplete entry of data to the MDS, prescribers now identify the MDS as inaccurate and time consuming with little benefit for practice, patients or audit purposes. This situation has resulted in the development of separate audit structures being put in place depending on the local requirements.

'The database provides you with none of the quality indicators I feel support best practice in relation to prescribing … I use an auditing tool we devised here in the hospital for auditing my prescribing now—not the MDS'. (Nurse Prescriber 2)

'Whatever data is pulled off it, if it is looking at reflection of numbers of nurses prescribing I can tell you now it is not accurate … the data is absolutely skewed and flawed … I do not use it for auditing.' (Nurse Prescriber 7)

'The data on the MDS is flawed and does not capture information on diagnosis, comorbidities, or drug interaction and should not be used for reports or research'. (Nurse Prescriber 8)

At present, nurse prescribers feel there is limited understanding of the nurse prescriber's role and the additional workload of the prescribing process that is taken on in addition to an already full clinical workload. While some participants felt that having a means of identifying when nurse prescribers were becoming overburdened was important, others felt that there was the additional element of valuable data loss that contributed to the negative reaction to the MDS that needed to be addressed:

'It is totally of no use to me personally and I suppose … this sounds awful but we often wonder what it's for—I wonder what it's for—but I do feel there is valuable data that needs to be captured and used more appropriately'. (Nurse Prescriber 7)

Now that participants are experiencing the MDS as an obstacle with little perceived value, their motivation appears to be challenged:

'I think the MDS is overkill and is not of any benefit to the prescriber or patient … if I didn't have the MDS in place I would be more inclined to prescribe for patients'. (Nurse Prescriber 6)

Negative comparisons were also made between the prescribing process in place for nurses and those for doctors. Six respondents felt it was more time efficient to get the doctor to prescribe:

'The main problem I have is the time it takes and … doctors don't have to do it [input data] *so I just ask them to prescribe—it's easier'.* (Nurse Prescriber 8)

© 2014 MA Healthcare Ltd

Theme 3: attitude

In general, participants' attitudes to nurse prescribing were very positive. They agreed that having prescribing rights improved continuity of care and delivery time for patients. However, the impact on their own workload did cause them concern:

> ***'The extra work prescribing generates is always in the back of my mind … and controls my decision to prescribe or not—yes, it's a big element of my decision to prescribe'.*** (Nurse Prescriber 5)

The same participant avoided prescribing complex medications or taking on high-risk patients because of increased workload:

> ***'It's stopping patient care and that's not what nurse prescribing was about in the first place. The MDS is defeating the purpose of prescribing for me'.*** (Nurse Prescriber 5)

Nurse prescribers understood the prescribing processes, which are controlled by the use of standards, policies and improved patient outcomes:

> ***'With nurse prescribing organisational policy in place we are within our own comfort zone and have the knowledge base … that's good'.*** (Nurse Prescriber 4)

However, they expressed concern regarding the lack of representation from the clinical areas. In particular, participants felt that nurse prescribers' views on structures in place and relevance of these structures to patients and practice was central to the future development as nurse prescribing was becoming a stressful experience in some clinical situations.

> ***'I am very happy to prescribe, I am very happy to do the assessments; I just find the MDS is a complete waste of my time, I find it very stressful … and you see there is no benefit in it for me.'*** (Nurse Prescriber 10)

Participants found it difficult to align their thoughts and actions with the expectations and change experiences within the HSE because of its state of continuous flux. In fact, each nurse prescriber's unique understanding of what change is or represents seems to add to the formulation of attitudes and reaction to change in the clinical setting:

> ***'Prescribing can be very frustrating because it's such a good course and you learn so much…in fact, it is the best course I have ever done … it's just so frustrating when you can't use it more… it*** [the MDS] ***even stops you from extending your CPA*** [collaborative practice agreement]***'.*** (Nurse Prescriber 6)

> ***'I get very stressed out about it';I worry about not filling it, I just do not…absolutely not have any time in my working week even to consider putting data into the MDS'.*** (Nurse Prescriber 7)

Participants felt that role overload and expansion of duties without clear description was causing problems for them as prescribers. The extra time that it takes to write the prescription and subsequent documentation does have its costs to patients, and participants would like to see role expansion and increased workload offset with sufficient support. In addition, participants felt that they were in a good position to identify and help resolve underlying systemic issues and offer suggestions for possible resolution to issues encountered with the MDS. However, the MDS appears to be creating a negative attitude to prescribing because the participants cannot see the benefit of results considering the time that is required to input the data onto the system.

> ***'I thought the MDS was to be in place for 1 year and then it would be reviewed, but that was 5 years ago … like any new initiative there are things that work and things that don't, but no one came back to the prescribers using the system to find out what they were'.*** (Nurse Prescriber 6)

> ***'I would say having the right to prescribe is very beneficial but the MDS stops me from prescribing'.*** (Nurse Prescriber 2)

> ***'Nurse prescribing is the greatest thing I have experienced in years and years … it's brilliant … but I have so many issues with the MDS'.*** (Nurse Prescriber 10)

Discussion

Findings indicate that participants believe prescriptive rights for nurses is of significant benefit in the health service—results that are comparable to those identified in other settings where nurses prescribe medicines (Avery et al, 2004; Latter et al, 2005; Courtenay and Berry, 2007; Stenner and Courtenay, 2008; Courtenay et al, 2010; Bowskill et al, 2012). However, findings also provide insight into some of the concerns and anxieties nurse prescribers have regarding data recording. Factors identified that contribute to these anxieties and concerns are:

- The MDS and its perceived value
- Communication
- Staffing levels
- Time and workload.

NMPs viewed the task of inputting data to the MDS as having limited outcomes and being a deterrent to prescribing. This situation may be better understood in the context of the HSE *National Implementation Report* (HSE, 2014), which states that '1067 nurses and midwives have been funded' to undertake the nurse prescribing programme to date. However, the numbers of registered nurse prescribers in the country as of March 2014 is '678', equating to 63.5% of the nurses and midwives that have been funded and have completed the education programme. The *National Implementation Report* also uses the MDS to report on nurse prescribing productivity nationally. Considering the source of the data, the findings from this research would dispute the accuracy of the figures published, which are, in fact, a serious under-reporting of the actual prescribing undertaken. In addition, our results find that the database does

© 2014 MA Healthcare Ltd

not capture important information on diagnosis, patient age, comorbidities, drug interactions or discontinuation of drugs that could be cross-referenced to inform practice and policy. Participants acknowledged this from their concern that the database end-user and technology does not interact to achieve a common goal. Perhaps the independent lists contained in the database and identified by O'Halloran (2010) as not being structurally designed to generate queries need to be addressed before the database can produce information that is valuable in the clinical setting. Nurse prescribers have moved beyond the simplistic presentation of prescribing data in the *National Implementation Report* (HSE, 2014) to understanding that recorded prescribing data is information that is be valuable to inform their decision-making and guide quality improvement.

'Workarounds'

Perceived and real inefficiencies in the MDS have encouraged the nurse prescribers to use 'workarounds' (Lawlor et al, 2011). These are locally constructed paper-based alternatives that meet their clinical needs and goals more efficiently and effectively. While the 'workarounds' may benefit the nurse prescriber, they are also a manifestation of incompatibility with the MDS and clinical requirements. Resolving competing demands by managing nurse prescribing data using 'workarounds' creates new pathways of documentation that must now be cross-referenced with the MDS to fully understand the challenges of nurse prescribing in practice. The dramatically reduced HSE staffing levels (by 5197 nurses in the last 5 years) (O'Regan, 2014) further support concerns regarding unacknowledged workloads. These figures together with the results of this study imply that clinical workloads have been increased substantially since the introduction of nurse prescribing to the clinical setting without consideration for altering existing arrangements or roles. Difficulties in adapting to such demands on time in the clinical setting are appearing, with nurse prescribers reducing the numbers of prescriptions written, asking the doctor to prescribe, not expanding their collaborative practice agreement to add new drugs or simply not prescribing. While participants believe that prescribing is very beneficial, the difficulties identified have caused stress for the nurse prescriber. This is now becoming an inhibiting factor to the initiative, making it unattractive, problematic and leading to a non-supportive attitude (Vakola and Nikolaou, 2005). However, participants are also aware that smart use of prescribing data and information is an important component of creating a responsive system that contributes positively to the nurse prescribing initiative and provides opportunity to improve health in terms of both quality and cost. Having access to good data that is accurate, reliable and consistent reflects what is really happening in practice with nurse prescribing. Interpretation of this data then determines the most appropriate interventions to address the issues/problems identified in the study. Participants revealed an insightful understanding of the nurse prescribing processes and are well placed to select the most appropriate interventions to establish implementation strategies in collaboration with the HSE to improve workload issues in the clinical setting.

The evidence from this research finds that the MDS is designed to meet different needs from those of the local clinical areas, making it difficult to implement. This in turn results in reduced productivity and access to nurse prescribing information that is a critical component of future patient care and safety. The task for the HSE is to re-evaluate the design of the MDS to ensure the benefits significantly outweigh the disadvantages clearly communicated by the research participants.

Conclusion

Nurse prescribers recognise the integral connection of nurse prescribing data to evidence-based practice and the role both those components play in clinical decision making, professional development, operational effectiveness and, ultimately, the patient–nurse relationship. If the MDS is to remain in place, it needs to be reviewed and restructured to ensure it facilitates NMP rather than causing an obstruction.

Due to the moratorium on national recruitment, an insufficiency of staff numbers has become a hindering factor for service delivery. The paradox for nurse prescribers at present is that, on one hand, they are a service that is valued by patients and, on the other, they are a disenfranchised, overworked and undervalued group of staff. The role of the nurse prescriber is clearly an important element of future health care, and issues surrounding workload management and communication need to be addressed by the HSE to guarantee appropriate and accurate management of nurse prescribing and the data generated. Research is also required to understand the reluctance of newly qualified nurse prescribers to register for practice.

As demonstrated by international research, in the long term, time and resources will need to be invested by the health service to address the issues identified by participants in this research. **BJCN**

Accepted for publication: 22 October 2014

Adams E, Cuddy A, Flynn M, Lorenz R, MacGabhann C (2010) Nurse and midwife prescribing in Ireland: the Minimum Dataset. *Nurse Prescribing* **8**(5): 234–41

An Bord Altranais (2005) Review of Nurses and Midwives in Prescribing and Administration of Medicinal Products. Final Report. An Bord Altranais,

KEY POINTS

- Nurse prescribing has been introduced as a quality improvement; however, the initiative requires investment, which may not necessarily result in cost cutting in the short term
- The Health Service Executive needs to ensure that difficulties relating to nurse prescribing are addressed and managed in a timely manner
- The most common complaint expressed by nurse and midwife prescribers in connection with the introduction of the initiative is the increase in workload and documentation required to fulfil their new role
- Careful attention to detail is required to ensure nurse prescribing data is captured properly, including active promotion of the benefits and ways in which these benefits can be incorporated into practice workflow and clinical activities

© 2014 MA Healthcare Ltd

Dublin. http://tinyurl.com/o2kmaok (accessed 13 November 2014)

Avery A, Savelyich B, Wright L (2004) Doctors' views on supervising nurse prescribers. *Prescriber* **5**: 56–61

Bates D, Britton A (2010) The future of health information technology in the patient-centered medical home. *Health Affairs* **29**(4): 614–21. doi: 10.1377/hlthaff.2010.0007

Bose R (2003) Knowledge management-enabled health care management systems: capabilities, infrastructure, and decision-support. *Expert Systems with Applications* **24**(1): 59–71. doi: 10.1016/S0957-4174(02)00083-0

Bowskill D, Timmons S, James V (2012) How do nurse prescribers integrate prescribing in practice: case studies in primary and secondary care. *J Clin Nurs* **22**(13): 2077–86. doi: 10.1111/j.1365-2702.2012.04338.x

Chaudhry B, Wang J, Wu S et al (2006) Systematic review: impact of health information technology on quality, efficiency, and cost of care. *Ann Intern Med* **144**(10): 742–52

Cipher D, Hooker R (2006) Prescribing trends by nurse practitioners and physician assistants in the United States. *J Amer Acad Nurse Pract* **18**(6): 291–6

Colaizzi PF (1978) Psychological research as the phenomenologist views it. In: Valle RS, King M, *Existential-Phenomenological Alternatives for Psychology*, Oxford University Press, New York.

Cooper R, Anderson C, Avery T et al (2008) Stakeholders' views of UK nurse and pharmacist supplementary prescribing. *J Health Service Res Policy* **13**(4): 215–21

Coull A, Murray I, Turner-Halliday F, Watterson A (2013) The expansion of nurse prescribing in Scotland: an evaluation. *Br J Community Nurs* **18**(5): 234–42

Courtenay M, Berry DC (2007) Comparing nurses' and doctors' views of nurse prescribing: a questionnaire survey. *Nurse Prescribing* **5**(5): 1–6

Courtenay M, Stenner K, Carey N (2010) The views of patients with diabetes about nurse prescribing. *Diabet Med* **27**(9): 1049–54. doi: 10.1111/j.1464-5491.2010.03051.x

Health Service Executive (2008) *Guiding Framework for the Implementation of Nurse and Midwifery Prescribing in Ireland*. Nursing Service Director, Dublin. http://tinyurl.com/m6u2vq5 (accessed 26 February 2014)

Health Service Executive (2012) *Health Service Plan 2012*. http://tinyurl.com/mbq7mke (accessed 28 February 2012)

Health Service Executive (2014) National Implementation Report on the Nurse and Midwife Medicinal Product Prescribing Initiative From January–March 2014. Office of the Nursing & Midwifery Services Director, Health Service Executive. http://tinyurl.com/k7x6vec (accessed 12 November 2014)

Jamal A, McKenzie K, Clark M (2009) The impact on health information technology on the quality of medical and health care: a systematic review. *HIM J* **38**(3): 26–37

Jones K, Edwards M, While A (2010) Nurse prescribing roles in acute care: an evaluative case study. *J Adv Nurs* **67**(1): 117–26. doi: 10.1111/j.1365-2648.2010.05490.x.

Kroezen M, Frencke A, Groenewegen P, van Dijk L (2012) Nurse prescribing of medicines in Western Europe and Anglo-Saxon countries: a survey of forces, conditions and jurisdictional control. *Int J Nurs Stud* **49**(8): 1002–12

Kroezen M, van Dijk L, Groenewegen P, deRond M, de Veer A, Frencke A (2013) Neutral to positive views on the consequences of nurse prescribing: results of a national survey among registered nurses, nurse specialists and physicians. *Int J Nurs Stud* **51**(4): 539–48

Lapane KL, Waring ME, Schneider KL, Dubé C, Quilliam BJ (2008) A mixed method study of the merits of e-prescribing drug alerts in primary care. *J Gen Intern Med* **23**(4): 442–6

Latter S, Maben J, Myall M, Courtenay M, Young A, Dunn N (2005) An evaluation of extended formulary independent nurse prescribing. Final Report. Policy Research Programme, Department of Health & University of Southhampton. http://tinyurl.com/pvh5qvj (accessed 13 November 2013)

Latter S, Sibley A, Skinner T et al (2010) The impact of an intervention for nurse prescribing on consultations to promote patient medicine-taking in diabetes: a mixed-method study. *Int J Nurs Stud* **47**(9): 1126–38

Lawlor EK, Hedge A, Pavlovic-Veselinovic S (2011) Cognitive ergonomics, socio-technical system, and the impact of healthcare information technologies. *Int J Industr Ergonomics* **41**(4): 336–44

McKenna H, Richey R, Keeney S, Hasson F, Poulton B, Sinclair M (2008) The managerial and development issues of nurses and midwives in new roles. *Scand J Caring Sci* **22**(2): 227–35. doi: 10.1111/j.1471-6712.2007.00519.x

Munhall P (2012) *Nursing Research: A Qualitative Perspective*, 5th edn. Jones & Bartlett Learning, Sudbury, MA

Munsch C (2002) Managing the measurement: a model of data support in an integrated delivery system. *J Nurs Care Qual* **16**(2): 1–9

O'Halloran S (2010) Private meeting with the Nursing Services Director Health Service Executive to discuss the Minimum Dataset. Tuesday 26 January. Dublin, Ireland

O'Regan E (2014) Over 5000 nurses cut from the HSE in five years. *Irish Independent*, Lifestyle and Health. http://tinyurl.com/l64pnjo (accessed 6 September 2014)

Ortiz E, Clancy C (2003) Use of information technology to improve the quality of health care in the United States. *Health Service Research* **38**(2): 11–22

Sequist T, Cook D, Haas J, Horner R, Tierney W (2008) Moving health information technology forward. *J Gen Intern Med* **23**(4): 355–7

Stenner K, Courtenay M (2008) Benefits of nurse prescribing for patients in pain: nurses' views. *J Adv Nurs* **63**(1): 27–35

Van Manen M (1990) *Researching Lived Experience: Human Science for an Action Sensitive Pedagogy*. State University of New York Press, Albany, NY

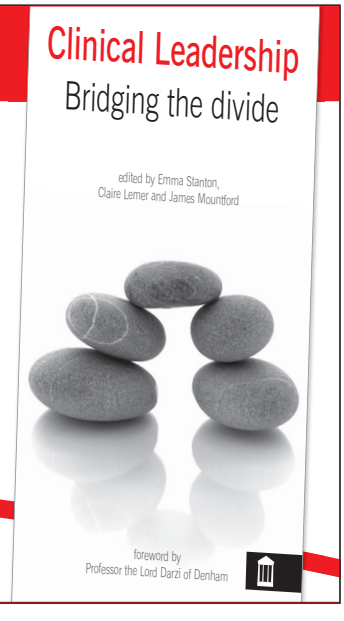
Vakola M, Nikolaou I (2005) Attitudes towards organizational change: what is the role of employees' stress and commitment? *Employee Relations* **27**(2): 160–74

Develop and improve your clinical leadership skills

- Comprehensive overview of the knowledge, skills and behaviours required for effective clinical leadership today.
- Practical tips and advice on ways to deliver higher quality, efficient patient care.
- Co-authorship by aspiring and enthusiastic junior doctors with experienced senior leaders.
- Reflects the growing emphasis on quality of care and clinicians' role in building and running great services at the NHS.
- Foreword written by Lord Darzi of Denham

ISBN: 978-1-85642-398-4; 234 x 156mm; paperback; 200 pages; publication 2009; RRP £19.99

Order your copies by visiting **www.quaybooks.co.uk** or call our Hotline **+44(0)1722 716 935**



© 2014 MA Healthcare Ltd

Appendix 8 - Irish Questionnaire

Link to the Irish Nurse / Midwife Prescribing Questionnaire 2011

Appendix 9 - UK Questionnaire

Link to the UK Nurse Prescribing Questionnaire 2011

Appendix 10 - General Ethics Approval for the Research

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Tel: + 353-21-490 1901
Fax: + 353-21-490 1919

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Our ref: ECM 4 (k) 05/10/10

22nd September 2010

Professor Julia Kennedy
Professor of Clinical Pharmacy
Department of Pharmacy
Cavanagh Building
University College Cork
Cork

Re: Exploring the Clinical experiences of nurse prescribers.

Dear Professor Kennedy

Expedited approval is granted to carry out the above study in:

- Cork University Hospital
- Cork University Maternity Hospital.

The following documents have been approved:

- Application Form
- Detailed Protocol
- Focus Group Questions.

We note that the co-investigators involved in this study will be:

- Dr Suzanne McCarthy and Ms Rena Creedon.

Yours sincerely

Dr Michael Hyland
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

Tel: + 353-21-490 1901
Fax: + 353-21-490 1919

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Our ref: ECM 4 (k) 05/10/10

22nd September 2010

Professor Julia Kennedy
Professor of Clinical Pharmacy
Department of Pharmacy
Cavanagh Building
University College Cork
Cork

Re: Exploring the Clinical experiences of nurse prescribers.

Dear Professor Kennedy

Expedited approval is granted to carry out the above study in:

- Cork University Hospital
- Cork University Maternity Hospital.

The following documents have been approved:

- Application Form
- Detailed Protocol
- Focus Group Questions.

We note that the co-investigators involved in this study will be:

- Dr Suzanne McCarthy and Ms Rena Creedon.

Yours sincerely

Dr Michael Hyland
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

Appendix 11 - Information sheet relating to the questionnaire

Dear Nurse Prescriber,

I am conducting research for my PhD in the area of nurse prescribing. The aim of the research is to undertake a 'Comparative Analysis of Nurse Prescribing' and in light of this the opinion of nurse prescribers in the UK is very valuable.

The questionnaire is designed to address various areas of prescribing in order to gather the necessary data in order to undertake an international comparative analysis of nurse prescribing. In particular I am interested in:

your opinion of prescriptive authority and how prescribing supports you in practice

your role as a nurse prescriber and the support you require

your prescribing workload how it is identified and recorded

your professional development needs as a nurse prescriber

I would be most grateful therefore if you could take time (10 mins) to complete the questionnaire which is contained on the link below.

https://www.surveymonkey.com/s/UKnurseprescribingquestionnaire

When the questionnaire is completed click done and it will automatically return for analysis which is anonymous.

Thank you in advance for taking the time to complete the questionnaire it is much appreciated.

Yours sincerely,

Rena Creedon,
Nurse prescribing programme Coordinator,
University College Cork,
Ireland.

Appendix 12 - STOPP/START Screening Tool

STOPP

Screening Tool of Older People's potentially inappropriate Prescriptions.

The following prescriptions are potentially inappropriate in persons aged ≥ 65 years of age

A. Cardiovascular System

1. Digoxin at a long-term dose > 125µg/day with impaired renal function* *(increased risk of toxicity).*
2. Loop diuretic for dependent ankle oedema only i.e. no clinical signs of heart failure *(no evidence of efficacy, compression hosiery usually more appropriate).*
3. Loop diuretic as first-line monotherapy for hypertension *(safer, more effective alternatives available).*
4. Thiazide diuretic with a history of gout *(may exacerbate gout).*
5. Non-cardioselective beta-blocker with Chronic Obstructive Pulmonary Disease (COPD) *(risk of bronchospasm)*.
6. Beta-blocker in combination with verapamil *(risk of symptomatic heart block).*
7. Use of diltiazem or verapamil with NYHA Class III or IV heart failure *(may worsen heart failure).*
8. Calcium channel blockers with chronic constipation *(may exacerbate constipation).*
9. Use of aspirin and warfarin in combination without histamine H2 receptor antagonist (except cimetidine because of interaction with warfarin) or proton pump inhibitor *(high risk of gastrointestinal bleeding).*
10. Dipyridamole as monotherapy for cardiovascular secondary prevention *(no evidence for efficacy).*
11. Aspirin with a past history of peptic ulcer disease without histamine H2 receptor antagonist or Proton Pump Inhibitor *(risk of bleeding).*
12. Aspirin at dose > 150mg day *(increased bleeding risk, no evidence for increased efficacy).*
13. Aspirin with no history of coronary, cerebral or peripheral arterial symptoms or occlusive arterial event *(not indicated).*
14. Aspirin to treat dizziness not clearly attributable to cerebrovascular disease *(not indicated).*

15. Warfarin for first, uncomplicated deep venous thrombosis for longer than 6 months duration *(no proven added benefit).*

16. Warfarin for first uncomplicated pulmonary embolus for longer than 12 months duration *(no proven benefit).*

17. Aspirin, clopidogrel, dipyridamole or warfarin with concurrent bleeding disorder *(high risk of bleeding).*

∗ estimated GFR <50ml/min.

B. Central Nervous System and Psychotropic Drugs

1. Tricyclic antidepressants (TCA's) with dementia *(risk of worsening cognitive impairment).*

2. TCA's with glaucoma *(likely to exacerbate glaucoma).*

3. TCA's with cardiac conductive abnormalities *(pro-arrhythmic effects).*

4. TCA's with constipation *(likely to worsen constipation).*

5. TCA's with an opiate or calcium channel blocker *(risk of severe constipation).*

6. TCA's with prostatism or prior history of urinary retention *(risk of urinary retention).*

7. Long-term (i.e. > 1 month), long-acting benzodiazepines e.g. chlordiazepoxide, fluazepam, nitrazepam, chlorazepate and benzodiazepines with long-acting metabolites e.g. diazepam *(risk of prolonged sedation, confusion, impaired balance, falls).*

8. Long-term (i.e. > 1 month) neuroleptics as long-term hypnotics *(risk of confusion, hypotension, extra-pyramidal side effects, falls).*

9. Long-term neuroleptics (> 1 month) in those with Parkinsonism *(likely to worsen extra-pyramidal symptoms)*

10. Phenothiazines in patients with epilepsy *(may lower seizure threshold).*

11. Anticholinergics to treat extra-pyramidal side-effects of neuroleptic medications *(risk of anticholinergic toxicity).*

12. Selective serotonin re-uptake inhibitors (SSRI's) with a history of clinically significant hyponatraemia *(non-iatrogenic hyponatraemia <130mmol/l within the previous 2 months).*

13. Prolonged use (> 1 week) of first generation antihistamines i.e. diphenydramine, chlorpheniramine, cyclizine, promethazine *(risk of sedation and anti-cholinergic side effects).*

C. Gastrointestinal System

1. Diphenoxylate, loperamide or codeine phosphate for treatment of diarrhoea of unknown cause *(risk of delayed diagnosis, may exacerbate constipation with overflow diarrhoea, may precipitate toxic megacolon in inflammatory bowel disease, may delay recovery in unrecognised gastroenteritis).*

2. Diphenoxylate, loperamide or codeine phosphate for treatment of severe infective gastroenteritis i.e. bloody diarrhoea, high fever or severe systemic toxicity *(risk of exacerbation or protraction of infection)*
3. Prochlorperazine (Stemetil) or metoclopramide with Parkinsonism *(risk of exacerbating Parkinsonism).*
4. PPI for peptic ulcer disease at full therapeutic dosage for > 8 weeks *(earlier discontinuation or dose reduction for maintenance/prophylactic treatment of peptic ulcer disease, oesophagitis or GORD indicated).*
5. Anticholinergic antispasmodic drugs with chronic constipation *(risk of exacerbation of constipation).*

D. Respiratory System

1. Theophylline as monotherapy for COPD. *(safer, more effective alternative; risk of adverse effects due to narrow therapeutic index)*
2. Systemic corticosteroids instead of inhaled corticosteroids for maintenance therapy in moderate-severe COPD *(unnecessary exposure to long-term side-effects of systemic steroids).*
3. Nebulised ipratropium with glaucoma *(may exacerbate glaucoma).*

E. Musculoskeletal System

1. Non-steroidal anti-inflammatory drug (NSAID) with history of peptic ulcer disease or gastrointestinal bleeding, unless with concurrent histamine H2 receptor antagonist, PPI or misoprostol *(risk of peptic ulcer relapse).*
2. NSAID with moderate-severe hypertension (moderate: 160/100mmHg – 179/109mmHg; severe: ≥180/110mmHg) *(risk of exacerbation of hypertension).*
3. NSAID with heart failure *(risk of exacerbation of heart failure).*
4. Long-term use of NSAID (>3 months) for relief of mild joint pain in osteoarthritis *(simple analgesics preferable and usually as effective for pain relief)*
5. Warfarin and NSAID together *(risk of gastrointestinal bleeding).*
6. NSAID with chronic renal failure* *(risk of deterioration in renal function).* * estimated GFR 20-50ml/min.

7. Long-term corticosteroids (>3 months) as monotherapy for rheumatoid arthritis or osteoarthritis *(risk of major systemic corticosteroid side-effects).*
8. Long-term NSAID or colchicine for chronic treatment of gout where there is no contraindication to allopurinol *(allopurinol first choice prophylactic drug in gout)*

F. Urogenital System

1. Bladder antimuscarinic drugs with dementia *(risk of increased confusion, agitation).*
2. Bladder antimuscarinic drugs with chronic glaucoma *(risk of acute exacerbation of glaucoma).*
3. Bladder antimuscarinic drugs with chronic constipation *(risk of exacerbation of constipation).*
4. Bladder antimuscarinic drugs with chronic prostatism *(risk of urinary retention).*
5. Alpha-blockers in males with frequent incontinence i.e. one or more episodes of incontinence daily *(risk of urinary frequency and worsening of incontinence).*
6. Alpha-blockers with long-term urinary catheter *in situ* i.e. more than 2 months *(drug not indicated).*

G. Endocrine System

1. Glibenclamide or chlorpropamide with type 2 diabetes mellitus *(risk of prolonged hypoglycaemia).*
2. Beta-blockers in those with diabetes mellitus and frequent hypoglycaemic episodes i.e. ≥ 1 episode per month *(risk of masking hypoglycaemic symptoms).*
3. Oestrogens with a history of breast cancer or venous thromboembolism *(increased risk of recurrence)*
4. Oestrogens without progestogen in patients with intact uterus *(risk of endometrial cancer).*

H. Drugs that adversely affect those prone to falls (≥ 1 fall in past three months)

1. Benzodiazepines *(sedative, may cause reduced sensorium, impair balance).*
2. Neuroleptic drugs *(may cause gait dyspraxia, Parkinsonism).*
3. First generation antihistamines *(sedative, may impair sensorium).*
4. Vasodilator drugs known to cause hypotension in those with persistent postural hypotension i.e. recurrent > 20mmHg drop in systolic blood pressure *(risk of syncope, falls).*

5. Long-term opiates in those with recurrent falls *(risk of drowsiness, postural hypotension, vertigo).*

I. Analgesic Drugs

1. Use of long-term powerful opiates e.g. morphine or fentanyl as first line therapy for mild-moderate pain *(WHO analgesic ladder not observed).*
2. Regular opiates for more than 2 weeks in those with chronic constipation without concurrent use of laxatives *(risk of severe constipation).*
3. Long-term opiates in those with dementia unless indicted for palliative care or management of moderate/severe chronic pain syndrome *(risk of exacerbation of cognitive impairment).*

J. Duplicate Drug Classes

Any regular duplicate drug class prescription e.g. two concurrent opiates, NSAID's, SSRI's, loop diuretics, ACE inhibitors *(optimisation of monotherapy within a single drug class should be observed prior to considering a new class of drug).* This excludes duplicate prescribing of drugs that may be required on a prn basis e.g. inhaled beta2 agonists (long and short acting) for asthma or COPD, and opiates for management of breakthrough pain.

START

Screening Tool to Alert doctors to Right i.e. appropriate, indicated Treatments.

The following medications should be considered for people ≥ 65 years of age with the following conditions, where no contraindication to prescription exists.

A. Cardiovascular System

1. Warfarin in the presence of chronic atrial fibrillation.
2. Aspirin in the presence of chronic atrial fibrillation, where warfarin is contraindicated, but not aspirin.
3. Aspirin or clopidogrel with a documented history of atherosclerotic coronary, cerebral or peripheral vascular disease in patients with sinus rhythm.
4. Antihypertensive therapy where systolic blood pressure consistently >160 mmHg.
5. Statin therapy with a documented history of coronary, cerebral or peripheral vascular disease, where the patient's functional status remains independent for activities of daily living and life expectancy is > 5 years.
6. Angiotensin Converting Enzyme (ACE) inhibitor with chronic heart failure.
7. ACE inhibitor following acute myocardial infarction.
8. Beta-blocker with chronic stable angina.

B. Respiratory System

1. Regular inhaled beta 2 agonist or anticholinergic agent for mild to moderate asthma or COPD.
2. Regular inhaled corticosteroid for moderate-severe asthma or COPD, where predicted FEV1 <50%.
3. Home continuous oxygen with documented chronic type 1 respiratory failure (pO2 < 8.0kPa, pCO2 <6.5kPa) or type 2 respiratory failure (pO2 < 8.0kPa, pCO2 > 6.5kPa).

C. Central Nervous System

1. L-DOPA in idiopathic Parkinson's disease with definite functional impairment and resultant disability.
2. Antidepressant drug in the presence of moderate-severe depressive symptoms lasting at least three months.

D. Gastrointestinal System

1. Proton Pump Inhibitor with severe gastro-oesophageal acid reflux disease or peptic stricture requiring dilatation.
2. Fibre supplement for chronic, symptomatic diverticular disease with constipation.

E. Musculoskeletal System

1. Disease-modifying anti-rheumatic drug (DMARD) with active moderate-severe rheumatoid disease lasting > 12 weeks.
2. Bisphosphonates in patients taking maintenance oral corticosteroid therapy.
3. Calcium and Vitamin D supplement in patients with known osteoporosis (radiological evidence or previous fragility fracture or acquired dorsal kyphosis).

F. Endocrine System

1. Metformin with type 2 diabetes +/- metabolic syndrome (in the absence of renal impairment*).
2. ACE inhibitor or Angiotensin Receptor Blocker in diabetes with nephropathy i.e. overt urinalysis proteinuria or micoralbuminuria (>30mg/24 hours) +/- serum biochemical renal impairment*.
3. Antiplatelet therapy in diabetes mellitus if one or more co-existing major cardiovascular risk factor present (hypertension, hypercholesterolaemia, smoking history).
4. Statin therapy in diabetes mellitus if one or more co-existing major cardiovascular risk factor present.

   * estimated GFR <50ml/min.

Appendix 13 - STOPP/START Ethics Approval

UCC

Tel: + 353-21-490 1901
Fax: + 353-21-490 1919

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Our ref: ECM 4 (aa) 07/08/12

23rd July 2012

Dr Suzanne McCarthy
Lecturer
Clinical Pharmacy
Cavanagh Building
University College
Cork

Re: To determine the prevalence of potential inappropriate prescribed drugs for the elderly patients by nurse prescribers.

Dear Dr McCarthy

Expedited approval is granted to carry out the above study at:

- Elderly Care Sites in HSE South.

The following documents were approved:

- Application Form.

We note that the co-investigators involved in this study will be:

- Dr Stephen Byrne, Professor Julia Kennedy and Ms Rena Creedon.

Yours sincerely

Dr Michael Hyland
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

Appendix 14 - Feedback Letter Generated by STOPP/START

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Application of STOPP/START (Screening Tool of Older Persons' Prescriptions/Screening Tool to Alert to Right Treatment) to nurse prescribing.

PATIENT NAME: **DATE OF REVIEW:**

DATE OF BIRTH: **CONSULTANT:**

MRN:

The nurse prescriber for the above patient has consented to participate in the study 'An exploration of nurse prescribing using the STOPP START Screening Tool'. Following the application of the STOPP START Screening Tool to the prescriptions written for this patient the following were highlighted as potentially inappropriate medications.

STOPP

1.benzodiazepines (sedative, may cause reduced sensorium, impair balance)-

2. long-term (i.e. > 1 month) neuroleptics as long-term hypnotics (risk of confusion, hypotension, extra-pyramidal side effects, falls)-

START

1. Angiotensin Converting Enzyme (ACE) inhibitor with chronic heart failure.

Thank you for considering these proposed adjustments to Mrs XXX medications.

_____ _____

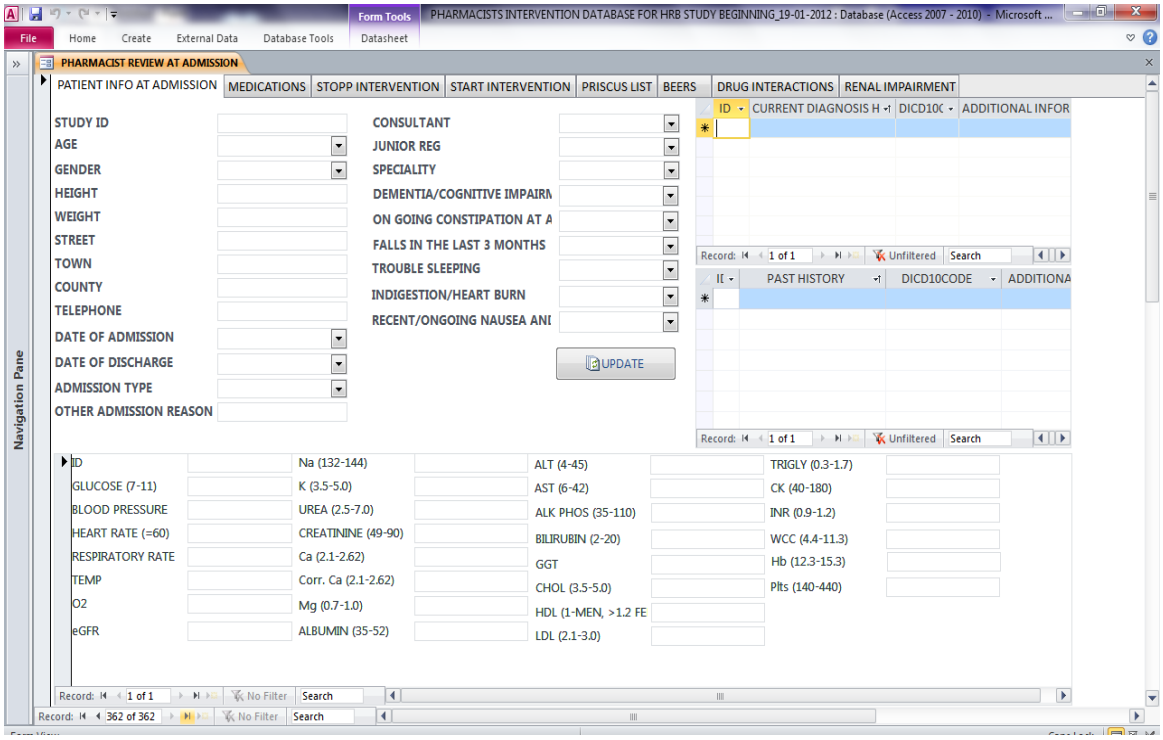
Rena Creedon
PhD Student School of Pharmacy
University College Cork

Prof. Stephen Byrne/Dr. Suzanne McCarthy
PhD supervisors
University College Cork

Appendix 15 - E-Pharm-Assist-CDSS System

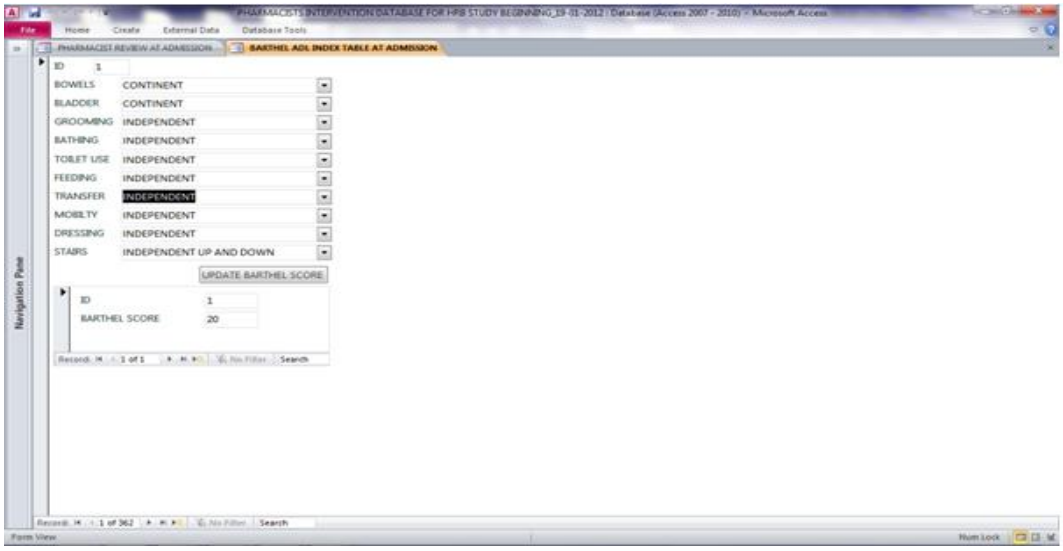
Review of patient medications:

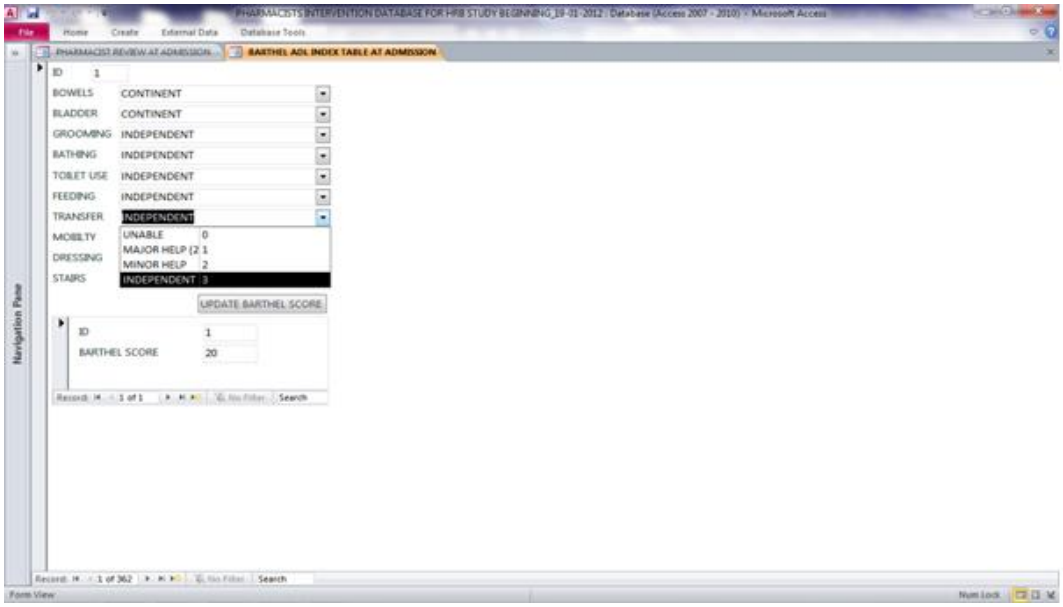
At admission the study patients demographic, current and past medical history and biomedical information were extracted from the patients' medical and nursing notes and entered into the specially developed electronic data collection form. This database was developed by the pharmacy research group in UCC that was generated from previous studies.



Barthel Index:

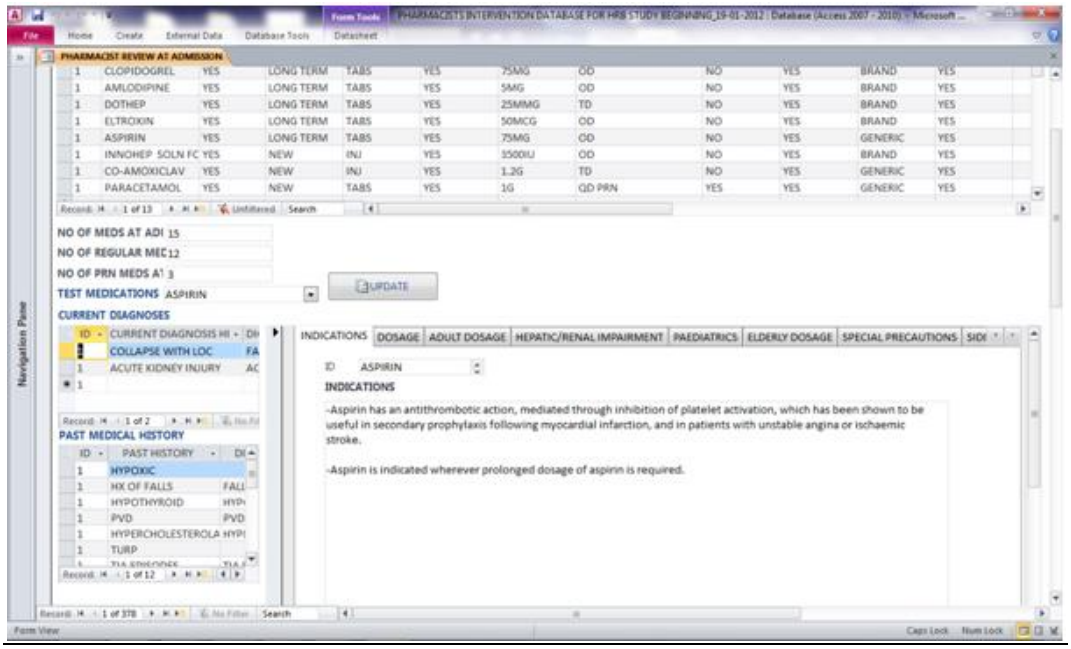
The Barthel Index consists of 10 elements that assess an individual's daily function, specifically their activities of daily living and mobility. The index primarily issues relating to feeding, mobilising, grooming, transfer, toilet use, bathing, going up and down stairs, dressing and level of bowel and bladder continence. The system incorporates a computerised Barthel Index, the user answers the specific questions relating to the Barthel index and the system then calculates and records the corresponding score.





Medication information:

The medications are coded at the point of data entry using a modified version of the ATC codes (D-ATC codes). As the medications are entered, the system is designed to give the user the ability to simultaneously check specific indications, dosages, side effects, cautions and contra-indications etc. in a specially designed drug information tab, which updates based on specific drug selected by the user. The information in this drug information tab was developed from the summary of product characteristics (SPC) for each medication.

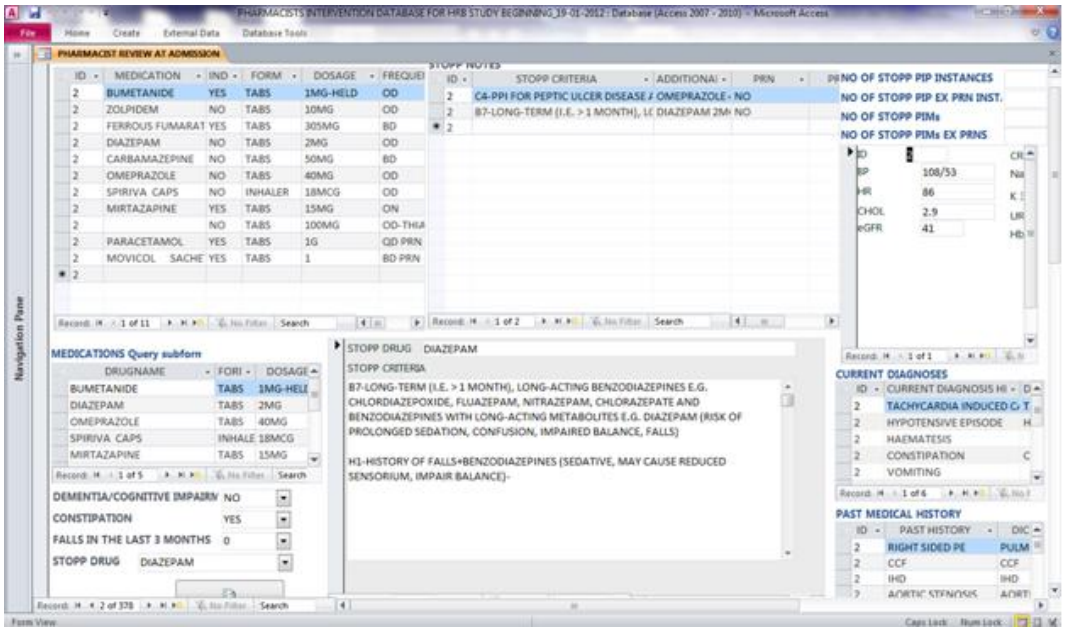


The conditions/ disease states are also coded at the point of entry based on a modified version of the ICD-10 codes (D-ICD-10). The medications are entered into an auto/predict- text box and a free text box. The D-ICD-10 codes are based on the ICD-10 codes and the most common described disease descriptions used in practice. On repeat usage new D-ICD-10 codes will be

generated based on new descriptions or abbreviated descriptions of diseases and conditions. However eventually this should theoretically reach saturation.

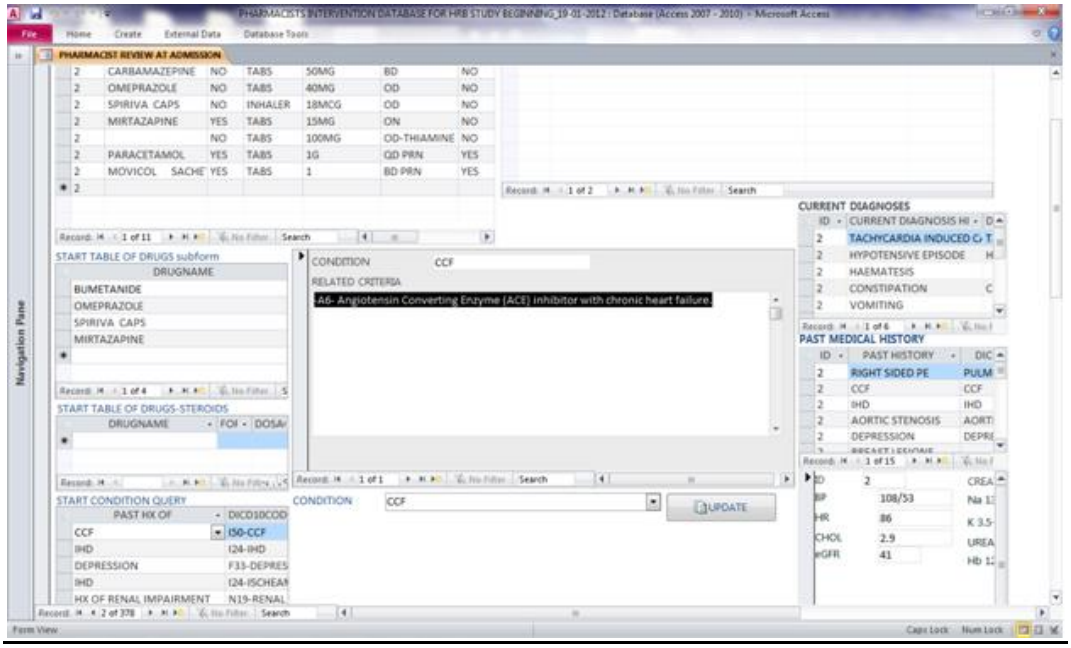
STOPP Intervention 2008:

The system is designed to screen for the medications related to the STOPP criteria, based on a subset of STOPP D-ATC filter codes. These medications are filtered out and the user can then select the individual medications to see its corresponding STOPP criteria. The user can then record the relevant instances of potentially inappropriate prescribing (PIP) information in the STOPP recommendations box.



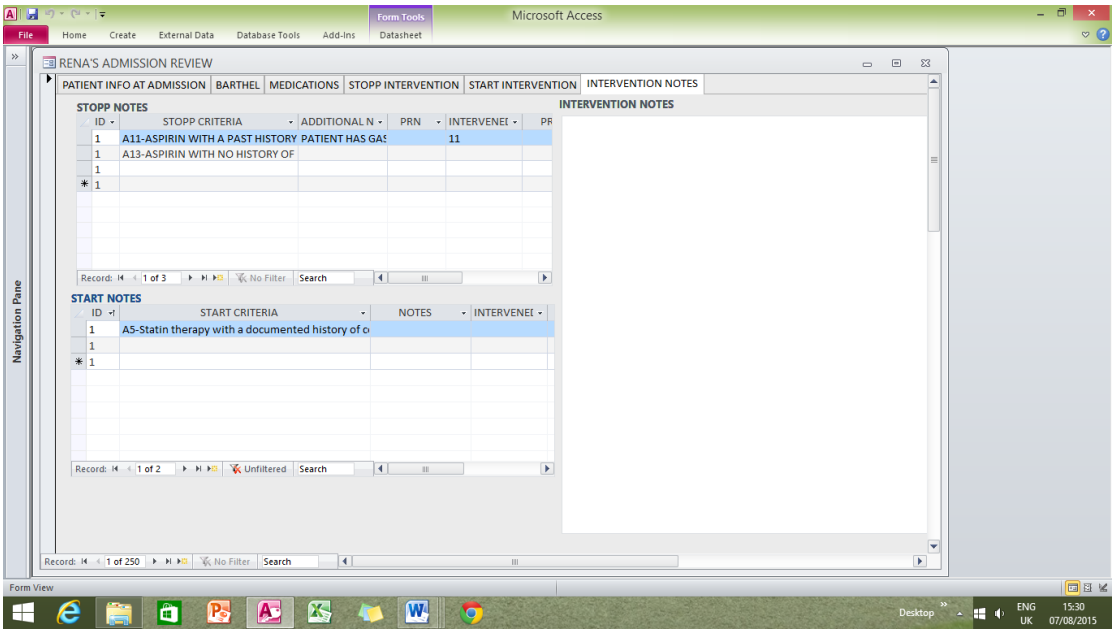
START:

The system is designed to screen for conditions relating to the START criteria, based on a subset of the START D-ICD-10 filter codes and screen for medications relating to the START criteria, based on a subset of the START D-ATC filter codes. These conditions that are filtered out and the user can select the specific conditions to see the corresponding START criteria. The user can then record the relevant instances of potential prescribing omissions (PPOs) information in the START recommendations box.



Intervention Notes

Notes were also recorded throughout the data collection process to ensure clinical decisions regarding medications prescribed were understood.



Appendix 16 - Question Set for STOPP/START interviews

INTERVIEWS QUESTIONS STOPP/START.

Before I commence the interview can I please confirm that you are still willing to participate in this interview regarding inappropriate prescribing?

Thank you for agreeing to participant and let me reinforce that the interview is confidential. All information from this interview will be anonymised before analysis. There will not be any consequences to what you tell me and there will be no blame attributed to you or anyone else. There is no right or wrong answer to the questions, just give as much detail as you can. It will probably take 20 minutes.

Are you happy for me to proceed with the interview?

1. DEMOGRAPHIC QUESTIONS:

	Nurses grade	
	Years of experience as a nurse- Nurse prescriber-	
	Do you have qualification in geriatric care?	
	Undergraduate / postgraduate?	

2 CAN YOU TELL ME WHAT YOU UNDERSTAND BY THE TERM INAPPROPRIATE PRESCRIBING?

	Can you give an example?	
	Drugs with wrong/no indication?	
	Prescribing of a drug or drug class that are likely to exacerbate a clinical problem – ADE?	
	Drug that is unnecessarily expensive?	
	Prescribed for too short or too long period of time?	
	Underuse of medications	

	or under prescribing	
	Failure to prescribe for irrational or ageist reasons?	

3. **WHAT PORTION OF OLDER PEOPLE (65 YEARS OR OLDER) ARE PRESCRIBED AT LEAST ONE INAPPROPRIATE MEDICINE?**

	On admission	
	During their stay in hospital	
	On discharge	

4. **DO YOU THINK THE LEVEL OF INAPPROPRIATE PRESCRIBING IS A PROBLEM AMONGST OLDER PATIENTS?**

	Primary care	
	Secondary care	
	Tertiary care	

5. **WHAT DO YOU THINK CONTRIBUTES TO INAPPROPRIATE PRESCRIBING IN OLDER PEOPLE?**

	Age	
	Polypharmacy	
	Comorbidities	
	Multiple doctors / prescribers	
	History of falls	
	Other	

6. **DO YOU THINK THERE IS ANYTHING IN PARTICULAR YOUR SHOULD KNOW MORE ABOUT WHEN PRESCRIBING FOR OLDER PEOPLE?**

	Clinical knowledge	
	Procedural knowledge	

7. COULD YOU TELL ME WHAT YOU UNDERSTAND BY THE TERM ADVERSE DRUG ACTION?

	What class of drugs are likely to be problematic in older patients?	
	What percentage of older patients would you say experience an adverse drug event?	

8. ON A SCALE OF 1 TO 10 HOW WOULD YOU RATE YOUR CONFIDENCE IN PRESCRIBING FOR OLDER PEOPLE, 1 BEING NOT CONFIDENT AT ALL AND 10 BEING VERY CONFIDENT?

	What parts of the prescribing process would you be least confident about?	
	Deciding on the drug?	
	Appropriateness of drug?	
	Dose?	
	Duration?	
	Discontinuation?	

9. WHAT WOULD YOU SAY THE POTENTIAL CONSEQUENCES OF INAPPROPRIATE PRESCRIBING ARE?

	For Patient?	
	You?	
	Job?	
	Colleagues?	
	Patient's family?	

10. DO YOU THINK THE POSSIBILITY OF PRESCRIBING AN INAPPROPRIATE MEDICINE IS SOMETHING THAT IS ON THE PRESCRIBERS MIND ON A DAY-TO-DAY BASIS?

11. AS A PRESCRIBER, HOW WOULD YOU DESCRIBE YOUR OWN ROLE IN ENSURING MEDICINES PRESCRIBED FOR OLDER PEOPLE ARE APPROPRIATE?

	Directly involved?	
	Not much input?	
	Reviewing charts?	

12. WOULD YOU FEEL COMFORTABLE CHANGING AND INAPPROPRIATE PRESCRIPTION IF IT WAS HIGHLIGHTED TO YOU, IF NOT, WHY NOT?

	If you had prescribed something and it was highlighted to you?	
	If you noticed something else someone had prescribed?	
	Have you changed inappropriate prescriptions in the past?	
	What would warrant you changing a prescription?	

13. FROM YOUR EXPERIENCE WOULD YOU SAY ENVIRONMENTAL CONTEXT IMPACTS ON PRESCRIBING? DOES THIS INCREASE THE CHANCE OF INAPPROPRIATE PRESCRIBING?

	Time constraints?	
	Multi-tasking?	
	Are the necessary resources/structures available to assist you?	

14. TO WHAT EXTEDT DO THE VIEWS/ACTIONS OF YOUR COLLEAGUES AFFECT YOUR PRESCRIBING?

15. DO YOU THINK YOUR EMOTIONS EVER IMPACT ON PRESCRIBING? DOES THIS INCREASE THE CHANCE OF INAPPROPRIATE PRESCRIBING?

16. DO YOU THINK THERE IS A PARTICULAR WAY OF WORKING OR STEPS THAT COULD BE TAKEN TO ENCOURAGE APPROPRIATE PRESCRIBING IN OLDER PATIENTS?

17. IF SOMETHING COULD BE DONE TOMORROW TO ADDRESS INAPPROPRIATE PRESCRIBING, WHAT DO YOU THINK WOULD NEED TO BE DONE DIFFERENTLY AND WHO WOULD NEED TO DO IT?

	Do you think it can be easily achieved?	
	What barrier do you see to implementing this?	

18. WHAT ROLE DO YOU THINK SCREENING TOOLS PLAY IN PRESCRIBING FOR OLDER PATIENTS?

	Are you aware of the tools BEERS, STOPP/START	
	Do you refer to them?	

19. DO YOU FIND SCREENING TOOLS BENEFICIAL?

	Yes No	Comment:

20. IS THERE ANYTHING ELSE YOU WOULD LIKE TO ADD?

	Yes No	Comment:

Appendix 17 - Ethics Approval for Canadian Research Study

UCC

Tel: + 353-21-490 1901
Fax: + 353-21-490 1919

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Our ref: ECM 3 (s) 19/05/15 & ECM 4 (y) 03/07/12

22nd April 2015

Dr Suzanne McCarthy
School of Pharmacy
University College Cork

Re: To determine the prevalence of potential inappropriate prescribed drugs for elderly patients by nurse prescribers.

Dear Dr McCarthy

The Chairman approved the following:

- Revised Amendment Application Form
- Annual Protocol Renewal Form dated 14th April 2015.

Full approval to implement this amendment will be granted subject to receipt of the following:

- **Revised Study Protocol: Changes must be clearly highlighted and must contain a new a version and date (see paragraph 1 of amendment application form and our letter dated 25th March 2015)**

- **If the Information Leaflet and Consent Form have changed please put a new version and date on these documents and ensure that the changes are clearly highlighted**

Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

UCC

Tel: + 353-21-490 1901
Fax: + 353-21-490 1919

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee

Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Our ref: ECM 3 (ss) 06/12/16 & ECM 4 (y) 03/07/12

29th November 2016

Professor Stephen Byrne
School of Pharmacy
University College Cork
Cavanagh Building
College Road
Cork

Re: To determine the prevalence of potential inappropriate prescribed drugs for elderly patients by nurse prescribers.

Dear Professor Byrne

The Committee has considered the issues discussed at our meeting on Tuesday 22nd November 2016.

As you are aware, despite requests from the Committee for specific changes to study documentation (letters dated 25th March 2015 and 22nd April 2015) we did not receive the correct amendments required in order to approve Part II of this study i.e. collection of data from participants in Canada.

The Committee is bound by regulation and because the documents on file for this study do not comply with the regulations, we are not in a position to approve Part II of the study.

We are mindful however, that Part II has added value to the results and that the risk to participants was low. For these reasons, we will not insist on removal of the results of Part II from the thesis but we request that a footnote be added to each page stating that ethical approval was not granted for Part II i.e. data collected in Canada. We require a copy of same for our files.

Yours sincerely

Professor Michael G Molloy
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.

Appendix 18 - Canadian Research Publication (Chapter 7)

ORIGINAL RESEARCH

Nova Scotia nurse practitioners understanding of inappropriate prescribing and using a prescribing evaluation tool: A pilot study

Rena Creedon *[1], Stepehn Byrne[2], Ingrid Sketris[3], Julia Kennedy[4], Suzanne McCarthy[2,5]

[1] School of Nursing and Midwifery, University College Cork, Cork, Ireland
[2] Pharmaceutical Care Research Group, School of Pharmacy, University College Cork, Cork, Ireland
[3] Pharmacy Department, Dalhousie University, Halifax, Canada
[4] Pharmacy Department, Otago University, Dunedin City, New Zealand
[5] Pharmacy Department, Cork University Hospital, Cork, Ireland

Received: August 20, 2015 **Accepted:** November 1, 2015 **Online Published:** December 8, 2015
DOI: 10.5430/jnep.v6n4p21 **URL:** http://dx.doi.org/10.5430/jnep.v6n4p21

ABSTRACT

Background and Objective: Over the past two decades nurse practitioners' prescriptive authority, has evolved specifically in response to pressures from patients' physicians, changing policies and preoccupation with the effectiveness and efficiency of care. However, little is known of the nurse practitioners' understanding of appropriate and inappropriate prescribing and their views of using a prescribing evaluation tool in practice to ensure prescribing is optimal and can support national change. The aim of this research is to explore Nova Scotia nurse practitioners (with prescriptive authority) understanding of inappropriate prescribing and their experience of using a prescribing evaluation tool.
Methods: This qualitative study used a phenomenology research design. A series of semi-structured telephone interviews were held with a purposive sample of nurse practitioners with prescriptive authority. Interviews were tape recorded and transcribed verbatim. Data were analysed using Colaizzi's framework method.
Results: The study identified four recurrent themes: competence and confidence, understanding inappropriate prescribing, consequences of inappropriate prescribing and the role screening tools play in prescribing.
Conclusions: The potential for prescribing nurse practitioners to contribute positively to address the issues with increasing healthcare demands and associated problems and to improve quality of care in the Canadian health system is substantial given their insight to medication management.

Key Words: Nurse practitioner, Prescribing, Inappropriate prescribing, Prescribing evaluation tool, Quality care

1. INTRODUCTION

Nurse practitioner has no universal definition[1] but it is generally accepted that nurse practitioners provide services to individuals and families across the lifespan and work in a variety of community-based settings.[2,3] The title is frequently used to identify advanced practice nursing in Canada, the United States (US), Australia and the United Kingdom (UK). In Ireland, the position is referred to as an Advanced Nurse Practitioner (ANP). Historically, the nurse practitioner role was introduced in the US in the mid-1960s[4] and Canada in 1967[2] to meet increasing health service needs, with the literature describing the first reported nurse practitioner's

*Correspondence: Rena Creedon; Email: r.creedon@ucc.ie; Address: School of Nursing and Midwifery, University College Cork, Cork, Ireland.

role as "a contentious issue that produced a good deal of conflict and anxiety" at the time.[5] Today however, the role encompasses an evidence-informed holistic approach that emphasises health promotion and partnership development, that complements rather than replace other healthcare providers.[6] More recent events of physician shortage, together with the aging population and the associated increase in healthcare demands that has exerted considerable pressure on the Canadian health care system[7] and so nurse practitioners have become increasingly identified as a resource that can meet the ongoing health need of the Canadian population.[8]

Nurse practitioner's prescriptive authority has therefore evolved in response to pressures from patients, physicians, changing policies and requirements relating to the effectiveness and efficiency of care.[9,10] Prescribing authority for Canadian nurse practitioners is particularly important because health services cover large geographical regions that are remote, sparsely populated and where medical practitioners are not readily available.[11] However, prescriptive authority for nurse prescribers in the Canadian context is complex and may vary due to provincial and territorial governance systems within the country.[11] This has resulted in each province and territory having its own approach to nurse practitioner positions with prescriptive authority closely linked to the development of the role within each province. The common ground being the requirement for additional education, training, and regulation to ensure that those functioning in the nurse practitioner role are able to provide safe care to the public.[6]

Internationally over the past decade nurse practitioners have become part of the long term care system[12–14] and are now caring for clients with higher prevalence of chronic illness, disability and dependency.[15] However, advancing age and exposure to medications increases the risk of contact with a potentially inappropriately prescribed medication and development of complications from drug therapy. More specifically, the literature describes inappropriate prescribing as encompasses the use of medicines that pose more risk than benefit to patients, the use of medicines that have clinically significant drug-drug and drug-disease interactions, and importantly, the under-use of beneficial medicines.[16] Consequently, particular care must be taken when determining drugs and dosages for this section of the population to ensure prescribing is appropriate considering the long standing issues and number of older adult clients in receipt of medicines for chronic conditions in the Canadian health service.[17] While the benefits of pharmacotherapy for the older adult are potentially substantial, the process of choosing the appropriate medicine for the individual older adult patient may be complex. Changes in the patient's medical status over time can cause long-term medicines to become unsafe or ineffective, therefore part of the nurse practitioner's role is regular medication review to ensure continuing positive benefit for each medicine prescribed for the older adult. To ensure medication benefits are maintained several validated tools have been developed to help prescribers identify potential inappropriate prescribing in older adult care.[16,18,19] The significance of appropriate prescribing is best viewed in the context of the financial cost to the health service which has been identified by the Canadian Institute of Health Information (CIHI). In 2013, an estimated $34.5 billion was spent on drugs, the majority of which $29.3 billion (85.0%) was spent on prescribed drugs.[20] Within the priority research area of Drug Policy, the Canadian Institute of Health Research has identified effectiveness, safety and adverse events as key areas to be addressed, their vision being to "transform from a reactive, one-size-fits all approach to a more personalized system of predictive, preventive, and precision healthcare that is tailored to a population or an individual".[21] Incorporating nurse practitioners to provide direct care by way of "initial diagnosis of problems/concerns, establishing of diagnosis following appropriate diagnostic tests if required and formulation of a management plan, which may include prescriptions of medications"[22] has the ability to provide personalised appropriate care the initiative requires. Furthermore, the competence of nurse practitioners to manage patient care in a comparable manner to physicians, with high levels of patient satisfaction, combined with increased advice on education and health promotion has been well reported in the international literature.[23–27] However, the literature in relation to nurse practitioners understanding of appropriate or inappropriate prescribing is limited; leaving a void in our understanding of the impact nurse practitioners with prescriptive authority may have on patients' drug regimes. The difficulty however, can be local governance policy that limits the number of products available in the prescribing formulary for nurse practitioners[28] causing restrictions on prescribing that impact on their ability to prescribe appropriately. Therefore, it is important to gain a better appreciation of Canadian nurse practitioners' understanding of appropriate and inappropriate prescribing and their views of using a prescription evaluation tool in practice to ensure prescribing is optimal and can support the planned national change.

Aim

The aim of this research is to explore Nova Scotia nurse practitioners (with prescriptive authority) understanding of inappropriate prescribing and their experience of using a prescribing evaluation tool.

2. METHOD

This study adopted a Husserlian, or descriptive, phenomenology approach to the research. Data were collected in May 2015 during a research travel bursary visit to Dalhousie University, in Halifax. Using a descriptive phenomenology approach is the most appropriate way to develop an understanding of nurse practitioners' experience of appropriate and inappropriate prescribing and importance placed on a prescribing evaluation tool as interpreted by nurse practitioners who have lived the experience. An important component of Husserlian phenomenology is the belief that it is essential for the researcher to shed all prior personal knowledge to grasp the essential lived experiences of those being studied.

2.1 Participants

Participants in a Husserlian phenomenology study must have experienced the phenomenon and be able to articulate what it is like to have lived that experience[29] of using a medication evaluation tool in practice. Therefore, a purposive sample of nurse practitioners with prescriptive authority working with older adult care in the greater Halifax region and the wider area of Nova Scotia, Canada were asked to participant. Sampling continued until no new themes emerged, this occurred after eight interviews. All participants except one was female, experience as nurse practitioners with prescriptive authority ranged from 2 to 14 years. All of the nurse practitioners interviewed were primary healthcare practitioners, with seven of them currently working in community health centres and one in private practice supported by a health care team.

2.2 Interviews

Participants were first contacted by email to establish their interest in participating in the research. Positive responses were followed up with personal emails that included interview details and requesting that the participant identify a date and time suitable to carry out a telephone interview. Telephone interviews were necessary because of the diverse geographical location of participants across the state of Nova Scotia, Canada and the time frame available to the researcher to collect the data. Interviews followed a structured process to ensure appropriate structure and accurate preparation for the interviews, the process was divided into three: a) before, b) during and c) after the interview, details of which are set out in Table 1.

Table 1. Telephone interview protocol

Before the interview
• Appropriate information was communicated to the potential participant and questions answered.
• Interviews were scheduled with free time allocated by the researcher prior to and after the interview to accommodate any last minute change to arrangements because of clinical commitments or interruptions.
• The interview protocol was pre-tested.
• Audiotaping techniques were predetermined and tested.
• Appropriate time was allocated for introductions and study overview.
• Confidentiality was assured.
• Results would be sent to each individual participant via email on completion.
• Finally the process was piloted with a research student to ensure the process was smooth, and there were no technical problems.
During the interview
• Interview style was clearly identified.
• Initial conversation was light to encourage the participant to relax. Introductions including career background, education and clinical interests of the researcher were discussed. An overview of the study was given and an explanation of how the present research contributes overall. Confidentiality was also reinforced.
• Interview questions were structured to vary and allow for the participants opinion.
• Themes of interest identified in earlier interviews informed the schedule in later interviews.
• At the end of each interview any issues concerning information for a particular question was addressed with the participant and clarification or explanations sought regarding terminology etc. before moving forward.
After the interview
• Each interview was transcribed immediately following the interview while the researcher was still immersed in the essence of the interview.
• Ample time was allocated for analysis.
• Interviewees agreed to be contacted should validation of any issues in the interview transcripts be deemed necessary.

2.3 Data collection

Before the interview process commenced, research participants were given the opportunity to ask the researcher questions regarding the study. Verbal consent was obtained and the possibility of re-negotiating consent was also discussed. Confidentiality was assured and the right to withdraw at any time during the investigation, without prejudice, was guaranteed.

Interviews were conducted by telephone with each practitioner for approximately 25-35 mins. A predetermined set of open questions were used to maintain focus on appropriate and inappropriate prescribing and the value of using a prescription evaluation tool. This topic guide was developed by the author for a previous study using STOPP/START and piloted to ensure the guide maintained focus on appropriate and inappropriate prescribing. This structure provided an outline for the interview however, additional questions were allowed to emerge naturally from the dialogue. Due to the lack of visual cues the researcher took notes as a reminder of the non-verbal communication such as pauses or hesitations that took place during the interview to facilitate transcription.

The interviews were digitally recorded and transcribed immediately following the interview to ensure the experience as described by the participant was accurately captured. Using the telephone for data collection interviews may also reduce some forms of response bias (facial expressions) as the interviewer and participant are potentially less affected by each other's presence. This, in turn, may increase the level of comfort for both parties and result in a more relaxed interview.[30]

2.4 Ethical considerations

A research proposal was submitted and approved by the Clinical Research Ethics Committee of the Cork Teaching Hospitals and University College Cork to undertake the research.

2.5 Data analysis

Data analysis was carried out using Colaizzi's (1978) Procedural Steps[31] which provided a framework in keeping with phenomenological research. Meaning statements were clustered into common themes and again referred back to the original commentary for validation, thus ensuring that only the participant's perception was captured.

In following the principles of data reduction all themes were included until a textural-structural description of the experiences of the nurse prescribers as a whole was obtained. It was necessary to recognise overlapping themes and clarify others that were ambiguous by bringing them back to the participant for validation or further elaboration, when necessary. In doing this, the interpretive research moved back and forth between two worlds: that of the understanding and resourceful dwelling of the participants, and the distancing and questioning world of the researcher. Through analyses and interaction with the data, it is hoped to progress beyond the common sense understanding of the participants' experience in the situation under study to a level of interpretation and critique.[32]

3. Results

Following analysis of the narrative data, findings were grouped under the following headings for reporting:

- Level of confidence and competence described by nurse practitioners in their role as prescriber.
- Understanding and consequences of inappropriate prescribing.
- The role screening tools play in prescribing for older people.

3.1 Confidence and competence

Participants acknowledged that having prescribing rights had improved their self-esteem, and autonomy in practice. When asked specifically to rate their confidence in prescribing on a scale of 1-10, 1 being the least and 10 the most confident the majority of participants rated themselves between 8 and 10. These participants were well established having the most experience in their specialty area, kept up to date and understood their professional boundaries. However, one participant did not share this view awarding themselves a 6. This participant had the least experience and attributed this to not having had the opportunity to prescribe as part of the education process.

> "You know I found when you get in a course you can teach about the disease and learn about a particular drug but we don't know how to prescribe or how to titrate or discontinue it (medication) really I find you learn by using the drug or talking to colleagues…I didn't know how to, start it (prescribing) and I always 'start low and go slow'. But what is low and what is slow?" (Participant 2)

Additional, issues concerning confidence and competence surfaced when asked if there was anything they should know more about when prescribing for older adults. CPD was identified by all participants as important to maintain awareness of medication issues and better placing them to question or challenge medication changes or adjustments required.

> "I won't prescribe anything new unless I have absolute understanding of what patients

are on and taking in addition, like herbal over the counter or any complementary therapies... because a lot of them don't even think that an enteric coated aspirin they take for heart disease is even a medication because they don't get a prescription for it... patients adding over the counter medications can be a big problem." (Participant 7)

Accurate assessment was also identified as important for competent prescribing. However, several participants highlighted that developing nursing expertise in a particular area can focus your knowledge so finely that limitations can occur.

"I'm comfortable assessing my patients, my background is renal but my patients don't just come with renal problems they have vascular problems, diabetes the whole list. I'm not an expert in some of those other areas." (Participant 6)

Participants felt that their role was not to primarily generate prescriptions instead they were keen to communication and interact with patients as part of an accurate assessment and competent prescribing process. Understanding the characteristics of the patient's requirements, strengths and weaknesses that facilitated a more holistic approach to prescribing was identified as important.

"Having a conversation is important because you can have patients with strange reactions to their medicines and if you don't explore it properly you won't know. I find that sometimes the gaps I identify during conversation give me the most information." (Participant 7)

3.2 Understanding and consequences of inappropriate prescribing

The level of understanding regarding inappropriate prescribing was broad and has been condensed into the main areas identified in Table 2.

Table 2. Description of inappropriate prescribing

1)	Medications not appropriate for the client in terms of diagnosis or health status at the moment.
2)	Prescribing without a good cause or reason.
3)	Making a choice of medications for patients that either don't follow best practice or are not in the patient's best interest.
4)	Prescribing outside my scope of practice. Wrong dose for the wrong patient.
5)	Medications prescribed that are not clinically relevant.
6)	Prescribing something that is not based on evidence based rationale from a clinical assessment point of view that fits the actual condition.
7)	Prescribing a medication that may not be warranted or effective.
8)	Wrong medication for the wrong patient.

Although not referred to directly prescribing by omission was addressed indirectly when answering questions.

It is an established fact that medication use increases with advancing age. This in turn requires that prescribing for older people represents a range of options and values that attempt to optimize prescribing quality for individual patients.

"Prescribers do not use frailty as a predictor when prescribing. A lot of the medication of older folk are family driven because they want Mom or Dad or whoever to have the same level of care that they have not recognising the physiological changes that occur with aging may not make those medications appropriate." (Participant 4)

Also depending on the level of care, therapies can be viewed from different perspectives.

"Sometimes treatment in hospitals would be a little more aggressive than what we would consider appropriate in primary care." (Participant 7)

All participants identified they had a substantial role to ensure medicines were appropriate. Specifically, interactive approaches were used to combat problems.

"I have a direct involvement because I am educating the residents myself and nursing staff plus allied staff. I also review charts as part of the process." (Participant 4)

"I have direct involvement in making sure medications are appropriate we do hundreds of med reviews every year and we do med reconciliation also. I explain to the families and staff the physical and medications review results." (Participant 3)

Participants linked proper assessment to appropriate prescribing through individualised care assessment thereby, ensuring the drug–patient interaction is implicitly included in the prescriptive process.

> "I've seen families who were primary care givers for older adults struggling to manage with what appeared to be deteriorating conditions which were actually side effects of medications when assessed." (Participant 7)

Several characteristics of ageing and geriatric medicine affect medication prescribing for older adult people and render the selection of appropriate pharmacotherapy a challenging and complex process that may not result in the desired effect.

> "I really don't think there is a black and white answer to prescribing sometimes the patient does not keep up to date with the changes to medications it's not always about the medicines sometimes its human error that causes the problems. We try to do our best, but sometimes problems just happen." (Participant 4)

Inappropriate prescribing remains a problem in day-to-day practice and despite increased awareness the dynamic nature of the problem requires updating solutions that address constant changing patterns.

> "I try to focus on what I do well. . . and individualise care to reduce risk." (Participant 6)

For prescribing in general it is important that the patient has trust in the prescriber. Trust is also essential for establishing collegial relationships with other healthcare professionals and patients.

> "There is human error in everything we do. What people deserve to know is whether it was an error or an omission and the biggest thing people want to know is what are we going to do differently, or if we are going to do anything differently. That's how we tend to manage most everything here." (Participant 5)

Participants were confident that the consequences of inappropriate prescribing could be addressed.

> "I think it would be education for all involved but there is a barrier to that because it costs money." (Participant 2)

> "So in order to make change we really have to have a complete culture shift and make the prescribers and the whole system aware that seniors require unique care and they are uniquely different form the adult population when it comes to prescribing." (Participant 4)

> "I'm the only nurse practitioner within a huge facility (485 beds) in my opinion there is work for three in the facility then we could cover and support each other and share the workload and have cover at the weekends. Yes we need more prescribing nurse practitioners." (Participant 3)

> "Address polypharmacy we've been talking about it for years but we are only starting to take some action now." (Participant 1)

Polypharmacy was identified as very common among older adults and is often adopted as a strategy to address symptoms, reducing disease-related problems and improving quality of life in the older adult.

> "When we look at underlying causes for problematic symptoms it is sometimes due to too many drugs. We have to strip them back to the essential drugs so that the team can get in and treat the patient in a meaningful way." (Participant 5)

Polypharmacy may also be the result of patient and/or family assuming the role of prescriber.

> "If over the counter drugs are added (to the medication regime) the patients may present to us with problems that can be difficult to figure out. Education is important and even salads in the summer for someone on warfarin can cause problems." (Participant 8)

It is unrealistic to expect that the majority of clinicians have enough knowledge about drug-related appropriateness and interactions when prescribing for older people with multimorbidity to avoid errors. However, participants felt that they could err on the side of caution.

> "If there is ever a problem I write my cell number on all my prescriptions so if the pharmacist ever has a question they can contact me directly to discuss any possible error." (Participant 5)

The most effective benefits of prescriptive drug therapy for older adults can only be derived if drugs are prescribed and used appropriately. Participants voiced that combining expert opinions was also an option.

> ". . . attention to detail is required and if I have a problem I will take it to my collaborative practice partner to discuss. I work in a collaborative

> team so I don't work in isolation it's always good to have colleague around for advice." (Participant 6)

3.3 The role screening tools play in prescribing for older people

All participants had experience of using a prescribing appropriate evaluation tool and were familiar with the STOPP/START evaluation tool in particular.

> "I used the STOPP/START criteria in my work and clearly identified areas where there is inappropriate prescribing and the need for re-evaluation depending on the stage of life." (Participant 4)

Time appeared to be an issue when applying a screening tool with some participants identifying it as cumbersome to apply in the clinical setting. Many practical issues were raised.

> "I can really see the benefit of using a medication evaluation tool especially if we had the database that you (the researcher) use. It would save us time and we would get immediate results. Using STOPP/START and applying the criteria manually is just not practical." (Participant 3)

> "I think it would play an important role especially if the nurses and doctors were using the same computer based system. We would follow the same structure and have a better result for the patient using the evaluation tool." (Participant 2)

Participants' concerns regarding potential inappropriate prescribing (PIP) also extended to the management of patients' medications from the wider perspective of changing conditions to ensure medications prescribed remain appropriate.

> "I love the STOPP/START tool because the research is there in the literature and so easy to share the information and findings. They make us think about leaving people on medications for extended periods of time simply because they saw a cardiologist 15 years ago." (Participant 3)

Other participants could see possibilities beyond the initial identification of PIP.

> "They are not necessarily looking at just prescribing but gathering data on your patient about their diagnosis, past history, medications, lab tests and activities of daily living a concise history and assessment on each patent documented and easily accessible." (Participant 8)

4. Discussion

All participants were knowledgeable regarding inappropriate prescribing and had information about or worked with a prescribing evaluation tool in the past. As with previous research, participants highly rated the use of a prescribing medication evaluation tool, understanding that medication appropriateness can be measured by evaluating the content or quality of a prescribing decision and or the outcome of that decision.[33] Even though there was a number of prescribing evaluation tools available for detecting inappropriate prescribing, the participants had a very good working knowledge of the STOPP/START criteria. This was attributed to the ongoing research using the STOPP/START criteria undertaken by the Pharmacy Department in Dalhousie University, Halifax, in collaboration with the Pharmacy Department in University College Cork, Ireland.

All participants endorsed regular reviews of older adults prescriptions, a practice that is supported by the literature to reduce medications prescribed.[34] Nurse practitioners were aware of the issues surrounding the aging population in their region especially the growing number of older adults that face challenging treatment decisions. This trend makes it even more critical to develop interventions that can improve the decision-making process to ensure appropriate medications are prescribed.[35] In order to facilitate good decision making and depending on cognitive awareness of patient's nurse practitioners included families when necessary through organised family conferences. Including the family in the assessment process opened communication to ensure that patients concerns and wishes regarding medications and treatments are elicited and understood. This is an important additional component of managing medications considering physicians' and patients' perspectives on treatment and associated decisions can sometimes differ. Such differences were identified by Kutner *et al.*[36] who recognised physicians rank co-morbid conditions and the medical literature as important factors in treatment decision-making, while patients rank family preference, family burden, and physician's opinion as important factors in making treatment decisions. Nurse practitioners with prescriptive authority are adequately placed in practice to promote informed treatment choices that are consistent with the patients' personal preference and based on informed decision making. Nonetheless, the balance is fine between medications that improve quality of life for the older adult and medication related problems that place them at risk[37] .

Nurse practitioners identified that selecting appropriate medications for use in older adult patients is often complicated by multiple illnesses and multiple medications. The potential is high for drug-drug and drug-disease interactions which the

nurse practitioner must bear in mind when choosing a medication or assessing its effectiveness or side effects.[38] The primary factor associated with medicine under use was a lack of health literacy concerning geriatric conditions in those caring for older adults' findings similar to Lang *et al.*[39] Even though participants indicated that specialisation improved their knowledge, it was focused on a specific condition or system depending on nurse practitioners area of expertise. This posed a considerable challenge for nurse practitioners, because patients who usually presented with problems require a wider understanding of individual diagnosis and differential diagnosis in order to make appropriate medication decisions for them. To ensure patients with multiple problems were appropriately assessed the nurse prescriber utilised the expertise of the multidisciplinary team which according to the literature "utilises individuals from different disciplines working in a team toward a common goal".[40] Internationally such collaboration has led to improved client outcomes such as decreased hospital admissions and timely interventions for older adults.[41,42] However, participants also expressed the importance of combining multidisciplinary care with a medication evaluation tool especially STOPP/START was significant because of its correlation with adverse drug events (ADEs).[43]

Much attention has been paid to over-prescribing for older adults nonetheless participants recognised that under-prescribing of appropriate medications was also a concern. This is a seriously misdirected practice according to Rochon[44] (2015) because seeking to simply limit the overall number of drugs prescribed to older adults in the name of improving quality of care is incorrect practice. Therefore, a medication evaluation tool used in practice needs to encompass the appropriateness of prescribing which according to Spinewine *et al.*[45] embraces three values: 1) the preferences of the patient; 2) the scientific and technical rationale of prescribing; and 3) the interests of the community. However, quantifying what the patient wants and serving the best interests of the community can be quite challenging as they can be influenced by societal, economic and family factors.[46]

The literature reveals that numerous studies using STOPP/START criteria have been conducted in various patient-care settings to assess prescribing appropriateness.[47–52] However, when using a prescribing evaluation tool, it is important to consider that explicit criteria such as that of STOPP/START do not take into account all factors that define high quality health care for the individuals. The START screening tool for potential prescribing omissions (PPOs) does not allow for factors such as life expectancy, time needed to derive clinical benefit and patient preference as legitimate reasons for under-prescribing.[45] It is the nurse practitioners responsibility to understand the burden of comorbid disease and patient preference which are then taken into account and required to reconcile decisions with the evaluation tool. Applying the STOPP/START evaluation tool may require flexibility, in some cases, what is considered inappropriate according to STOPP/START may not be appropriate for an individual patient for various reasons.[53] To address this, guidelines accompanying the STOPP/START evaluation tool clearly state that the tool does not replace the clinical judgment of the prescriber.[50] There were however, concerns expressed about inconsistent implementations of the evaluation tools and the time required to evaluate patient's medications. According to Ryan *et al.*[48] this issue was recognised by the research group in the School of Pharmacy, University College Cork and University Hospital Cork who began developing a database to facilitate the use of STOPP/START criteria in day-to-day clinical practice. Furthermore, in 2013 the research group was funded to develop a Software ENgine for the Assessment & optimization of drug and non-drug Therapy in Older peRsons (SENATOR) a highly-powered and efficient software engine capable of individually screening the clinical status and pharmacological and non-pharmacological therapy of older adults with multimorbidity. The significance of this software to nurse practitioner and other prescribers is that it can define optimal drug therapy, highlight adverse drug reaction risk, indicate best value drug brand for selection and provide advice on appropriate non-pharmacological therapy. A very valuable tool considering the majority of older adults with multimorbidity are managed by healthcare professionals that are not specially trained in geriatric medicine and rehabilitation and may not have access to a geriatrician or specialised nurse practitioner to help with assessments.

In this study, nurse practitioners' knowledge and experience was recognised by senior doctors as supportive within their practices. In addition, the value of nurse practitioners was also considered important because of connection with a range of services and clinical networks that have been emphasised in the literature as primary, speciality and acute services.[54] Participants in this study did not take for granted the referring diagnosis of the GP or hospital department but showed initiative and integrity and acted on their advanced knowledge and experience to independently assess their patients. The nurse practitioner then had the confidence and ability to bring a range of clinicians together to develop a package of care that was focussed on the individual patient needs. Utilising this approach helps the nurse practitioner to look beyond the initial clinical problems that presented to focus on the more holistic plan of care for each patient and provide staff with support and motivation.[55] However, building

such an integral service required healthcare professionals to broaden their professional standards. This process requires training, discussion, collaboration, and a shared assessment and treatment plan.[56] The fact that the nurse practitioners mentor and are champions for change within organisations is significant for the future development of best practice in elderly care.

The importance of continuing professional development (CPD) and remaining up to date was and issue identified by all participants that required additional support. Positive comments were tempered with a belief that too many demands placed on the nurse practitioner encroach unacceptably on the opportunity to undertake CPD. Specifically, heavy workload and absence of colleagues to cover the work (backfill) prevent uptake of CPD, issues already identified in the literature.[57] Whilst it was acknowledged that a certain amount of learning was achieved "on the job", it was repeatedly put forward in the interviews that formal education and training was necessary to supplement and enhance such learning. Considering the predicted changes of increasing complexity in elderly care[58] it is essential that nurse practitioners engage with CPD and are supported throughout their careers to maintain and develop the knowledge and skills to respond effectively to the needs of patients, service users and the wider public.[59] Especially when viewed in the context of changing demographic patterns of disease in countries across the world and the subsequent impact on health service delivery, preparatory education can only ever be an initial grounding for nurse practitioners.

Limitations

This study has the limitations specifically related to the use of the qualitative methodology. Among its limitations is the low number and source of the participants drawn from a specific area in Canada, who are not necessarily representative of all Canadian nurse practitioners, restricting the study's generalisation to other areas or countries. In addition, recruitment of participants for this study was the responsibility of the senior nurse practitioner for the Nova Scotia Region, Canada. All of the participants had previously heard about STOPP/START criteria, because of involvement with research in the clinical practice, which is not representative of the general nurse practitioner population. The sample size of eight although small is acceptable for qualitative research and reached saturation point.

5. Conclusion

Nurse practitioners have derived both personal and professional benefits from prescribing and feel better equipped to make decisions and challenge changes if necessary. The potential for prescribing nurse practitioners to contribute positively to address the issues with increasing healthcare demands and associated problems and to improve quality of care in the Canadian health system is substantial given their understanding regarding appropriate and inappropriate medication management.

Nurse practitioners in Nova Scotia, Canada are both competent and confident prescribers and have integrated prescribing effectively within their respective roles. In addition, recognition of their role and contribution to the wider healthcare team is acknowledged but there are still some cautious responses from a number of doctors in practice. Another tangible issues identified is the importance and support required for ongoing CPD. More specifically CPD was identified as a substantial prerequisite for maintaining knowledge and keeping up-to-date with the ever changing pharmaceutical industry and medications available in practice. Management strategies employed in practice were communication, collaboration and collegial relationships to effectively safeguard medications prescribed and reviewed as appropriate for the older adult population. However, the issues surrounding the consequences of inappropriate prescribing were more complex requiring an organisational approach to the interactive management of medications prescribed and reviewed to ensure maximum benefit.

Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

References

[1] Worster A, *et al.* Understanding the role of the nurse practitioner in Canada. Canadian Journal of Rural Medicine. 2005; 10(2): 89-91. PMid:15842791

[2] DiCenso A, *et al.* Report on the Integration of Primary Health Care Nurse Practitioners into the Province of Ontario. Toronto, ON: Ministry of Health and Long-Term Care. 2003.

[3] DiCenso A, *et al*. Primary health care nurse practitioners in Canada, Contemporary Nurse. 2007; 26(1): 104-115. PMid:18041990 http://dx.doi.org/10.5172/conu.2007.26.1.104

[4] McIntosh E, *et al.* Financially viable nurse-managed centres. The Nurse Practitioner. 2003; 28(3): 46-51. http://dx.doi.org/10.1097/00006205-200303000-00009

[5] Schober, Affara. Advanced Practice Nursing. Blackwell Publishing Oxford UK. 2006.

[6] Donald F, *et al.* The Primary Healthcare Nurse Practitioner Role in Canada. Nursing Leadership. 2010; 23(Special Issue): 88-113. http://dx.doi.org/10.12927/cjnl.2013.22271

[7] Gould O, *et al.* Nurse Practitioners in Canada: Beginnings, Benefits, and Barriers. Journal of the American Academy of Nurse Practitioners. 2007; 19(4): 165-71. PMid:17430537 http://dx.doi.org/10.1111/j.1745-7599.2007.00210.x

[8] Esmail N. Canada's physician supply. Fraser Forum March/April 2011. 2011.

[9] Latter S, Courtenay M. Effectiveness of nurse prescribing: a review of the literature. Journal of Clinical Nursing. 2004; 13: 26-32. PMid:14687290 http://dx.doi.org/10.1046/j.1365-2702.2003.00839.x

[10] Kaplan L, Brown M. What is "true" professional autonomy? The Nurse Practitioner. 2006; 31(3): 37. http://dx.doi.org/10.1097/00006205-200603000-00010

[11] Forchuk C, Khor R. Prescriptive authority for nurses: the Canadian perspective. Perspectives in Psychiatric Care. 2009; 45(1): 3-8. PMid:19154247 http://dx.doi.org/10.1111/j.1744-6163.2009.00194.x

[12] Jehan W, Nelson C. Advanced primary nursing: Liberating the talents. Nursing Management. 2006; 12(9): 20-23. PMid:16475535 http://dx.doi.org/10.7748/nm2006.02.12.9.20.c2042

[13] Stolee, *et al.* Advanced primary nursing: Liberating the talent. Nursing Management. 2006; 12: 20-23.

[14] Health Service Executive. Guiding Framework for the Implementation of Nurse and Midwifery Prescribing in Ireland. In: CHILDREN, D. O. D. A. (ed.). Dublin. 2008.

[15] Barry M, *et al.* Projecting the Impact of Demographic Change on the Demand for and Delivery of Health Care in Ireland. The Economic and Social Research Institute. Dublin. 2009.

[16] Gallagher P, Ryan C, Byrne S, *et al.* STOPP (Screening Tool of Older Persons Prescriptions) and START (Screening Tool to Alert doctors to Right Treatment): Consensus validation. Int J Clin Pharmacol Ther. 2008; 46(2): 72-83. http://dx.doi.org/10.5414/CPP46072

[17] Sitar D, *et al.* Prescribing pattern for elderly community-dwelling heavy medicinal drug users in Manitoba, Canada and Jamtland, Sweden. J Clin Epidemiol. 1995; 48(6): 825-31. http://dx.doi.org/10.1016/0895-4356(94)00189-W

[18] Beer M, Ouslander J, Rollingher I, *et al.* Explicit criteria for determining inappropriate medication use in nursing home residents. Arch Intern Med. 1991; 151: 1825-32. http://dx.doi.org/10.1001/archinte.1991.00400090107019

[19] Cantrill J, Sibbald B, Buetow S. Indicators of the appropriateness of long term prescribing in general practice in the United Kingdom: consensus development, face and content validity, feasibility and reliability. Qual Health Care. 1998; 7: 130-135. http://dx.doi.org/10.1136/qshc.7.3.130

[20] Canadian Institute of Health Information. Health Indicators. 2013.

[21] Canadian Institution of Health Research. Personalised Medicine. 2014.

[22] Lowe G, *et al.* Time to clarify-the value of advancing practice nursing roles in health care. Journal of advanced Nursing Practice. 2012; 68(3): 677-685. PMid:21790738 http://dx.doi.org/10.1111/j.1365-2648.2011.05790.x

[23] Snowden A, Martin CR. Mental health nurse prescribing: A difficult pill to swallow? Journal of Psychiatric & Mental Health Nursing. 2010; 17: 543-553. PMid:20633082 http://dx.doi.org/10.1111/j.1365-2850.2010.01561.x

[24] Courtenay M, Carey N, Stenner K, *et al.* Patients' views of Nurse prescribing: effects on care, concordance and medicine taking. The British Journal of Dermatology. 2011; 164: 396-401. PMid:21054336 http://dx.doi.org/10.1111/j.1365-2133.2010.10119.x

[25] Bowskill D, Timmons S, James V. How do nurse prescribers integrate prescribing in practice: case studies in primary and secondary care. Journal of Clinical Nursing. 2012; 22: 2077-2086. PMid:23186080 http://dx.doi.org/10.1111/j.1365-2702.2012.04338.x

[26] Latter S, Smith A, Blenkinsopp A, *et al.* Are nurse and pharmacist independent prescribers making clinically appropriate prescribing decisions? An analysis of consultations. Journal of Health Services Research & Policy. 2012; 17: 149-156. PMid:22734082 http://dx.doi.org/10.1258/jhsrp.2012.011090

[27] Ben Natan M, Kabaha A, Jackob N, *et al.* The attitudes of patients with chronic conditions towards nurse prescribing medications. International Nursing Review. 2013; 60: 469-476. PMid:24251939 http://dx.doi.org/10.1111/inr.12043

[28] Wilson J, Bunnell T. A review of the merits of the nurse practitioner role. Nursing Standard. 2007; 21(18): 35-40. PMid:17256666 http://dx.doi.org/10.7748/ns2007.01.21.18.35.c6398

[29] Lopez K, Wills D. Descriptive versus interpretive phenomenology: their contributions to nursing knowledge. Qual Health Res. 2004; 14(5): 726-35. PMid:15107174 http://dx.doi.org/10.1177/1049732304263638

[30] Smith EM. Telephone interviewing in healthcare research: Summary of the evidence. Nurse Researcher. 2005; 12(3): 32-41. http://dx.doi.org/10.7748/nr2005.01.12.3.32.c5946

[31] Colaizzi PF. Psychological research as the phenomenologist views it. In: Valle. RS, King M (eds.) Existential phenomenological alternatives for psychology. New York.: Oxford University Press; 1978.

[32] Benner P. Interpretive phenomenology: Embodiment, caring, and ethics in health and illness. Thousand Oaks, CA: Sage Publications; 1994.

[33] O'Connor M, Gallagher P, O'Mahony D. Inappropriate Prescribing. Drugs Aging. 2012; 29(6): 437-452. PMid:22642779 http://dx.doi.org/10.2165/11632610-000000000-00000

[34] Loganathan M, Singh S, Franklin B, *et al.* Interventions to optimise prescribing in care homes: Systematic review. Age Ageing. 2011; 40: 150-62.

[35] Tariman J, Berry D, Cochrane B, *et al.* Physician, Patient and Contextual Factors Affecting Treatment Decisions in Older Adults with Cancer: A Literature Review. Oncol Nurs Forum. 2012; 39(1): E70-E83. PMid:22201670 http://dx.doi.org/10.1188/12.ONF.E70-E83

[36] Kutner J, Vu K, Prindiville S, *et al.* Patient age and cancer treatment decisions. Patient and physician views. Cancer Pract. 2000; 8(3): 114-119. http://dx.doi.org/10.1046/j.1523-5394.2000.83004.x

[37] Rocchiccioli J, Sanford J, Caplinger B. Polymedicine and Aging: Enhancing Older Adult Care Through Advanced Practitioners. Journal of Gerontological Nursing. 2007; 33(7): 19-24. PMid:17672165

[38] Herr K. Chronic pain in the older patient: Management strategies. Journal of Gerontological Nursing. 2002; 28(2): 28-34. http://dx.doi.org/10.3928/0098-9134-20020201-08

[39] Lang P, Hasso Y, Drame M, *et al.* Potentially inappropriate prescribing including under-use amongst older patients with cognitive or psychiatric co-morbidities. Age and Ageing. 2010; 39: 373-381. PMid:20378571 http://dx.doi.org/10.1093/ageing/afq031

[40] Thylefors I, Persson O, Hellstrom D. Team types, perceived efficiency and team climate in Swedish cross-professional teamwork. Journal of Interprofessional Care. 2005; 19: 112-114. PMid:15823885 http://dx.doi.org/10.1080/13561820400024159

[41] Arbon P, Bail K, Eggert M, *et al.* Reporting a research project on the potential of aged care in the Australian Capital Territory. Journal of Clinical Nursing. 2008; 18: 155-162.

[42] HSE. Cost of Care in Approved Facilities. Department of Health, Dublin Press. 2010. Available from:

http://www.hse.ie/eng/services/Find_a_Service/Older_People_Services/nhss/costs.html

[43] Hamilton H, Gallagher P, Ryan C, *et al.* Potentially inappropriate medications defined by STOPP criteria and the risk of adverse drug events in older hospitalized patients. Arch Intern Med. 2015; 171: 1013-19.

[44] Tochon P. Drug prescribing for older adults. 2015. Available from: http://www.uptodate.com/contents/drug-prescribing-for-older-adults

[45] Spinewine A, Schmader KE, Barber N, *et al.* Appropriate prescribing in elderly people: how well can it be measured and optimised? Lancet. 2007; 370: 173-184. http://dx.doi.org/10.1016/S0140-6736(07)61091-5

[46] Lam M, Cheung B. The use of STOPP/START criteria as a screening tool for assessing the appropriateness of medications in the elderly population. Expert Review of Clinical Pharmacology. 2012; 5(2): 187-97. PMid:22390561 http://dx.doi.org/10.1586/ecp.12.6

[47] Gallagher P, O'Mahony D. STOPP (Screening Tool of Older Persons' potentially inappropriate Prescriptions): Application to acutely ill elderly patients and comparison with Beers' criteria. Age & Ageing. 2008; 37(6): 673-679. PMid:18829684 http://dx.doi.org/10.1093/ageing/afn197

[48] Ryan C, O'Mahony D, Kennedy J, *et al.* Potentially inappropriate prescribing in an Irish elderly population in primary care. British Journal of Clinical Pharmacology. 2009; 68(6): 936-947. PMid:20002089 http://dx.doi.org/10.1111/j.1365-2125.2009.03531.x

[49] Cahir C, Fahey T, Teeling M, *et al.* Potentially inappropriate prescribing and cost outcomes for older people: A national population study. British Journal of Clinical Pharmacology. 2010; 69(5): 543-552. PMid:20573091 http://dx.doi.org/10.1111/j.1365-2125.2010.03628.x

[50] Gallagher P, Lang P, Cherubini A, *et al.* Prevalence of potentially inappropriate prescribing in an acutely ill population of older patients admitted to six European hospitals. European Journal of Clinical Pharmacology. 2011; 67(11): 1175-1188. PMid:21584788 http://dx.doi.org/10.1007/s00228-011-1061-0

[51] Ryan C, O'Mahony D, Kennedy J, *et al.* Potentially inappropriate prescribing in older residents in Irish nursing homes. Age And Ageing. 2012; 42(1): 116-120. PMid:22832380 http://dx.doi.org/10.1093/ageing/afs068

[52] O'Sullivan D, O'Mahony D, Parsons C, *et al.* A Prevalence Study of Potentially Inappropriate Prescribing in Irish Long-Term Care Residents. Drugs & Aging. 2013; 30(1): 39-49. PMid:23229766 http://dx.doi.org/10.1007/s40266-012-0039-7

[53] Jansen P, Jacobus R. Clinical Pharmacology in Old Persons. Scientifica. 2012. PMid:24278735 http://dx.doi.org/10.6064/2012/723678

[54] Conger M, Plager KA. Advanced nursing practice in rural areas: Connectedness versus disconnectedness. Online Journal of Rural Nursing & Health Care. 2008; 8(1): 24-38.

[55] Garrubba M, Harris C, Melder A. Clinical Leadership: A literature review to investigate concepts, roles and relationships related to clinical leadership. Centre for Clinical Effectiveness, Southern Health, Melbourne, Australia. 2011.

[56] Veysey BM, Anderson R, Lewis L, *et al.* Integration of alcohol and other drug, trauma and mental health services'. Alcoholism Treatment Quarterly. 2005; 22(3-4): 19-39. http://dx.doi.org/10.1300/J020v22n03_02

[57] Gould O, Johnstone D, Wasylkiw L. Nurse Practitioners in Canada: Beginnings, Benefits, and Barriers. Journal of the American Academy of Nurse Practitioners. 2007; 19(4): 165-71. PMid:17430537 http://dx.doi.org/10.1111/j.1745-7599.2007.00210.x

[58] Canadian Nurses Association. Advanced Nursing practice A National Framework. 2008. Available from: https://www.cna-aiic.ca/~/media/cna/page-content/pdf-en/anp_national_framework_e.pdf

[59] McCormick R. The state of the nation in CPD: a literature review. The Curriculum Journal. 2010; 21(4): 395-412. http://dx.doi.org/10.1080/09585176.2010.529643