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**The competencies required by hospital doctors to care for
older adults**

Thesis presented by

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for the degree of

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Declaration

“This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism and intellectual property.”

Digital signature of the candidate:

A handwritten signature in black ink, appearing to be 'E. J. B.', is displayed on a light gray rectangular background.

List of Abbreviations

ACP- Advance Care Planning

AV- audiovisual

BNF- British National Formulary

CGA- Comprehensive geriatric Assessment

CLE- Clinical Learning Environment

ESP- Embedded Simulation Participants

FRAX- Fracture Risk Assessment Tool

FTP- File Transfer Protocol

GCM- Group Concept Mapping

HCP- Healthcare professional

HSE- Health Service Executive

IM- Internal Medicine

IMC- Irish Medical Council

MSc- Master of Sciences

MDS- Multidimensional scaling

NTS - Non- Technical Skills

NUIG- National University of Ireland, Galway

OSCE- Objective Structured Clinical Examination

PD- Parkinson's disease

PEARLS- Promoting Excellence And Reflective Learning in Simulation

RCDP- Rapid Cycle Deliberate Practice

RCPI- Royal College of Physicians Ireland

RCSI- Royal College of Surgeons Ireland

rTA- Reflexive Thematic Analysis

SBE- Simulation-based education

SHO- Senior House Officer

SMOTS- Scotia Medical Observation and Training System

SP- Simulated Participants

SSWHG – South/Southwest Hospital Group

TA- Thematic Analysis

TLT- Transformative learning theory

UHW- University Hospital Waterford

U.K – United Kingdom

U.S.A- United States of America

WICOPSIM- Waterford Integrated Care for Older People Simulation

QI- Quality Improvement

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Dedication

To Darragh

Research outputs

Conference presentations

- Buckley E, Barrett A, O' Tuathaigh C, Bennett D, Cooke J. *The Simulation Solution: Empowering Hospital Doctors To Care For Older Adults*. The European Geriatric Medicine Society (EuGMS) congress 2024 (poster presentation)
- Buckley E, Barrett A, O' Tuathaigh C, Bennett D, Cooke J. *The Simulation Solution: Empowering Hospital Doctors To Care For Older Adults*. Society for Simulation in Europe (SESAM) Annual Meeting June 2025 (oral presentation)
- Buckley E, Barrett A, O' Tuathaigh C, Bennett D, Cooke J. *Bridging the Gap: A Competency Framework for Hospital Doctors Caring for Older Adults*. Irish Gerontological Society Annual Meeting October 2024 (oral presentation)
- Buckley E, Bennett D, Barrett A, O' Tuathaigh C, Cooke J. *Geriatric Medicine Competencies Required By All Hospital Doctors Caring For Older Adults: A Scoping Review* British Geriatrics Society Spring Meeting 2024 (oral presentation)
- Buckley E, O' Tuathaigh C, Barrett A, Bennett D, Cooke J. *Competencies Required By All Hospital Doctors Caring for Older Adults: A Group Concept Mapping Study*. British Geriatrics Society Spring Meeting 2024 (poster presentation)
- Buckley E, Bennett D, Barrett A, O' Tuathaigh C, Cooke J. *Geriatric Medicine Competencies Required By All Hospital Doctors Caring For Older Adults: A Scoping Review*. Irish Network of Healthcare Educators Annual Meeting 2024 (oral presentation)
- Buckley E, O' Tuathaigh C, Barrett A, Bennett D, Cooke J. *Competencies Required By All Hospital Doctors Caring for Older Adults: A Group Concept Mapping Study*. University Hospital Waterford Research Day 2023 (poster presentation)
- Buckley E, Bennett D, Barrett A, O' Tuathaigh C, Cooke J. *Geriatric Medicine Competencies Required By All Hospital Doctors Caring For Older Adults: A Scoping Review*. Irish Gerontological Society Annual Meeting 2023 (poster presentation)

Awards

- Second place poster presentation at University Hospital Waterford Research Day 2023: Buckley E, O' Tuathaigh C, Barrett A, Bennett D, Cooke J *Competencies Required By All Hospital Doctors Caring for Older Adults: A Group Concept Mapping Study*

Invited presentations

- 'Simulation Applied-Gerontological Competencies For All' Royal College of Physicians of Ireland St Luke's Symposium Day: Evolution, Progress, Leadership and Practice - Empowering a Healthy Nation 2024
- 'Integrated Care: The Role of Simulation-Based Education' Royal College of Physicians of Ireland St Luke's Symposium: The Future of Healthcare Delivery 2022

Abstract

Background

The ageing population has created an escalating demand for age-attuned healthcare globally. Most older adults will now receive their care from doctors without specialist geriatric medicine training. Older adults are a distinctly heterogenous group with varying co-morbidities that can often present with atypical symptoms. This complexity can make the treatment of older adults challenging for doctors. Calls for integrating generalism into postgraduate training has been proposed as a potential solution. However, what exactly these generalist competencies remain unclear. Equally, how to deliver them in overburdened healthcare systems is also a concern as learning in the clinical learning environment is often hindered by competing demands. Studies suggest that using simulation-based education (SBE) to deliver these competencies may form part of the solution. The aim of this research programme was to determine what are the generalist competencies required by hospital doctors to care for older adults and the role of SBE to support the transformative learning of a subset of these competencies.

Methods

This research programme consisted of three interconnected studies using a mixed methods approach. The first study was a *scoping review*. We utilised the Arksey and O'Malley guidelines to determine the generalist competencies already identified in the literature for hospital doctors caring for older adults. To explore this further and determine which competencies should be prioritised we sought stakeholder input via a *group concept mapping* (GCM) study. We invited healthcare professionals from different disciplines and specialties to participate via a web-based platform.

Multidimensional scaling and hierarchical cluster analysis were utilised to analyse participants views and prioritise the identified competencies. The final study explored whether SBE could facilitate transformative learning of a subset of the identified generalist competencies. Guided by transformative learning theory (TLT), a SBE scenario focusing on the assessment and management of an older adult with delirium and Parkinson's disease was developed. Hospital doctors within a single hospital site were invited to participate in the simulation scenario, followed by an audio recorded

debrief and subsequent individual semi-structured interviews. Transcripts were analysed using reflexive thematic analysis.

Results

1.) Two hundred and two competencies within twenty-three competency domains were identified in the literature. The most common competency domains identified were medication management, cognitive impairment and chronic diseases and comorbidities management.

2.) Eighty-eight competencies within nine competency domains were generated in the GCM study. Generalist competencies pertaining to communication skills, medicolegal affairs and delirium were rated most important by participants.

3.) Nine SBE scenarios and debriefs were followed by nine individual semi-structured interviews. Four overarching themes reflecting various phases of TLT continuously arose: 1.) *'Creating a realistic challenge'*; 2.) *'Simulation as a catalyst for reflection'*; 3.) *'Planning for future'* and 4.) *A paradigm shift'*.

Conclusion

The rapidly ageing population indicates that older adult care will be delivered by doctors not specifically trained in geriatric medicine- particularly in the acute setting. This is a heterogeneous population with varying and complex needs. This research programme set out to describe the generalist competencies required by hospital doctors to care for older adults and explore how simulation-based education can facilitate the transformative learning of a subset of these competencies. The resulting competencies are numerous and variable reflecting the complexity and heterogeneity of the older adult population. Simulation-based education was presented as an educational initiative to deliver these competencies to all hospital doctors in a way that can facilitate transformative learning. We recommend that the competencies described in this research programme should undergo expert validation to develop an overarching competency framework for hospital doctors caring for older adults. Finally, efforts should focus on further verification and implementation of SBE as a transformative learning initiative for hospital doctors caring for older adults.

Chapter 1: Introduction

1.1 Overview

The increasingly ageing population indicates that older adult care will be provided by doctors who are not specifically trained in geriatric medicine. This is particularly the case in acute care settings where the extent to which hospital doctors are trained to care for older adults is variable. There is now an urgency to ensure all hospital doctors are prepared to care for older adults. Recently there has been increasing emphasis towards fostering doctors to be generalists (regardless of their chosen specialty) by adopting comprehensive and individualised approach to complex, multimorbid patients. The Health Foundation describes generalism as ‘a distinct paradigm of clinical practice which is at its root, a way of thinking and acting as a health professional and, more than that, a way of looking at the world’ (1). However, which generalist competencies they should develop to adequately care for older adults is unclear. Similarly, the most effective way to develop these competencies in an already overburdened healthcare service remains a challenge. Given the increasing number of older adults accessing acute healthcare services, the aim of this programme of research was to explore the generalist competencies required by hospital doctors to care for older adults and the role of simulation-based education to support the transformative learning of a specific subset of these competencies.

In this introductory chapter I will present an overview of our current understanding of the distinct challenges of an ageing population for the acute healthcare services as the setting for this research and the requirement for all hospital doctors to be able to care for older adults. I will then discuss the current landscape of medical education in the specific context of competency-based medical education as a means to define outcomes and design training to meet that need, followed by the requirement of generalist competencies for hospital doctors to care for older adults. I will then outline the development of competence through workplace learning, followed by exploring how specifically simulation-based education (SBE) can potentially support hospital doctors to develop competencies to care for older adults. Finally, I will present the research programme aims and design.

1.2 An ageing population

1.2.1 A globally ageing population and acute healthcare services

The global population is ageing rapidly with the number of adults aged 65 years old and older projected to increase from 761 million in 2021 to 1.6 billion in 2050 (2).

Furthermore, the number of adults aged 80 years and older worldwide is predicted to reach 426 million by 2050 (3). Older adults are the largest healthcare service users, accounting for a significant proportion of the patients in acute care (4-10). This presents a problem for hospital doctors who are not specifically trained to care for older adults.

1.2.2 The challenges facing hospital doctors in providing adequate care for older adults

1.2.2.1 Atypical older adult presentation to acute services

The increasing demand on capacity by the ageing population extends to most hospital specialties that maintain inpatient services. Older adults are somewhat arbitrarily defined as an adult aged 65 year old and older (11). However, there is significant variability in the ageing process between individuals resulting in a heterogeneous group, often with complex care needs differing from that of the general population. The healthcare requirements of a 65-year-old often varying significantly from that of an 85-year-old. This variability can lead to 'atypical' presentations to acute services including frailty, a decline in mobility and altered cognition (12-16). Inadequate knowledge and poor understanding of these distinct health conditions affecting old adults can lead to suboptimal care and undertreatment (17). Conversely, early identification and management can mitigate the risk of morbidity, reducing length of stay in hospital and ultimately improving older adult inpatient outcomes (18).

1.2.2.2 Increasing chronic disease prevalence and requirement for older adults to present to multiple specialties

As older adults live longer, the incidence of chronic diseases persists and disease prevalence has increased with this longevity (19). Multimorbidity is the co-existence of two or more chronic diseases (20). The prevalence of multimorbidity is 62% globally in older adults aged 65 to 74 year old (21). The accumulation of co-morbidities will mean that often older adults may attend multiple hospital doctors of differing specialties to treat each chronic disease. These hospital doctors may not be equipped or have had

the opportunity to develop the generalist competencies to adequately care for older adults.

1.2.2.3 Preparedness to care for older adults

It is unclear to what extent hospital doctors have been afforded the opportunity to develop competencies to care for older adults with some reporting insufficient training and lacking confidence to competently care for older adults in the acute setting (22-24). The integration of geriatric medicine competencies into already over-burdened postgraduate medical curricula presents a significant challenge for both postgraduate training bodies and hospital sites given the existing service demands and time constraints (25).

1.2.2.4 Inadequate specialist geriatric medicine workforce

The addition of geriatric medicine expertise into specialties such as emergency medicine, surgical specialties and oncology has led to significant decreases in mortality, healthcare expenditure and favourable patient outcomes (26-30). However, this care is often provided by healthcare professionals (HCP) including hospital doctors who have specialised in geriatric medicine. As the number of older adults presenting to acute care increases, older adult care will be provided by hospital doctors not specifically trained in geriatric medicine. This coupled with the decline in the number of hospital doctors specialising in geriatric medicine suggests it is integral that doctors within other specialties develop generalist competencies to care for older adults (31, 32).

1.3 Competency based medical education

A competency is an observable ability of a healthcare professional, integrating multiple components such as knowledge, skills, values, and attitudes (33). Competency-based medical education (CBME) is an outcomes-based approach to design, development, implementation, evaluation and assessment of education programmes centred around a dedicated competency framework (33). The origins of CBME began in the 1970s, however its utility was recognised in earnest by medical educators in the early 2000s (34, 35). The development of competency frameworks in Canada, Australia and the U.K have influenced postgraduate medical training around the world (36-40).

Competency-based medical education has been adopted internationally for several reasons. It recognises that each learner is an individual and may acquire competencies at a different pace, promoting the acquisition of knowledge, skills and attitudes over a flexible time period rather than the traditional view that working in a specific area over a defined time-period deems the learner to be competent in certain expertise (35, 41, 42). This ultimately encourages learners to take ownership of their own progress of designated competencies (35). Promoting the development of competencies encourages training programmes to develop definitive curricular outcomes that serve both the learner and the patient in real-world clinical practice rather than lists of knowledge, thereby fostering an environment where new knowledge and skills can be built on prior knowledge (34, 35).

In order for flexible learning to be managed in a clinical setting, a supervisor's role is altered from that of traditional teacher to a coach and mentor. Within flexible learning supervisors provide ongoing, specific feedback to guide the learner's progress. This can be monitored and managed through electronic portfolios and progress dashboards to ensure transparency in learner advancement.

For flexible learning within CBME to be successful, assessment can be continuously performed in the CLE. Progress can be evaluated through a number of methods within the CLE including:

- A structured conversation between the supervisor and trainee surrounding a patient case to explore clinical reasoning and decision-making e.g. case-based discussion.
- Assessment of a specific technical or non-technical skill e.g. direct observation of procedural skills.
- A supervisor observing an encounter between the learner and a patient and subsequently providing constructive feedback.

Flexible learning may be streamlined by developing blended and asynchronous learning models (e.g. pre-recorded lectures and interactive online cases), microlearning

modules and guided reflection and debriefing (e.g. in simulation-based teaching) alongside structured and focused clinical experience (e.g. bedside tutorials) (43-45).

Flexible learning can be managed by including a variety assessment methods to accommodate different learning approaches and to allow each learner to demonstrate competency outside of traditional assessment methods. These may include case presentations or reflective journals. At the beginning of a rotation, the supervisor and trainee should codesign a learning plan that integrates the rotation's core competencies with specific, measurable goals that align to the trainee's identified needs.

Given the multiple assessment methods and educational initiatives encompassed in flexible training, the struggling trainee can be identified through recurring patterns as opposed to an isolated event. Identification may be achieved by encouraging and expecting supervisors to consistently incorporate microteaching models e.g. one-minute preceptor (44) to detect any weaknesses. This combined with observing the trainee's performances in various assessment methods as well as their engagement in online modules may help to flag any issues. When remediation is required a supervisor should meet with the trainee as soon as possible and develop a formal remediation contract based on the previous individualised learning plan (46). This includes specific and time-fixed measurable goals (e.g. successfully take and present a history on patient with delirium incorporating the 4AT screening tool by week four) and specific directed activities e.g. complete two online modules on management of acute stroke by week three). A supervisor may provide dedicated and protected 1:1 teaching or arrange simulation-based education for practicing the required skills with the trainee. Any remediation should include continuous monitoring with frequent feedback to allow the trainee to progress towards the desired goals and competencies as outline in the remediation contract.

However, the implications of CBME are not fully understood (47) and it is not without potential pitfalls. Transitioning from the well-established time-based method to learners progressing at their own pace presents a challenge for learners and educators

and requires significant buy-in. Some reservations include the risk of reducing medical training to a series of ‘tick-box’ exercises and checklists rather than the immersive and experiential focused learning (33). Additionally, the success of CBME may be affected by lack of resources including technology as well as the requirement for educators to adopt new teaching strategies and assessments (33).

1.4 Generalism

1.4.1 What is generalism

A generalist is a doctor who adopts a holistic, personalised approach to complex, often multimorbid patients and are equipped to deliver comprehensive and equitable care for all patients including identifying undifferentiated symptoms, complex issues including multimorbidity, as well as situated and contextual issues (48). They consider other expertise and various knowledge forms, valuing collaboration with other healthcare professionals and the patient themselves to achieve solutions (48).

1.4.2 Generalism in postgraduate education

An emphasis on hospital doctors developing generalist specialties in postgraduate medical training is not new. In the United Kingdom, seven ‘Enhance’ trailblazer pilots have been developed to implement generalism into postgraduate education (49, 50). It is mandatory to rotate through a community or integrated placement for foundation year 2 trainees (51). While in Canada and the U.S.A it is mandatory for all doctors to display competence in generalist competencies regardless of subspecialisation (52, 53).

1.4.3 Generalism and geriatric medicine

The ageing population and with it their increasing complexity has been described as a catalyst for providing more generalist care with calls for integrating generalism into postgraduate training proposed as a potential solution (54-57). Generalists are holistic and focus on what matters most to patients now rather than their own specialist skills or preferred approach (48). In recognising this requirement for all doctors who care for older adults the concept of ‘Big G and little g’ has been proposed. Developed to address the increasing need for specialist geriatric medicine expertise ‘Big G’ represents the specialty of geriatric medicine. For these doctors developing competencies in the

management of an older adult with advanced dementia is essential. While ‘little g’ refers to the geriatric medicine competencies that all doctors regardless of speciality should develop to ensure the provision of adequate healthcare for older adults (58). For example, this includes generalist competencies such as the management of an older adult with delirium in the acute setting. A collaboration between American and Canadian geriatricians resulted in the development of the 5Ms framework (Mind, Mobility, Medications, Multicomplexity, and Matters Most) which provides a structured approach to assessing older adults for healthcare professionals not specifically trained in geriatric medicine (59). ‘Mind’ consists of competencies that address issues pertaining to cognitive impairment in older adults. ‘Mobility’ includes the assessment of gait, transfers, balance and performing activities of daily living. ‘Medications’ focuses on the optimisation of medications in older adults including deprescribing. ‘Multicomplexity’ addresses the relationship between multiple issues including functional, co-morbidities, and social conditions which may affect an older adult. ‘Matters most’ describes the significance of developing an understanding for and implementing the patient’s goals and values particularly in relation to shared-decision making. The goal of the 5Ms framework is to provide all HCPs with a framework to both recognise and address issues affecting each individual older adult as early as possible, augmenting patient outcomes.

Other postgraduate training curricula in the U.K, Australia, Canada and Ireland include competencies for caring for older adults such as medication management, bone health and falls assessment (60-68). However they vary, and it is unclear whether they include all generalist competencies required for hospital doctors to care for older adults.

1.5 Developing Competence through Workplace Learning

1.5.1 Workplace learning

Most postgraduate medical education for hospital doctors takes place through workplace learning (69-72). This can include ward rounds, clinics, emergency departments, and operating theatres. Learning can be derived from direct observation, interactive ward rounds and clinics, bedside tutorials and participating in clinics as well

as practice of technical (e.g. lumbar punctures) and non-technical skills (NTS) (e.g. communication with patients and care givers). This experiential learning within the clinical learning environment (CLE) is the cornerstone of learning for healthcare professionals with clinical knowledge, skills and attitudes progressively developed through a gradual increase in participation over time (73, 74). Workplace learning takes place in dynamic, multifaceted and often unstable and complex systems (75). While some formal educational processes are also usually in place, such as journal clubs and grand rounds, most workplace learning occurs through opportunistic clinical encounters (76). The clinical learning environment is complex entity that encapsulates the resources including materials, social, cultural and psychological context that form a doctor's professional development and ability to learn (77-79). However, not all CLEs are equal and therefore cannot effectively and consistently achieve the desired learning outcomes for doctors (80, 81). Each CLE is shaped by social factors such as individual participation, relationships with one another and the structuring of work as well as physical factors (82, 83) and its own learning and practice culture. All of these factors affect how doctors learn in the workplace (83).

Sociocultural theory proposes that learning is inherently a social rather than individual process, rooted in ongoing activities or practice, and the specific context in which it occurs (84). A number of sociocultural theories underpin our understanding of how CLEs support the development of competence in the workplace.

Communities of practice is a multifaceted theory that describes the activities of a group of people who come together in pursuit of a shared goal (85). It has also be described as not necessarily a group of people but rather 'socially configured spaces that necessarily involve learning as an aspect of membership' (86). Lave and Wenger initially suggested the concept of *legitimate peripheral participation* to describe how learners move from novices/peripheral members of a team to more central role by increasingly gaining responsibility and legitimacy within a learning environment through their behaviours and communication (90). For example, a hospital doctor who commences a geriatric medicine rotation may have limited experience in caring for older adults. At the beginning of the rotation the hospital doctor may observe how geriatricians and other members of the multidisciplinary team interact with patients.

They observe how each member contributes to patient care and how clinical decisions are reached. As the rotation continues the hospital doctors may gradually take on tasks of increasing complexity and receive constructive feedback and guidance on their work. By the end of the rotation, they may more actively participate in discussions around the care of the older adult by contributing opinions and seeking clarification and thereby actively engaging in the learning process. Through these processes doctors acquire the professional values and behaviours of the community of practice in which they are working - this would include a 'generalist' approach to practicing their specialty for example, if that was something the community was doing.

This concept has further evolved to *recognise the role of Knowledgeability*, highlighting that a learner can be aware of and participate in multiple communities' practices at once while not necessarily being competent in each (87). Members of a community can continuously learn through shared practices, experiences and knowledge (88). For example, a hospital doctor rotating through a geriatric medicine rotation will take part in multidisciplinary meeting for older adult patients involving geriatricians, physiotherapists, occupational therapists, nurses, social workers, pharmacist. These hospital doctors will ultimately learn how to manage a complex older adult patients. Each member contributes their expertise e.g. the pharmacist may advise on medication interactions. However, knowledge is also reciprocal. Although a new hospital doctor will learn from established multidisciplinary team members, they also bring their own experience and perspectives which can be beneficial for the entire group.

Using a **realist theory of supervised workplace learning**, Wiese et al. provided a framework for creating effective learning environments and for preparing supervisors and trainees for their respective roles and developing competence in workplace learning (89). They highlighted that the reciprocal - and often informal - nature of learning between supervision and a hospital doctors' active role in their learning process and fragmented working patterns can challenge supervisor-trainee interactions.

They described three processes that occur together between supervisors and trainees in the clinical learning environment including *Supervised Participation in Practice*, *Mutual Observation of Practice*, and *Dialogue About Practice*.

- *Supervised Participation in Practice* is underpinned by both entrustment ('to confide the care of a patient or the execution of a professional activity to a trainee' (90)) and support seeking ('trainees request help from a supervisor with the aim to gain advice, reassurance, direction or active input regarding patient care' (89)).
- *Mutual Observation of Practice* draws upon monitoring ('balancing the dual responsibility of training and patient care requires constant monitoring of the clinical situation and the trainee' (89)) and modelling ('when trainees observe the practice of any senior doctor and integrating those observed behaviours into their own practice with varying degrees of consciousness on the part of both the role model and the learner' (89)) and
- *Dialogue About Practice* consists of both meaning making (*dialogic process typically centred around patient care* (89)) and feedback (*information relating to trainees' performance that is intended to guide their future performance* (89)).

However the effect of these processes and underlying mechanisms on developing competence is shaped by a complex interplay of each individual, their working relationship and team dynamic, the clinical work and wider healthcare system (89).

Ultimately in postgraduate medical education most learning takes place through work - through a gradual increase in participation over time, entrustment, role modelling, dialogue and feedback. Crucially, a supportive and effective learning environment depends on supervisors and hospital doctors having sufficient time to work together to provide patient care and the how healthcare system factors can influence this (89). High workload, inadequate time and exposure with patients and supervisors can hinder competency development. In these circumstances, some areas of learning focused learning through other methods e.g. simulation-based education may be beneficial.

1.6 Developing Competence through Simulation Based Education

1.6.1 Definition

Simulation-based education as defined by Gaba is a technique-not a technology to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner (91). It offers a safe, controlled environment for doctors to refine their skills, make mistakes with limited consequences, and build confidence before engaging with real patients (92).

Simulation-based education enables learners to examine their actions in the scenario and make decisions on their actions in future clinical practice (93). The simulation cycle consists of three constant overarching components (prebrief, simulation scenario and debrief) that are carefully orchestrated by facilitators. When effectively executed and devised for the appropriate learning outcomes, the result can be a sustained effective, transformative, and positive learning experience for the learner (94-98).

1.6.2 Use of SBE in medical education

High volume workload and inadequate time and exposure with patients and supervisors hinders learning in the CLE (99). Where the opportunity for developing certain competencies doesn't exist SBE has been increasingly used to complement traditional educational initiatives, enhancing interdisciplinary teamwork, communication, and error-recovery practices (100). Simulation-based education is diverse and can be incorporated to enhance both technical and non-technical skills required by hospital doctors. Participating in SBE has shown to be beneficial to hospital doctors for several reasons. Simulation-based education has long been integrated into procedural-based specialties to enhance technical skills including surgical, obstetrics and gynaecological, emergency medicine and anaesthetics training, often forming part of their core training (101-105). In the U.K, SBE has been highlighted as an integral component of not only postgraduate surgical but also core medical training by enhancing learning of evidence based care and thereby improving patient health outcomes (106, 107). Simulation-based education is now mandated for hospital

doctors training in internal medicine (IM) with increasing evidence that both junior and senior internal medicine doctors in core medical training benefit from practice of procedures (108-111).

Non-technical skills refer to the cognitive, social, and personal skills required by healthcare professionals which underpin successful teamwork, decision-making, and situational awareness in complex and dynamic healthcare environments (112). Inadequate NTS amongst HCPs significantly contribute to adverse medical events (113, 114) with sufficient NTS considered essential to provide high quality healthcare including improving interdisciplinary relationships, communication skills and ultimately resulting in improved patient outcomes (115-117). Simulation-based education is increasingly used to develop the 'non-technical' skills of hospital doctors particularly within surgical specialties and anaesthetics, improving teamwork and technical skills (118-120). Hospital specialties that encompass a large proportion of non-technical skills including communication, teamwork and collaboration e.g. psychiatry and geriatric medicine have also begun to utilise SBE thereby fostering comprehensive patient-centred care, knowledge acquisition, critical self-reflection, flexible problem-solving, emotional awareness and understanding (121, 122). Although limited, studies utilising SBE in geriatric medicine have suggested doctors found it an effective modality to develop NTS such as communication, situational awareness and teamwork. This is particularly the case in topics that they do not receive formal education in such as end-of-life care and continence care (123, 124).

1.6.3 Psychological safety

The culture of the learning environment is a crucial factor in optimising this learning; in order for these theories of learning to be reified in practice, psychological safety is the critical element common to all. Psychological safety is the perception of members of the team (i.e. learners) that the environment and the people in it are a safe zone to ask questions, provide support and that errors will be considered learning opportunities rather than causing embarrassment or punitive consequences (45, 125, 126). This can range from voicing concerns, asking questions, open communication and requesting feedback (38). The extent to which psychological safety is achieved can enhance or hinder a learning experience. A supportive clinical environment can link the theoretical

aspect of knowledge with clinical experience and enhance the possibility of achieving learning outcomes (127). In a psychologically safe learning environment hospital doctors will be empowered to voice their opinion, ask questions, reflect on their own clinical performance and trial new skills without fear of negative consequences or judgement.

1.6.4 Learning theory and simulation-based education

Not all SBE scenarios are designed with a theory in mind. A large proportion of SBE research studies do not incorporate any learning theory (128). When used effectively a learning theory provides a framework to support instructional design by explaining the effectiveness of specific teaching methods under various circumstances (128).

Simulation-based education draws upon a number of different learning theories that can be utilised individually or drawn together. Transformative learning theory (TLT) in particular has already been successfully applied in undergraduate medical and pharmacy education to demonstrate that exposure to NTS and interprofessional training in SBE can positively impact the learning of medical and pharmacy students resulting in the cognitive phases of transformative learning (94, 129).

1.6.4.1 *Transformative learning theory*

Transformative learning theory conceptualised by Jack Mezirow proposes that an adult learner's experience may challenge their current beliefs and understanding of the world, encourage reflection and impact on their future actions (130, 131).

Transformative learning theory is grounded in constructivism i.e. the idea that individuals draw upon past experiences to construct new meaning for experiences, facilitating learning, and greater self-understanding, and in the process, transforming personal paradigms (132). Mezirow focuses on critical reflection including aspects such as recognition of dissatisfaction, exploration of alternatives, plan for action, acquisition of new knowledge, experimentation of new roles, competence building, and reintegration of new perspectives into one's life (133). Ultimately Mezirow proposed that the process of transformative learning took place within ten steps including: (i) a disorienting dilemma; (ii) self-examination; (iii) critical assessment; (iv) recognition; (v)

exploration; (vi) plan of action; (vii) acquisition of knowledge and skills; (viii) developing new roles (ix) build competence and self-confidence; and (x) reintegration (134, 135). For hospital doctors this may involve having a clinical experience with a patient that challenged prior assumptions of clinical knowledge and/or skills. This prompts a critical reflection of these assumptions, followed by a discussion with peers and recognising that they too may have had a similar experience. This leads to the development of a new perspective and prompts exploration of how to approach future similar encounters with regards to their role and potential actions. Hospital doctors subsequently develop a plan and acquire new knowledge and skills through accessing relevant resources to trial this new approach. Hospital doctors subsequently change their approach when faced with a similar clinical experience and overtime confidently execute this new approach. Finally, this new approach and perspective is integrated continuously into their subsequent clinical scenarios.

1.6.5 Geriatric medicine competencies developed using SBE

Although limited, there is some evidence to suggest that SBE may be beneficial for doctors not specifically trained in geriatric medicine to develop competencies to care for older adults. Studies proposed that SBE has shown promise in developing competencies in domains like advance care planning (ACP), dementia, delirium, palliative care, communication skills, medication management and multimorbidity in relation to older adult care (136-141). However, although promising, evidence is limited as a complete description of the methods used are incomplete and outcome measurements are generally confined reaction and knowledge (136-141). They also varied significantly in study design with most lacking a comprehensive description of the simulation modality, educational theory, study methods and resources utilised including a complete description of the simulation cycle (136-141). This is further outlined in the table below. These studies would benefit from a more comprehensive inclusion of the entire simulation cycle and furthermore in-depth evaluation of whether the initiatives translated to a meaningful change in clinical behaviour. This may be achieved through a repeat simulation scenario a period of time after the first, direct observation in the workplace or chart audits. Although not yet explored in the literature, assessment of the competencies required by hospital doctors to care for older adults

using simulation could also be considered. Simulation-based education may provide a safe and low-stakes environment to carry out an assessment. Where applicable, assessment can include the development of standardised scenario focusing on a specific set of competencies required to care for older adults. Throughout the scenario trainees can be assessed using validated checklists (for technical skills) and a global rating scale (for non-technical skills e.g. communication). Trainees scores can be compared to a predetermined minimum pass score to determine competence. Gaps in certain competencies may also be determined which can help assess a trainee's readiness or the level of supervision required.

Publication	Simulation modality	Description of full simulation cycle (Y/N)	Learning theory applied (Y/N)	Outcomes measured
Allen et al. 2013	Role-play	N	N	Confidence and knowledge; using pre and post intervention surveys
Schlaudecker et al. 2013	Simulated patients	N	N	Knowledge; using pre and post intervention surveys
Barbas et al. 2014	Role-play	N	N	Confidence; Pre and post intervention survey
Lally et al. 2018	Role-play	N	N	Confidence; pre and post intervention survey
Berns et al. 2017	Simulated patients; role-play			Confidence; pre and post intervention survey
Roitto et al. 2020	Simulated patients; role-play	N	N	Confidence; post intervention feedback

Table 1 Studies describing the use of simulation-based education to develop competencies to care for older adults and their associated: outcomes, simulation modality and whether they included a description of the simulation cycle and learning theory (N=no; Y=yes)

In response to rapidly evolving stroke care advancements SBE in acute stroke management has been increasingly adopted across Europe, the UK, and the USA with the European Stroke Organisation promoting the implementation of SBE in stroke to ensure the relevant hospital doctors are equipped with the necessary skills to manage these patients effectively (142-144). Acknowledging the urgency with which hospital doctors need to be proficient in older adult care, teaching hospital doctors' geriatric medicine competencies via simulation-based education warrants further exploration.

1.6.6 Benefits of simulation-based education for hospital doctors to develop competencies to care for older adults

Simulation-based education promotes equity in education. With increasing subspecialisation of training, doctors have fewer opportunities and lack exposure to develop the generalist competencies to care for older adults. Although the importance of generalism is now widely recognised, it is not necessarily reflected in current practice. Therefore, we are training doctors for a practice that may not yet be valued or undertaken in the clinical environments in which they work. Simulation-based education can be used to provide opportunity for repeated practice in critical, high-pressure but infrequently encountered clinical situations e.g. acute stroke for IM doctors without causing harm to the older patient. It also provides opportunity to practice more complex scenarios including management of chronic and progressive conditions that require ongoing monitoring and decision-making with the patient.

With increasingly over-burdened curricula it can be difficult to ensure dedicated space and time to develop the required competencies. Simulation-based education is flexible and can occur in a variety of settings and modalities including in-situ simulation (simulation that occurs in the actual clinical environment where participants work) and 'off-site' simulation that occurs in facilities specifically designed for SBE, away from busy clinical settings (145, 146). Removing doctors from a busy clinical environment allows facilitators to tailor the complexity of the scenario and reduces the stress of real-world clinical experience, ultimately promoting psychological safety (19-21).

Simulation-based education may form part of the solution in developing generalist competencies in caring for older adults as it provides structured and formal training. Many studies exploring competencies have been developed in response to lack of formalised available training, lack of geriatric medicine knowledge in doctors not specialising in geriatric medicine, increasing number of older adults presenting to specialty services outside of geriatric medicine and lack of confidence in caring for older adults (25, 65, 66, 136-141, 147-193). To mitigate this, SBE could provide training in generalist competencies for all hospital doctors with structured experiences that simulate a variety of clinical scenarios with older adults.

There is growing recognition that NTS are essential to provide high quality healthcare including improving interdisciplinary relationships, communication skills and ultimately resulting in improved patient outcomes (115-117). Inadequate communication accounts for a large proportion of official complaints concerning the hospital care of older adults. Effectively communicating with older adults is vital to ensure improved health outcomes and reduced medical errors (194-197). Simulation-based education can potentially nurture the development of vital communication skills to care for older adults including adapting to different communication barriers, engaging in shared decision-making, assessing capacity, and educating patients and carers regarding chronic disease management and progression and medication management.

Ultimately, simulation-based education has the potential to transform how we train all hospital doctors to care for older adults. The complex, multifaceted, nature of geriatric medicine demands both technical expertise and strong interpersonal communication skills. Older adults often have multiple and interacting co-morbidities requiring comprehensive assessment and management. Simulation-based education has the potential to be the vehicle to provide safe and supportive environment that can nurture these skills as part of a multidisciplinary team without causing patient harm (198, 199).

1.7 Research programme

1.7.1 Research aim and research questions

In reviewing the literature around SBE and the development of competencies in caring for older adults, it became apparent that there is a lack of consensus as to what generalist, hospital-based doctor should be able to do to care for older adults.

Therefore, in order to explore whether SBE can provide opportunities to foster such competencies, we needed to firstly identify a set of competencies and then progress to evaluating the impact of SBE on developing those competencies. Given the increasing number of older adults accessing acute healthcare services, we wished to explore the generalist competencies required by hospital doctors to care for older adults and the role of SBE to support the transformative learning of a specific subset of these competencies. We developed a research programme consisting of three individual research projects answering three related research questions.

(i) What are the generalist competencies proposed in the literature for hospital doctors caring for older adults?

(ii) What are the generalist competencies identified by key stakeholders for hospital doctors to care for older adults?

(iii) How can simulation-based education support the transformative learning of generalist competencies to care for older adults?

1.7.2 Research paradigm

A research paradigm refers to specific way of framing and qualifying what we know, the things we can know and understanding how we can know the world around us (200).

Research paradigms are defined by specific epistemological and ontological assumptions (201). Ontology examines the nature of reality- is it real, singular and constant or everchanging (200). Epistemology describes the scope and limitations of

knowledge as well as how new knowledge is generated and how we know what exists (200). The philosophical underpinnings of a research paradigm significantly influence the research process (202).

Pragmatism is a paradigm that focuses on what knowledge is actionable and applicable in a real-world context rather than the theoretical (203). Pragmatism is particularly concerned with the context within which knowledge is utilised and relevant and therefore it is necessary to understand the different elements of a problem and their relation to each other in order to find a viable and practical solution (204). The objectives of our research programme were to describe the generalist competencies required by hospital doctors to care for older adults and we subsequently wished to explore whether participating in a simulation scenario provided a transformative learning experience for hospital-based doctors to develop a subset of these competencies to care for older adults. Employing a pragmatic philosophical viewpoint and acknowledging the multifaceted nature of our research programme we chose to incorporate a mixed methods approach. The flexibility of a mixed methods approach ensures that the research design is driven by the question we wish to answer rather than adhering to a fixed epistemological position (205).

1.7.3 Project design

Mixed methods research is a distinct methodology involving the collection, analysis and incorporation of both quantitative and qualitative methods (206, 207). Quantitative data provides breadth and generalisability, while qualitative data can offer depth and context. Combined, they can provide a rich understanding of a complex research topic such as ours that transcends institutional, regional, cultural and moral divides (208). The research team consisted of a mix of academic educators and researchers, a geriatrician with experience in clinical education and SBE and a specialist registrar in geriatric medicine and simulation fellow. The team's methodological expertise spanned qualitative and quantitative research approaches.

From a preliminary search of the existing literature, it was clear that multiple attempts have been made by various postgraduate training bodies and hospital sites around the world within various specialties to identify generalist competencies required by hospital

doctors to care for older adults. In the first study (**chapter 2**) we carried out a scoping review to identify the proposed generalist competencies in the existing literature for hospital doctors from a variety of grades and specialties to care for older adults. We used a mixed methods approach to describe our findings utilising descriptive numerical statistics to analyse and present the frequency of the identified competencies. We then interpreted and categorised the competencies based on the nature and content of each competency.

In the second study (**chapter 3**) we carried out a group concept mapping (GCM) exercise to determine the generalist competencies identified by key stakeholders for hospital doctors caring for older adults. This is a mixed-methods consensus building method conducted through an online platform. For this study we sought expert input from different disciplines, grades and specialties within Ireland to describe and prioritise which generalist competencies should be developed by hospital doctors to care for older adults.

In the final study (**chapter 4**) we explored how SBE can support the transformative learning of generalist competencies for hospital doctors caring for older adults. Utilising a subset of the competencies identified from the scoping review and GCM, we designed a bespoke SBE scenario. Using both the debriefs and semi-structured interviews, we explored if hospital doctors who participated in a SBE scenario experienced transformative learning to develop a specific subset of generalist competencies to care for older adults.

We employed a combination of development and complementarity from Greene et al. to guide our research in the application of mixed methods (209). Development 'seeks to use the results from one method to help develop or inform the other method, where development is broadly construed to include sampling and implementation, as well as measurement decisions' (209) and complementarity 'seeks elaboration, enhancement, illustration, clarification of the results from one method with the results from the other method' (209). We used generalist competencies garnered sequentially from the scoping review and GCM study to inform the development of the simulation scenario thereby increasing construct validity (209, 210). We utilised both quantitative data (from the scoping review and GCM study) and qualitative data (from the GCM, debrief and

semi-structured interviews) to gain a more comprehensive understanding of the competencies required by all hospital doctors to care for older adults. This aligns with the complementarity purpose, using different methods to enhance the findings of each other (209, 210).

In conclusion, the purpose of this research programme was to explore the generalist competencies required by hospital-based doctors to adequately care for older adults and examine how SBE can support the transformative learning of these competencies. The findings of this research programme have significance for older adults and caregivers, educators and learners. The impact of this work has the potential to contribute to improved patient care by providing clarity and direction for supervisors and hospital doctors in respect of provision of learning opportunities, competency development and assessment in generalist competencies required by hospital doctors to care for older adults.

Chapter 2: Scoping review: the generalist competencies proposed for hospital doctors caring for older adults

2.1 Introduction

Calls to develop a tangible response to the rapidly ageing population have been made by policymakers, geriatricians and academics for almost twenty years (58, 211-215). Responses to these calls have been significant and include quality improvement (QI) projects and a variety of educational initiatives (165, 174, 175). However, often these are ad hoc and aimed primarily at locally (e.g. department/hospital/university) identified needs and lack alignment with a defined set of generalist competencies to care for older adults. Given the heterogeneity of the older adult population there are likely numerous competencies required by hospital doctors to adequately care for older adults. Some of these competencies are required by every doctor and could therefore be described as generalist while others are only required by those who provide specialist diagnosis and care (specialist competencies). The identification of generalist competencies required by hospital doctors is a critical step as competency frameworks are an essential tool for educators by outlining the exact knowledge and skills required to deliver care (216). This will ensure educational initiatives are closely related to practice, ensuring that learners have developed the competence for their role (217).

Recognising the growing patient cohort in this age group, some specialties have also begun to incorporate generalist competencies to care for older adults within their own postgraduate training body curricula and in some cases prepare hospital doctors by including geriatric medicine competencies through dedicated subspecialty frameworks e.g. oncogeriatrics (61, 67, 183, 189, 218).

Rather than explore competencies specific to subspecialties, I wished to map the generalist competencies proposed in the existing literature for hospital doctors to provide holistic care to older adults, with the aim of informing the design and development of educational strategies to support hospital doctors in developing these competencies.

2.1.1 Rationale for scoping review

A scoping review is a *‘form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge’* (219-221). Scoping reviews are useful for broad research questions, mapping and summarising published literature for doctors, educators and policymakers.

An initial search of the literature on the topic of generalist competencies required by hospital doctors to care for older adults shaped the choice of review methodology. I recognised the heterogeneity of literature sources and methodologies, article types and approaches within the literature and therefore a scoping review facilitated the mapping of a variety of generalist competencies discussed within this range of literature. A scoping review was considered appropriate to determine the generalist competencies required by hospital doctors to care for older adults as the goal was not to critically appraise the available literature and accompanying results as in a systematic review but rather describe the published literature (220). In addition, a scoping review addresses the limitations of a narrative review, providing a true indication of the volume of sources available on this topic (222, 223). We were aware that competencies may not only be outlined in peer reviewed studies but also within grey literature in the form of reports, editorials, letters to the editor and, postgraduate curricula (220, 221). Flexibility in mapping the characteristics of these competencies would not be available in a systematic review, which would usually be reserved for answering more precise and specific questions (224). We wished to provide an overview of these competencies and also determine if any commonalties existed in the competencies proposed in the available evidence which may potentially provide the basis of a generalist competency framework for hospital doctors caring for older adults. Scoping reviews follow a systematic and transparent and rigorous process to identify, select and synthesise (where relevant) the available evidence through ensuring reproducibility and reducing bias which may occur in a narrative review (223). As calls for addressing care for older adults by hospital doctors have long been made and to capture as many different

generalist competencies relating to the care of older adults within as many specialties as possible, we conducted a scoping review.

2.2 Methods

2.2.2 Framework

To complete the scoping review, I employed the steps described by Arksey and O'Malley (223). This was a five-step process involving (i) identifying the research question (ii) searching for relevant sources, (iii) selecting relevant sources, (iv) charting the data, and (v) collating, summarising, and reporting the results. I applied the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for scoping reviews (PRISMA-ScR) as a guide (225). PRISMA-ScR is a checklist which covers various aspects of a scoping review including rationale, search strategies, selection criteria, data extraction processes and synthesis methods, thereby ensuring transparency, accuracy, and completeness of reporting. There is an optional sixth step in the Arksey and O'Malley framework- 'consultation'. This was not included in the scoping review as I wished to address this as a separate study within the research programme. This decision was grounded in the pragmatic paradigm and mixed methods research programme. I wished to seek not only validate the findings from the scoping review but also prioritise competencies and gain as many perspectives as possible to determine the generalist competencies that hospital doctors should develop to provide care to older adults.

2.2.3 Defining the scope of the review and review question

A preliminary search was conducted to help define the scoping review question and to determine the breadth of the available literature on the generalist competencies proposed for hospital doctors. This preliminary search was essential to define the review question as a question too broad may result in an untenable number of sources

of varying relevance (221). Defining the scoping review question was an iterative process involving regular meetings with the entire research team and refining the question based on preliminary search findings.

A librarian was consulted to help establish the most relevant databases. The preliminary search was carried out using PubMed and contained terms including 'geriatric medicine', 'competency' and 'doctor' and 'education'. We used the definition of 'competency' as 'an observable ability of a health professional, integrating multiple components such as knowledge, skills, values, and attitudes' (33). The preliminary searches revealed that the terms 'curriculum' was often used in conjunction with competency frameworks. Acknowledging the evolution of medical education, the term 'entrustable professional activities' (EPAs) was also included in the search. An EPA is a key task of a discipline that an individual can be trusted to perform in a given health care context, once sufficient competence has been demonstrated (46).

Throughout this process the primary research question guiding this review was identified as:

- What are the generalist competencies proposed in the literature for hospital doctors caring for older adults?

The secondary question explored was:

-How have these generalist competencies for hospital doctors been developed?

2.2.4 Literature Search Strategy

The literature search strategy consisted of three components. The initial step involved a systematic search of six electronic databases including PubMed, Cochrane, CINAHL, PsycINFO, ERIC and Embase for eligible records from January 2012 to December 2022. Sources relating to combinations of the following search terms were included: physician OR doctor OR resident AND competencies OR curriculum OR education OR entrustable professional activities AND geriatric medicine OR gerontology (Appendix A). Secondly, forward and backward citation tracking was undertaken. Finally, online searches of the postgraduate training body curricula in the U.K, Ireland, U.S.A, Canada, Australia and New Zealand for each specialty relevant to hospital doctors were

searched on postgraduate training body websites. Where a source could not be accessed online, we contacted the postgraduate training body via email. Only sources available in the English language were included. An updated electronic database and website search were completed in July 2023. The results of the above searches were exported to the reference management software Endnote X20. Duplicates were removed. Endnote X20 and Microsoft Excel were used to manage the data.

2.2.5 Selecting relevant sources

EB and AB independently screened the titles and abstracts of all sources identified in the search strategy. EB and AB subsequently carried out a full-text review of the selected sources. The full text was reviewed in the instance that an abstract was not available e.g. training curricula. Where disagreement regarding source inclusion occurred a third reviewer (DB) reviewed the full text. Sources were selected based on predetermined inclusion and exclusion criteria. The final selection criteria were the result of an iterative process consisting of multiple team meetings to ensure that the selection criteria aligned with the research question.

Inclusion criteria:

- 1.) Sources relating to hospital doctors working in an acute hospital setting, including those whose role extends to ambulatory care, rehabilitation, or residential care
- 2.) Sources that focus on generalist competencies or education or curriculum required to care for older adults
- 3.) Sources relating to doctors who have completed undergraduate medical training
- 4.) Sources published from 2012 to 2022 in the English language
- 5.) Peer-reviewed papers, editorials, commentary pieces and letters to the editor

- 6.) Postgraduate training body competency frameworks in Ireland, U.K, Canada, U.S.A, Australia and New Zealand (e.g. Royal College of Physicians of Ireland (RCPI))

Exclusion criteria:

- 1.) Sources that focused solely on doctors working in general practice, family medicine or psychiatry
- 2.) Sources that do not specifically relate to geriatric medicine, gerontology, ageing or older adults
- 3.) Sources that focused solely on fellowships in geriatric medicine
- 4.) Language other than English
- 5.) Sources that referred only to doctors specifically training in geriatric medicine
- 6.) Conference presentations
- 7.) Practice guidelines for caring for older adults
- 8.) Articles exploring attitudes and knowledge of doctors towards care of older adults without reference to competencies
- 9.) Sources that describe subspecialty competencies only

Sources included were limited to the English language only as this was the research team's primary language. A comprehensive review of sources outside of the English language would have been time intensive.

We included sources from 2012 to 2022 only to ensure the most relevant sources were included while also remaining manageable for a doctoral thesis. The year 2012 follows the publication of a seminal paper by Williams et al. which defined the minimum competencies required for internal medicine doctors to care for older adults with an aim to align with and improve training (226). A focus on all hospital doctors was determined, including doctors working in areas through which hospital doctors frequently rotate through during their training e.g. ambulatory care, long-term care, acute hospital. Recognising that many differences between the primary care and hospital environment exist, in addition to ensuring a dedicated exploration of

competencies within the context of that delivered within hospital care, sources focusing solely on general practitioners/family medicine doctors as learners were excluded.

In keeping with the ethos of a scoping review we included multiple sources including peer-reviewed papers which designed and/or implemented an already existing competency framework (e.g. Recommended Essential Geriatrics Competencies for Internal Medicine and Family Medicine Residents (226)) at local site level. Sources that described identifying a competency gap locally and subsequently developing an educational initiative and/or competency framework to address a particular set of competencies were also included. Preliminary searches identified that while these sources did not utilise a pre-existing competency framework, they identified certain competencies that were not outlined in existing competency frameworks. Competency frameworks from postgraduate training bodies which shared similar accreditation standards and healthcare system design and structure standards were also considered for inclusion (227-230) if they featured generalist competencies in the care of the older adult. Therefore, in alignment with a scoping review, sources were not excluded based on the type of study or quality but of their potential contribution to the research question.

2.2.6 Data extraction

2.2.6.1 Data charting process and data items

A data extraction tool was developed using Microsoft Excel in collaboration with all members of the research team (Appendix B). The data were extracted systematically using the predefined data extraction tool by EB. Data extraction was checked and reviewed by researcher AB. The title, author, specialty which conducted the study, publication type, the reason for looking at particular competencies, country, year, target learners, study design approach, each competency identified e.g. '*appropriately prescribing in older adults*' were extracted from each source.

A deductive thematic analysis (231) of the competencies described in the selected sources was undertaken using Microsoft Excel. Competencies were mapped to competency domains described in the 'RCPI Higher Specialist Training (HST) geriatric medicine competencies' and '21st Century: Recommended Essential geriatrics Competencies for Internal Medicine and Family Medicine Residents' by Williams et al.

(226, 232). Any generalist competencies in the care of the older adult that did not fall within these domains were coded and themed inductively.

2.2.7 Data synthesis

The included sources were collated, summarised, and presented in the data extraction sheet. Descriptive numerical summary analysis was used to highlight the frequency of competencies, the targeted learners and educational initiatives where relevant that were employed to support the development of the competencies. The research team met multiple times and subcategorised findings according to those which described a competency framework, sources that created and/or implemented a competency framework via an educational initiative and sources from postgraduate training bodies.

2.3 Results

2.3.1 Results of search

We identified 3,688 sources and following the stages outlined in the flow chart (figure 1), eighty-one were included in the final set for the review. Twenty-seven sources originated from the USA, with the remaining coming from Ireland (n=18), the United Kingdom (n=13), Australia and New Zealand (n=9), Canada (n=6), Finland (n=1), Greece (n=1) and the Netherlands (n=2). Four sources described research studies co-ordinated in multiple contributing countries. Appendix C summarises the title, first author, country, year, design, and methodology used in all included sources.

The final eighty-one sources included forty-three published by postgraduate training programme competency frameworks (60-68, 154, 185-192, 218, 233-253), thirty-three outline locally designed competency frameworks and/or educational initiatives to address gaps in competencies (25, 136, 138-141, 148, 150-152, 155, 158-165, 167, 168, 170, 171, 174-179, 182-184, 254), two opinion pieces (181, 255), two literature reviews (169, 180) and a descriptive/explanatory piece (59).

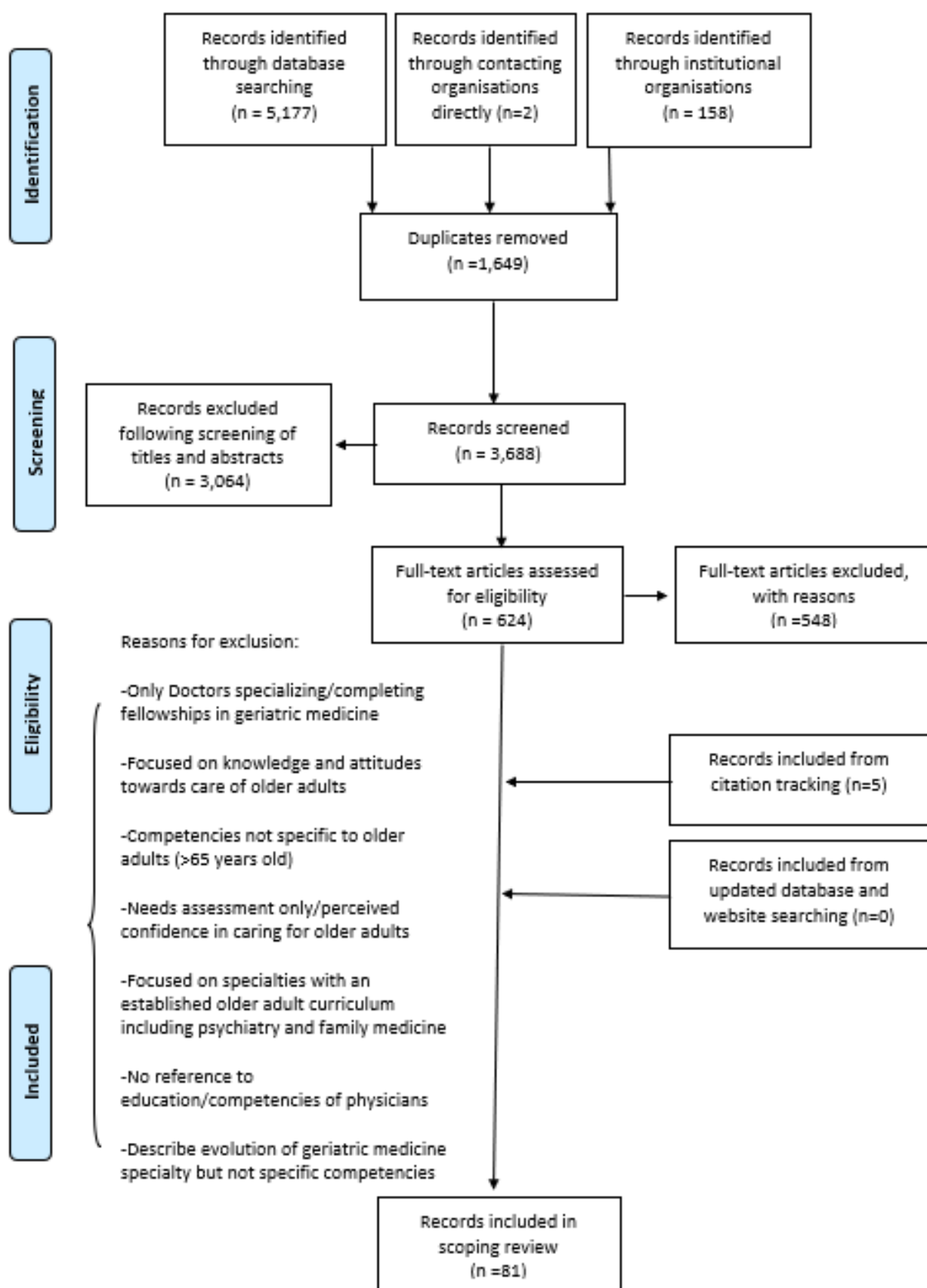


Figure 1 Flow chart of source selection process

2.3.2 Target learners

Table 2. outlines the target learners identified in the review. Most (n=51) of target learners were doctors training in internal medicine.

Target learner specialty	Source reference	Number of sources
Internal medicine	(60-63, 65-68, 136, 140, 148, 150, 155, 161, 165, 167, 170, 171, 174, 176, 178, 182, 185-188, 190-193, 218, 233-242, 245-250, 252, 254, 256, 257)	51
Surgery	(138, 151, 183, 258)	4
Interdisciplinary learners (including multiple HCPs and specialties)	(25, 139, 158-160, 162-164, 168, 175, 179, 184) (59, 181, 255)	15
Emergency medicine	(152, 154, 180, 189, 244, 253)	6
Dermatology	(169)	1
Hospital doctors (speciality unknown)	(141)	1
Obstetrics and gynaecology	(64, 243)	2
Clinical educators and researchers	(177)	1
Total		81

Table 2 Target learners identified in sources included for review (HCPs-healthcare professionals)

2.3.3 Competency Domains

Twenty-three competency domains including two hundred and two competencies focusing on delivering care to older adults were identified in the sources (2.2).

Competencies relating to **medication management** in older adults (n=53) followed by **chronic disease and comorbidities management** (n=44) and **cognitive impairment** (n=44) comprised the most common focus of these sources. Appendix D outlines the competency domains addressed by each source and Appendix E lists each individual competency identified.

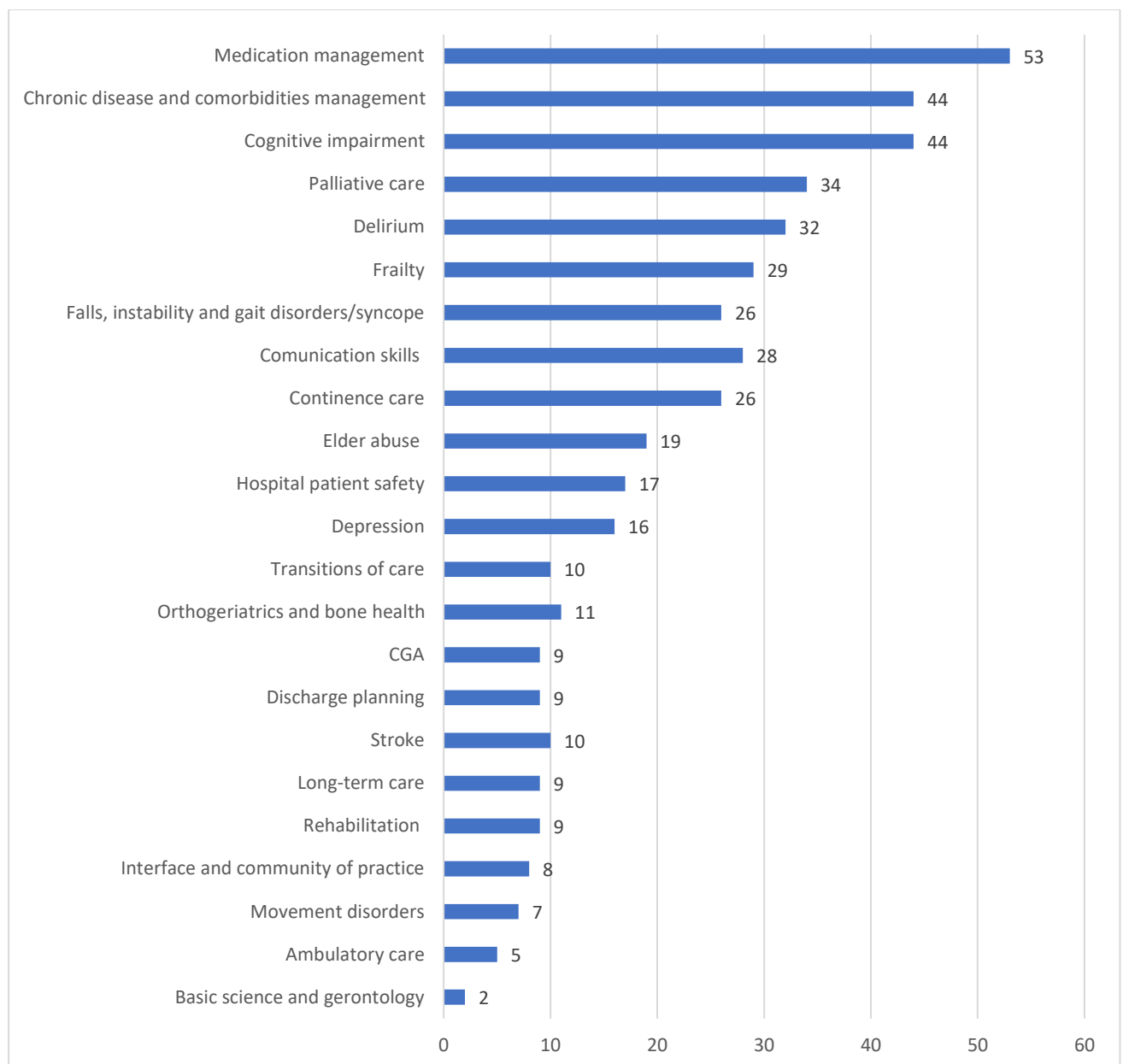


Figure 2 List and number of competency domains identified within all sources (CGA-comprehensive Geriatric Assessment);

2.3.3.1 Medication Management

Competencies relating to medication management included appropriate prescribing in older adults (59, 61, 139, 148, 150, 154, 158, 160, 170, 174, 176, 241, 245, 254, 255), pharmacological care at the end of life (155, 180), management of polypharmacy (59, 138, 148, 154, 174, 176, 235, 236, 240, 245, 254), perioperative management of medications (25, 168, 175) and medication safety (25, 150, 152, 164, 165, 168, 175, 244, 245).

2.3.3.2 Cognitive impairment

Recognition, assessment (including demonstrating the use of cognitive screening tools) and management of cognitive impairment were frequently addressed (25, 59, 61, 63, 65, 66, 68, 138, 141, 148, 150, 152, 154, 159, 161, 164, 165, 170, 171, 174, 176, 183, 186, 189, 218, 234-236, 238, 240, 244, 245, 248, 252, 256). Evaluation of behavioural and psychosocial symptoms of dementia (61, 152, 160, 165, 218, 234-236, 241, 256), patients with dysphagia (162), enteral feeding and maximising quality of life for patients and carers were emphasised specifically (248). Demonstrating professionalism while communicating and counselling patients and carers was also highlighted (154) alongside the ability to distinguish between types of cognitive impairments (245) and conducting a capacity assessment (148, 150, 165, 177, 183, 245, 248, 254).

2.3.3.3 Chronic disease and comorbidities management

Competencies describing chronic disease and management of co-morbidity included understanding the impact of multi-morbidity in older adults (59, 60, 63, 66, 67, 154, 160, 179, 183, 185, 186, 192, 237, 244, 248, 256) and the management of chronic conditions in the context of creating goals of care and facilitating advanced care planning (25, 59, 139, 140, 150, 152, 154, 161, 165, 170, 171, 176, 177, 179, 180, 183, 185, 186, 189, 244, 245, 252, 254, 255). The recognition, investigation, and management of multiple diseases processes in older adults including oral health are also outlined (61, 68, 148, 150, 152, 165, 183, 185, 187, 191, 193, 235-237, 241, 249, 252, 257). Identifying and generating a differential diagnosis, including conditions that frequently manifest atypically in older adults were also outlined (60, 152, 165, 238, 244).

2.3.3.4 Delirium

Screening for and evaluating causes of delirium in older adults (60, 141, 150, 152, 154, 164, 244) including in the acute setting (154, 244), long-term care facilities (160), intensive care unit (25) including post operatively were outlined (138). Sources emphasised recognition of signs and symptoms of delirium (25, 61, 65, 66, 68, 141, 148,

150, 154, 160, 164, 165, 168, 174-176, 186, 189, 245, 254) , knowledge and application of the pharmacological and non-pharmacological management of delirium (61, 65, 66, 68, 141, 148, 152, 154, 158, 168, 174, 175, 186, 189, 218, 234-236, 241, 245, 254, 256).

2.3.3.5 Palliative care and pain management

Palliative care and pain management included demonstrating knowledge of palliative care management in the acute setting (61, 180, 218, 234-236, 241, 256) and the ability to work as part of a team to deliver an older adult's goals of care including when escalation of care is/ is not appropriate (152, 179). This domain also highlighted the demonstration of knowledge of referral pathways for hospice care and when to seek advice to develop a palliative care plan (152, 179, 180, 244).

2.3.3.6 Communication skills

Communication skills were incorporated across multiple competency domains including palliative care (140, 180), cognitive impairment (248), management of chronic disease and co-morbidities as well as a range of specialties including internal medicine (150, 152, 165) and surgical specialties (183). Competencies in this domain included communicating with patients, relatives, and carers, implementing shared decision-making (59, 148, 151, 152, 164, 177, 178, 180, 240, 255), and co-ordinating family meetings (138, 139, 160, 171). Obtaining and documenting a collateral history (60), identifying and managing communication barriers (150, 152, 165) as well as interprofessional collaboration were also highlighted (181).

2.3.4 Rationale for developing and/or implementing generalist competencies

Fifty-six sources cited their rationale for exploring particular competencies for hospital doctors caring for older adults (25, 65, 66, 136, 138-141, 148, 150-152, 154, 155, 158-165, 167-171, 174-187, 189-193, 254). These are outlined on table 2.2 below.

A decline in the number of physicians trained in geriatric medicine was cited as both a reason to address the gap as well as contributing to a paucity of education in the area(148, 150).

Postgraduate training body curricula from Australia and New Zealand did not provide a specific reason for developing a competency framework or for including generalist competencies for caring for older adults (67, 188, 244-249, 257). Irish and Canadian competency frameworks as well as the Australasian College for Emergency Medicine fellowship curriculum did not provide any rationale for their chosen competency frameworks or including generalist competencies for caring for older adults. Reports calling for new curricular approach (212) citing a changing UK population prompted a reform of UK internal medicine competency frameworks (65, 66, 185-187, 190-193).

Rationale	Number of sources	Source
In response to an ageing population	35	(25, 65, 66, 138, 148, 150-152, 154, 158-162, 165, 168-170, 177, 179, 180, 183, 185-188, 192, 254)
In response to a national report	15	(65, 66, 154, 161, 176, 185-187, 189-193)
Declining number of geriatricians	5	(148, 150, 154, 162)
Lack of geriatric medicine knowledge in doctors not specialising in geriatric medicine	11	(25, 139, 148, 150-152, 154)
Lack of formal geriatric medicine training	46	(25, 65, 136, 138-141, 148, 150-152, 154, 155, 158-171, 174-183)
Increasing number of older adults presenting to specialty services outside of geriatric medicine	22	(25, 65, 66, 138, 148, 154, 160, 164-166, 169, 177, 179, 184-188)
Curricula requirement	15	(65, 66, 150, 151, 154, 170, 178, 185-187, 189-193)
Lack of confidence in caring for older adults	2	

Table 3 Rationale and corresponding source references for exploring competencies for caring for older adults

2.3.5 Process of competency development

There was significant variation in how sources described the process of developing competencies:

Postgraduate training body sources:

- Five Canadian postgraduate training body curricula (68, 250-253) did not describe the process
- Irish postgraduate training bodies used local expert groups to develop competencies (60-64, 218, 233-243, 256)
- Almost all U.K, Australia and New Zealand postgraduate training bodies used a combination of expert groups and stakeholder input to develop competencies (65, 67, 154, 185-188, 190-193, 245-249, 257), while the Australasian College of Emergency Medicine used a combination of prior curricula, review of the literature, stakeholder and expert group input (244)

All other sources:

- Four sources reviewed prior literature only to inform competency development (169, 180, 182, 184)
- Seven locally designed competency frameworks and/or educational initiatives to address gaps in competencies (151, 155, 159, 164, 165, 167, 178) did not describe the process
- Four sources used needs assessment only to develop competencies (138, 139, 150, 174)
- Three sources used a Delphi consensus method only to develop competencies (148, 152, 177)
- Seven used expert groups only to develop competencies (141, 158, 161, 168, 175, 179, 181)
- One source developed competencies based on the Assessing Care of Vulnerable Elders (ACOVE) quality indicators (171, 259). These are a list of indicators that can be used to evaluate the quality of care of older adult patients

- The remaining used varying combinations of expert group input (59, 136, 140, 162, 163, 170, 255) , literature reviews (25, 59, 136, 140, 162, 163, 170, 176, 254, 255), needs assessment (25, 140, 160, 176, 254) , reviewing prior curricula (160)

2.4 Summary

2.4.1 Main findings

This scoping review maps the range of proposed generalist competencies identified as necessary for hospital doctors to care for older adults over a ten-year period. It is evident that this issue is increasingly recognised by the multiple attempts to create and implement competency frameworks on national and international levels. We mapped two hundred and two competencies to twenty-three domains with **medication management, cognitive impairment and chronic disease and co-morbidity management** most frequently highlighted.

To what extent all hospital doctors need to be competent in all twenty-three competency domains is beyond the scope of this review, however given the frequency with which they are highlighted, certain competency domains should be considered in the postgraduate education of hospital doctors caring for older adults. In particular, **medication management** was prioritised in two-thirds of the sources within this review reflecting the growing recognition of the effects of polypharmacy on older adult morbidity and mortality (260, 261). However, doctors reportedly lack confidence in safely and effectively deprescribing medications (262). Therefore, clinical educators should prioritise competencies that focus on managing medications in older adults to empower doctors and improve older adult patient outcomes.

Competencies within **chronic disease and comorbidities management** were described in over half of sources. This represents a significant challenge for providing care to an ageing population. Although life expectancy has increased, this has not necessarily been accompanied by a corresponding increase in healthy years lived (263). The coexistence of multiple comorbidities and frailty can result in atypical presentations in unwell older adults often resulting in missed or delayed diagnoses (264). The consequence is adverse outcomes including increased mortality, length of

stay and costs to the healthcare service (265, 266). Furthermore, doctors report feeling less confident in treating older adults compared to younger patients, potentially impacting the quality of care provided (265). To overcome this, educational initiatives should focus on ensuring hospital doctors can develop competencies to care for older adults with chronic disease and comorbidities management and ultimately help to reduce adverse outcomes.

One-third of sources outlined competencies highlighting **communication skills** including transitions of care, shared-decision making and advance care planning and collaborating with other HCPs. This is in line with the growing calls from policymakers to collaborate with other disciplines to ensure optimal patient outcomes (179, 183). In particular hospitals it has been highlighted that hospital doctors should be equipped with communication skills that place the patient at the centre of shared decision making and determining their own goals of care, particularly before they are too unwell to participate in such a conversation (147, 267). Therefore, future efforts should focus on developing communication and interpersonal skills of all hospital doctors caring for older adults.

2.4.2 Specialist vs. generalist competencies

There are a significant number of competencies within the twenty-three domains described. The nuance, complexity and variety of competency domains highlights both the complex and individualised nature of the older adult population, presenting a challenging cohort for hospital doctors.

The complex nature of this issue is perhaps further emphasised by the various target learners identified in this review from multiple specialties and grades within hospitals. Although most sources targeted doctors working in IM, the representation of doctors from surgical and emergency specialties, as well as obstetrics and gynaecology at multiple grades suggests that a commonality exists between the required generalist competencies to care for older adults within these specialties. The purpose of this review focused on generalist competencies proposed for hospital doctors to care for older adults. However, not all competencies identified may be relevant to every hospital doctors with some of the competencies identified in this review considered more

specialist than generalist. For example, ‘knowledge of prevention of perioperative nerve block trauma in treating older adult’ (25) is likely to be an extremely important competency for surgical and emergency medicine doctors to develop but may be less relevant to IM doctors. In contrast, it is probably more relevant for all hospital doctors regardless of specialty to be competent in ‘identifying potential elder abuse’ (61, 68, 152, 218, 234-236, 241, 244, 246, 253, 256, 258) and ‘recognising polypharmacy and inappropriate prescribing in older adults’ (59, 61, 148, 150, 154, 158, 160, 170, 174, 176, 245, 254). Similarly, the ‘recognition and management of acute stroke in older adults’ (65, 66, 154, 189) is relevant to medical doctors who participate in a general internal medicine rota. However, the management aspect is potentially less relevant to doctors working in surgical specialties. Furthermore, although we specifically focused on jurisdictions with similar healthcare services to Ireland, it is likely that some differences exist between what would be considered generalist and specialist competencies for caring for older adults. As mentioned above, within the Irish healthcare system, hospital doctors working within IM and who participate in a general internal medicine rota are required to actively assess and manage acute stroke in older adults regardless of their chosen specialty. Whereas this is often carried out exclusively by neurologists in other jurisdictions e.g. U.K. Similarly, competencies pertaining to cognitive impairment e.g. ‘evaluating and formulating a differential diagnosis and workup for older adults with changes in affect, cognition’ (65, 66, 154, 159, 170, 186, 189, 238, 244, 245) is primarily carried out by doctors working in psychiatry of older age in the U.K. as opposed to other specialties e.g. IM in other jurisdictions. Future research in this area should consider refining the proposed generalist competencies, ensuring they are relevant to all specialties caring for older adults. Finally, acknowledging the large number of competencies identified it is essential to establish which of these generalist competencies should be prioritised to inform future educational initiatives.

2.4.3 Implications for education design and delivery

Irrespective of identification of the appropriate generalist competencies to care for older adults, barriers to implementation including service demands and time constraints present a major issue for doctors and educators (25). In the instance where hospital doctors are required to develop a large number of generalist competencies to

care for older adults, it must be determined whether postgraduate training programmes can meet this need. As highlighted in chapter one, multi-component initiatives have been cited as most useful in training doctors who have not specialised in geriatric medicine particularly when experiential learning including clinical experience and SBE are incorporated (268). However, as outlined in chapter one, not all clinical learning environments are equal and therefore cannot effectively and consistently achieve the desired learning outcomes for doctors (80, 81). Similarly, although the use of SBE to teach competencies in geriatric medicine have been explored, methodological descriptions vary and outcomes are generally limited to confidence and knowledge (136-141, 147, 269). Therefore, which exact educational initiatives these competencies can be optimally developed by hospital doctors warrants further exploration.

2.5 Strengths and limitations

2.5.1 Strengths

We conducted a thorough literature search across six databases and international sources to ensure a broad coverage of competency frameworks. This review is part of a larger research project, and our team comprises clinical educators and geriatric medicine practitioners. The Arksey and O' Malley framework was used to guide the review (223). The recognised scoping review methodology- the PRISMA SCR guidelines were adhered to (225).

2.5.2 Limitations

This study's timeframe spans ten years, and only English-language publications were considered. This potentially led to the unintentional exclusion of relevant sources. The review included thirty-three sources that identified local practice gaps and addressed them through developing educational initiatives or competency frameworks. While these sources do not explicitly reference published competency frameworks, they meet inclusion criteria by addressing competencies not necessarily addressed in the other sources e.g. competencies regarding perioperative care for older adults. However, as this was not the original purpose of the review it is plausible that other similar sources were not captured. We did not explicitly include the term 'generalist' in our search

strategy. However, we did exclude sources that addressed specialty or subspecialty specific competencies only.

2.6 Conclusion

This scoping review has highlighted that there have been significant efforts to develop generalist competencies for hospital doctors caring for older adults. This is particularly evident in the competency domains including medication management, cognitive impairment, and chronic disease and comorbidities management. However, the overarching finding of this review is that a gap remains in the lack of an agreed set of generalist competencies that hospital doctors should demonstrate in providing safe and effective care to older adults. While several competency frameworks aim to improve care by doctors not specialised in geriatric medicine, additional research is needed to develop a comprehensive and well-thought-out universal framework for all hospital doctors. Furthermore, the educational delivery of these competencies necessitates careful consideration.

Although not a competency framework synthesis, this chapter offers an extensive review of the literature, highlighting the generalist competencies required by hospital doctors caring for older adults. Although results are comprehensive, it is possible that the literature is inadequate and/or our search did not reach all relevant sources. Therefore, the next step was to seek expert opinion regarding the generalist competencies required by hospital doctors to care for older adults.

Chapter 3: Group concept mapping

3.1 Introduction

The call to equip hospital doctors with the generalist competencies to care for older adults is well established (213). The scoping review in chapter two provided a comprehensive overview of the generalist competencies already proposed in the literature for hospital doctors to care for older adults. Although a wide range of competencies were identified, these may not be exhaustive. Given the extensive generalist competencies required for caring for older adults identified in chapter two, it is essential to understand which of these should be prioritised for education and training. Additionally, an evidence-based link with the needs of older patients is not always made when generalist competencies are presented in the literature. The scoping review highlighted that the process of developing competencies can vary between including expert groups, key stakeholders and reviewing the literature. Few sources in the review included key stakeholders (65, 67, 154, 185-188, 190-193, 244-249, 257) and some sources not describing the process at all (68, 151, 155, 159, 164, 165, 167, 178, 250-253).

Incorporating the expertise of stakeholders can enhance our understanding of the generalist competencies required by hospital doctors to care for older adults and their applicability in a real-world context. Furthermore, involving stakeholders can generate additional generalist competencies, as well as those proposed in the existing literature. This can ultimately inform future research, policy development and educational initiatives. Consensus studies have previously been adopted to develop undergraduate geriatric medicine (270), geriatric emergency medicine (152), oral health in older adults (181) and postgraduate specialist geriatric medicine competency frameworks (271). Ensuring our research efforts align with the perspectives of key stakeholders is essential to increasing the impact of the research findings. By engaging stakeholders, we ultimately can foster collaboration, build awareness, and ultimately enhance buy-in into providing high quality care to older adults by hospital doctors.

Acknowledging that multiple hospital specialties and disciplines provide care for this diverse population, we used group concept mapping to seek as many perspectives as

possible to determine the generalist competencies that hospital doctors should develop to provide care to older adults. Group concept mapping is a structured consensus building process that has been used to good effect in many areas within medical education already including to identify areas that require more attention (272, 273) and to define learning outcomes (274).

3.2 Methods

3.2.1 Study aims and research question

The overall aim of this study was to form a national expert group consensus consisting of a broad range of relevant stakeholders to:

- 1.) Develop a comprehensive list of generalist competencies required by all hospital doctors to care for older adults
- 2.) Determine how these competencies should be prioritised

Throughout this process our primary research question guiding this study was identified as:

What are the generalist competencies identified by key stakeholders for hospital doctors to care for older adults?

3.2.2 What is group concept mapping?

Group Concept Mapping is a mixed methods consensus technique first devised by Trochim who defined it as “a structured process, focused on a topic or construct of interest, involving input from multiple participants, that produces an interpretable pictorial view of their ideas and concepts and how these are interrelated” (275). Group concept mapping is situated within a pragmatic paradigm as it acknowledges there are multiple ways to solve a problem is often used to address real-world issues and develop viable, actionable solutions (275).

Group concept mapping began originally as a three-step process (generating, structuring and representation of a domain) facilitating a group of participants to share their thoughts pertaining to a particular concept or idea, thereby accommodating a

wide variety of perspectives from multiple stakeholders. Participants often span various geographical locations thereby empowering participants to work independently and anonymously in a time efficient manner (275). Trochim and Kane expanded GCM to a six step process involving preparation; generation; structuring; representation; interpretation; and utilisation (189). This involves gathering a group of participants either online via specialised software (as in our research study) or in-person to represent various perspectives, experiences or expertise, engaging the group in a brainstorming session to generate a list of statements or ideas pertaining to the topic; followed by sorting the statements into meaningful categories based on perceived similarities and rating the statements based on importance feasibility and relevance. The collected data is then analysed quantitatively using specialised concept mapping software whereby multivariate statistical techniques including multidimensional scaling and hierarchical cluster analysis can be employed to generate a series of maps to represent the participant's statements and their relationship to each other to aid identifying patterns within the data (276). Finally, the findings of the analysis are then presented and interpreted by the research team and/or the group of participants allowing them to identify patterns and explore connections between concepts and identify key insights and potential implications.

3.2.3 Rationale for group concept mapping

Various methods to obtain a list of competencies from multiple stakeholders were considered by the research team. These included a Delphi study, a focus group or group concept mapping study.

A Delphi study is a structured technique to modulate a group communication process effectively in facilitating a group of participants to deal with a complex issue (277). It often involves participants completing multiple rounds of an anonymous survey with the ultimate goal of reaching consensus on a specific topic (278) e.g. competencies to care for older adults. A Delphi technique can ensure anonymity and can bring the views of participants together from different geographical locations without an in-person group meeting. When a Delphi study incorporates multiple rounds, it allows participants to review their own and others' responses which can encourage reflection

on their own perspective (279). However, multiple rounds can also be time intensive and result in a high participant drop-off rate(280).

A focus group is a conversation between a group of participants guided by a facilitator that occurs in a single setting (281). They can be useful to gather multiple viewpoints as well as stimulate an in-depth exploration and understanding of a topic of interest (282). Participants within focus groups can elaborate extensively on their own perspective but also disagree with other viewpoints. Additionally, the facilitator can capture the participants reactions to each other's views. Although multiple participants can provide their own opinions, some participants' may dominate a discussion and equally not all participants may contribute to the discussion (281). It may also not be possible to facilitate all participants to meet in one setting at a specific time.

Ultimately, I felt that GCM was the optimal methodology to answer our research question. Group concept mapping is a rapid and effective method to gather a large and diverse range of opinions and concepts in a short amount of time. Although it may not facilitate participants to elaborate on their viewpoints, unlike a Delphi study or focus groups, GCM can maintain participant anonymity from one another and only requires a single round of data collection (279). This ensures each individual can contribute equally and not be influenced by the opinions and viewpoints of other participants. The web-based tool (Concept System Global 2023) enables data to be gathered from multiple participants in different geographical thereby facilitating the collection and similarity sorting of a large volume of statements over a relatively short period of time compared to other research methods (283). The web-based tool was also available through University College Cork and members of the research team (DB and COT) had previous experience with utilising it in research studies. Given the breadth and heterogeneity of geriatric medicine as outlined in chapter one and as evidenced by the number of competencies identified the literature in the scoping review in chapter two, we required a research method that could accommodate a considerable number of statements to be generated by participants from a wide variety of backgrounds in different geographical locations in a limited timeframe. Acknowledging that various disciplines and specialties contribute to the care of older adults, we chose to use group concept mapping to explore a wide array of perspectives from various stakeholders.

3.3 Group concept mapping phases

The web-based tool (Concept System Global 2023) is a specialised software that assists the GCM process. This process is divided into six different phases: (i) Preparation; (ii) Generation of statements; (iii) Structuring of statements (rating and sorting); (iv) Data analysis and representation of statements; (v) Interpretation of results; and (vi) Utilisation of results and maps (276). The web-based tool systematically structures the qualitative processes (phases two and three) and transforms them into quantitative data which can then be analysed in phase four.

3.3.1 Phase 1: Preparation

3.3.1.1 Study population

Preparation began by the research team identifying study participants. We endeavoured to capture diverse viewpoints, even if they may not be proportionate to the population of participants (284). Participant groups identified for inclusion were hospital doctors of different grades and from different hospital specialties; nursing staff from multiple specialties including those working in geriatric medicine and palliative care. Allied health professionals including physiotherapists, dieticians, occupational therapists, psychologists and speech and language therapists working both within and outside of geriatric medicine, as well as patient advocacy groups (ALONE, Older Persons' Council Waterford and Age Action) were also included. Participants were included from both the acute and community setting in Ireland. Clinicians with responsibility for postgraduate training were also included.

3.3.1.2 Sampling and recruitment

Sampling was purposive and carried out by emailing professional participants known to my own professional networks as a specialist registrar in geriatric medicine and that of the principal investigator (PI) (JC) who is a consultant geriatrician and director of education in the South/Southwest Hospital Group (SSWHG). Sampling was also opportunistic, employing approaches of identifying participants via word- of mouth, hospital contact mailing lists, and social media (284). Identified potential participants received an email and participant information leaflet outlining the study, the steps involved and approximate time to complete the process (Appendix F). Participants were asked to respond within two weeks if they wished to participate in the study. Those who

agreed to participate received a web-based link for the web-based tool which included an embedded consent form. Those that participated were granted two weeks to complete the brainstorming phase. A further two weeks were allocated to a subgroup of participants to complete the sorting and rating. A research study schedule spanning six weeks was prepared and approved by the research team. There was no gatekeeper for this study, and all data was managed by researcher EB.

3.3.1.3 *Data collection*

During this phase, the research team developed a focus prompt for participants to complete. A focus prompt is a statement that guides participants in the concept mapping exercise by outlining the intended scope of their maps. Participants use the focus prompt to generate statements that clarify the study's core focus (284). This was an iterative process that involved identifying, rewording, and narrowing the focus prompt until the research team were satisfied that it could be understood by all participants and yield adequate statements relevant to our research aim. The focus prompt for this study was: *'A specific competency I think is required by hospital doctors caring for older adults is....'* Once a final focus prompt was decided by the research team, this was entered into the web-based tool by EB and available for participants to complete in phase two -generation of statements (outlined below). A rating focus for evaluating the relative importance of each statement was also determined. The rating focus required participants to rate the relative importance of each statement as a competency required by all hospital doctors to care for older adults using a provided five-point scale ranging from 1 (unimportant) to 5 (very important).

3.3.1.4 *Ethical considerations*

Ethical approval for this study was granted by Clinical Research Ethics Committee of the Cork Teaching Hospitals (Appendix G).

3.3.1.5 *Data protection and management*

Participants who agreed to partake in the study were asked to provide an email address. This was not shared with anyone outside of the PI and co-investigator EB. The email address was only used to issue reminders and clarification requests as required. Once data collection was complete, participant data was anonymised using the web-based tool prior to analysis. All identifiers were subsequently removed from the data collection

platform. All data was stored on a UCC MS Onedrive account accessible to student and programme team. The storage period will be ten years in line with the UCC research data management policy.

3.3.2 Phase 2: Generation of statements

During this phase participants logged onto the web-based tool. Participants remotely and anonymously completed the demographic questionnaire. They then generated multiple statements by completing the focus prompt. There was no minimum or maximum number of times each participant could complete the prompt. Participants were provided with the definition of a competency within the web-based tool: *‘the observable abilities of a health professional related to a specific activity that integrates knowledge, skills, values and attitudes’* (33). An example of a geriatric medicine competency was also provided *“Comprehensive geriatric Assessment: To perform a comprehensive assessment of health status of any illness in an older person, including mood and cognition, nutrition, gait, fitness for surgery in an outpatient, inpatient, day hospital or community setting”*.

3.3.3 Phase 3: Idea synthesis

Once phase two was complete, members of the research team (EB and COT) reviewed all of the statements generated by the participants within the web-based tool. To decrease the number of statements to be sorted by participants duplicates were eliminated, multi-part responses were separated, and acronyms were removed by the research team. Care was taken to ensure that this synthesis was completed while maintaining the participants voice as much as feasible and without distorting the content of the statements.

3.3.4 Phase 4: Sorting and rating

Consensus in Group Concept Mapping (GCM) is not achieved through group discussion or debate, but rather through statistical aggregation of individual ratings. Sorting and rating were completed by a selection of participants who had completed phase two. A subset of participants who had generated statements in phase two were then invited to sort and rate the statements within the web-based tool. The web-based tool presented the compiled list of statements generated in phase two to each participant. Participants

then used the platform to digitally sort these statements into meaningful groups based on their perceived similarity. Following this, they rated each statement's importance using a Likert scale on the web-based tool. Sorting and rating required approximately 40 minutes to complete. For sorting participants were requested to '*Sort statements into categories according to your view of their meaning and how similar in meaning they are to one another*' Participants were asked to name each category they generated.

3.3.5 Phase 5: Data analysis and representation

Quantitative analysis was conducted using the web-based tool. A point map was generated by performing multidimensional scaling analysis (MDS) on all participant sorting data within the web-based tool. A point map is a visual representation of the aggregated statements of a group regarding a particular topic (276).

In this instance, each point represents a particular statement generated by a participant. The distances between each point on the map represent how closely the statements were linked following sorting by participants (276). Statements placed proximal to each other on the map reflects participants grouping of statements together, therefore proximity indicates that these statements share similar meaning as determined by the participants. By contrast, statements that were further away from each other signalled that participants believed the statements were unrelated. The web-based tool also integrated the importance ratings, overlaying them onto the cluster map to identify which conceptual groups were most highly valued by the participants.

A stress value was generated by the web-based tool, representing how accurately the map reflects the participants' perceptions regarding the connections between the different statements (276). A lower stress value indicated a better fit, suggesting the distance between points on the map closely match the relationships between statements specified according to the participants' input.

The web-based tool also carries out hierarchical cluster analysis. Hierarchical cluster analysis groups individual statements on the point map into clusters of statements that aggregate to reflect similar concepts (285, 286). Using hierarchical cluster analysis, the GCM software generated cluster map solutions (section 3.4.3)

Mean rating scores for each statement and cluster were determined using the web-based tool. The bridging value was calculated using the web-based tool. This measures the degree of connection between clusters in a concept map (276). It indicates how often statements from one cluster are linked to statements in another cluster with a lower bridging value indicating a greater level of consensus on the statements within the cluster (276).

3.3.6 Phase 6 Interpretation of results

The web-based tool allows researchers to generate a range of cluster solutions which are judged qualitatively by the research team. The final solution is selected based on the utility of the solution to address the research question. No statistical method exists to determine the appropriate number of solutions for the data. Therefore the qualitative component of a GCM study relies on the researchers' interpretation (276). The research team, using the GCM software generated five to thirteen cluster solutions. All members of the research team (AB, DB, EB, JC, COT) reviewed all cluster solutions moving from the largest towards the smallest acceptable number of clusters without compromising the data. A final cluster solution was determined by reviewing each of the statements within each cluster. A cluster was confirmed once all points in it were deemed relevant to each other. Once the final cluster map solution was decided, each cluster was named with all members of the research team consulted.

3.4 Results

3.4.1 Participants

One-hundred and twenty-five stakeholders were invited by email to participate in the study. Thirty-four participated in the brainstorming phase. Details of their discipline and speciality are outlined in table 4 and 5 respectively.

Occupation	No. of participants
Doctor:	
-Grade not specified	1
-Registrar	2
-Specialist registrar	12
-Consultant	4
-General practitioner	1
Nursing:	
-Director of nursing	1
-Advanced nurse practitioner	1
Physiotherapist	1
Occupational therapist	2
Social worker	1
Pharmacist	1
Advocacy manager	1
Support co-ordinator	1
Retired (not specified)	1
Occupation not specified	4
Total	34

Table 4 Number of brainstorming participants according to each discipline.

Specialty	No. of participants
Medicine:	
- Geriatric medicine	13
-Microbiology	2
-Acute medicine	1
-Dermatology	1
-Respiratory	2
-Medical oncology	2
-General medicine	1
Surgery:	
-Urology	1
-General and colorectal surgery	1
Emergency Medicine	
Geriatric emergency medicine	2
Older persons' advocacy groups	2
Specialty not disclosed	4
General practice	1
Total	34

Table 5 Number of brainstorming participants according to each specialty.

3.4.2 Brainstorming, idea synthesis, sorting results

One hundred and fifty-four statements were generated. Following idea synthesis, eighty-eight statements required sorting. Twenty-two participants completed the sorting and rating phase. To ensure the validity of the results, it is recommended to have sorting and rating groups with a size ranging between 20 and 25 participants(275). Details of their discipline and speciality are outlined in table 6 and 7 respectively.

Occupation	No. of participants
Doctor:	
-Consultant	5
-Specialist registrar	9
-General practitioner	1
Nursing:	
-Director of nursing	0
-Advanced nurse practitioner	0
Physiotherapist	2
Occupational therapist	1
Social worker	1
Speech and language therapist	1
Advocacy manager	1
Total	22

Table 6 Number of participants who completed sorting and rating according to each discipline

Specialty	No. of participants
Medicine:	
- Geriatric medicine	17
-General medicine	1
Surgery:	
-Urology	1
-General and colorectal surgery	1
Older persons' advocacy groups	1
General practice	1
Total	22

Table 7 Number of participants who completed sorting and rating according to each specialty

Participants did not necessarily compose their responses in a way that would correspond to the definition of a competency. The research team did not edit the statements to align with the format of a competency. Statements were sorted into clusters in their original format by participants and the web-based tool resulting in two to twenty-six clusters. The final nine clusters and associated statements and bridging values are described in table 8 below. Each cluster contains a number of statements ranging from technical and non-technical skills including communication skills and medicolegal affairs to understanding the requirement for input of specialist geriatric medicine services.

Cluster	Competency
Communication skills BV:0.13	1. Understand when to have a clear conversation with the patient and family about their (potentially imminent) demise or palliative course. 4. Understand terminology can be ageist and othering. 7. Communicate appropriately. 9. not to treat their patients as children. 10. Demonstrate understanding in older adult interactions. 11. Demonstrate kindness in older adult interactions. 19. Understand and use with non-verbal communication. 20. The ability to both understands and use with non-verbal communication. 44. The ability to communicate bad news to patients and families. 54. Understand when not to investigate if the diagnosis will not change management. 71. Ability to discuss resuscitation status and ceilings of care with patients and families. 74. Understand the importance of collateral history. 85. Communication skills, bearing in mind the specific challenges in this age group (cognitive impairment, hearing loss, vision loss, etc)
Engaging specialist services BV: 0.6	2. Understand when to seek multi- and interdisciplinary input when coordinating an integrated and individualised care plan specific to the older adult's needs. 14. Establish databases that support the growth and development of age friendly hospital and community systems that allow growth of the most meaningful services that serve patients. 28. Be aware of the range of pathways and services to work with when caring for an older person e.g. Integrated Care Programme for Older Persons, Day Hospitals, Frailty Intervention Therapy/Pathfinders, Rehab etc. 70. Incorporate friendly dementia and delirium care. 73. Understand different transitions of care, including the benefits and risks of inappropriate transitions of care (rehab, respite, convalescence, long-term care).
Medicolegal affairs BV: 0.3	8. Prioritise appointments e.g. consider how often patients travel to appointments and the length of appointments. 12. Prioritise key issues for each patient. 22. Understand the importance of patient centred care with family involvement at patient's discretion. 42. Knowledge of Advanced Care planning. 45. Understand the principles of the Assisted Decision-Making Act. 46. Knowledge of management of suspected elder abuse including referral services. 47. Knowledge of the signs of abuse of older and vulnerable adults 59. Assess capacity. 66. Understand basic principles including that all older adults have a right to autonomy. 80. Understanding the role and value of multidisciplinary- and interdisciplinary team members. 86. Knowledge of medicolegal issues e.g. Enduring Power of Attorney, testamentary capacity, advanced healthcare directives.
Components of specialist gerontology BV: 0.56	3. Demonstrate the ability to support the older adult who is living with dementia with non-pharmacological interventions. 5. Understand the role of nutrition and sarcopenia in the care of the older adult living with frailty. 16. Ability to support patients with chronic conditions in their self-care of skin conditions and the available supports. 21. Demonstrate use of evidence-based tools to identify frailty. 30. Consider how incontinence impacts ability to return to the home and requirement for long-term care and homecare supports. 35. Understand how to refer to a dietician for older adults. 36. Appreciate the high prevalence and risks of malnutrition in older people. 79. Recognise and understand the various types of cognitive impairment, including mild cognitive impairment, dementia, delirium. 87. Knowledge of the management of dementia. 88. Knowledge of assessment of dementia.
Falls and bone health BV: 0.2	31. Identify new versus chronic incontinence. 32. Carry out a bone health assessment and work-up post a fracture and commence secondary prevention. 37. Conduct a fall work-up. 43. Identify a treatment plan for fragility fractures. 53. Carry out peri-operative risk assessment, particularly in the elective setting; including selecting appropriate surgical candidates. 72. Treat fracture risk especially in those with falls and non-operative fractures. 77. Understand multifactorial falls risk factors. 84. Carry out fall's prevention.

Managing hospitalisation BV: 0.21	6. Knowledge of the adverse effects of hospitalisation - deconditioning, adverse effects on cognition, loss of muscle mass. 23. Understand physiological changes in older adults in acute illness. 27. Understand the difference between the signs and symptoms of sepsis in the older adult compared to the younger adult. 29. Knowledge of risks of incontinence including skin integrity. 34. Prescribe and monitor oral nutrition supplements. 41. Conduct a comprehensive pain assessment. 48. Assess global health and risk of receiving anti-cancer medications. 51. Recognise how chronic disease, medications and geriatric syndromes can impact physical performance and function, negatively impacting independence, and quality of life. 52. Knowledge of prevention of nosocomial infection. 60. Recognise that older patients with severe illness may present with frailty syndromes (e.g. falls, functional decline, delirium), 67. Understand that frailty is a dynamic condition and can be modified. 69. Knowledge of perioperative management of Parkinson's Disease. 75. Recognition of poor nutrition. 76. Recognition of how frailty and its accompanying geriatric syndromes predispose older adults to multiple adverse events in hospital settings.
Universal principles of care BV: 0.26	13. Knowledge of the epidemiology of diseases more prevalent in older persons. 15. Knowledge of the 5 Ms (mobility, mind, medications, multicomplexes and matters most of the Institute for Healthcare Improvement age friendly healthcare systems model. 17. Ability to explain self-check of skin to patients, and to the healthcare professionals involved in their care. 18. Distinguish normal ageing from pathological ageing. 33. Carry out basic care including ensuring patients are out of bed, dressed, orientation aids, mobility, and sensory aids around them. 38. Address the needs of individual patients and address local challenges and resource constraints 61. Recognise barrier to safely discharging patients. 78. Knowledge of when to refer to geriatric medicine services for further assessment and evaluation.
Delirium BV: 0.37	24. Understand the risk of Clostridium difficile in older adults prescribed antimicrobials. 40. Counsel the patients about potential medication side effects. 50. Use the delirium screening tool 4AT. 55. Ability to treat delirium in older adults. 56. Recognise delirium in older adults. 57. Implement risk reduction strategies for patients at risk of delirium. 58. Identify patients at risk of delirium. 63. Avoid anti-cholinergic and deliriogenic medication in older adults. 65. Understand the difference between delirium and dementia.
Prescribing BV: 0.1	25. Understand which specific antimicrobials should be prescribed with caution in older adults. 26. Understand the importance of careful monitoring of antimicrobial levels (when appropriate) in older adults with impaired renal function. 39. Carry out comprehensive medication management. 49. Knowledge of multiple medications that may have been started by different doctors at different times. 62. Recognise the differences in pharmacokinetics and pharmacodynamics as we age e.g. 'start low and go slow'. 64. Understand the limitations & dangers of sedation in the management of agitation in frail older adults. 68. Manage medication peri-operatively. 81. Identify polypharmacy. 82. Use medication management tools e.g. STOPPSTART. 83. Knowledge of deprescribing.

Table 8 Outline of all competencies into corresponding clusters (BV-bridging values)

3.4.3 Cluster Map

Solutions ranging from five to thirteen clusters were generated through hierarchical cluster analysis by the web-based tool and each solution was examined by all research

team members. A final cluster solution of nine was agreed based on discussion around and comparison of possible cluster solutions to achieve a solution which was a best fit for the dataset (figure 3) and that was most relevant to real-world clinical practice. Grey dots in figure 3 represent each brainstorming statement and its number. Each cluster was then named with a label by the research team. This was achieved by a combination of applying the GCM software's suggested labels for each cluster of statements, participant input and analysis of the statements within each cluster.

The average bridging value among the clusters was 0.27. High coherence between statements within a cluster is indicated by lowest bridging values i.e. most participants agreed on the statements being sorted into a certain cluster. Clusters with low bridging values included **prescribing** (0.1), **communication skills** (0.13) and **falls and bone health** (0.2). The cluster **engaging specialist services** (0.6) had the highest bridging value and therefore was the least coherent i.e. statements within the clusters have few similarities according to the participants. Each cluster, their associated statements and mean bridging values are outlined in table 3.5. The proximity of the clusters to each other were also considered. **Prescribing** has the lowest bridging values, suggesting that the statements are highly cohesive with each other but have few similarities with statements in other clusters and was relatively distant from other clusters indicating the cluster is conceptually unique. By contrast, **universal Principles of Care** is more centrally located and bordered by six other clusters. Although the high bridging value indicates lower interconnectivity between the statements within the cluster itself, the statements are highly connected with other statements identified in other clusters.

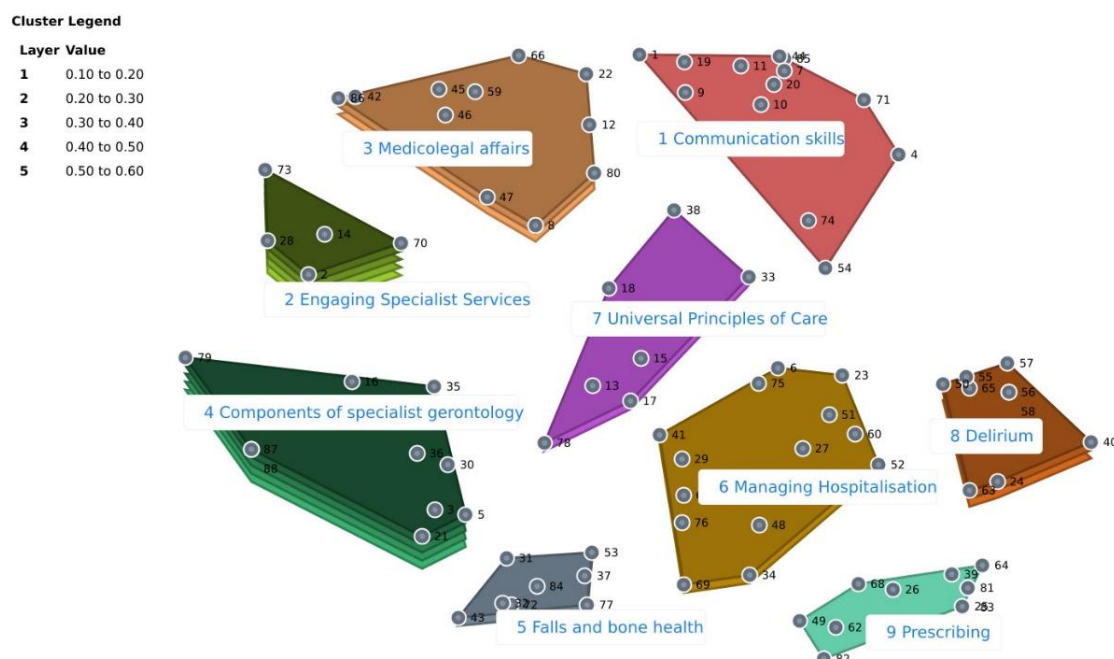


Figure 3 Cluster map showing statements grouped in each cluster/competency domain

3.4.4 Rating results

All clusters were rated as important or very important generalist competency domains required by hospital doctors based on all mean cluster rankings still ranging from 3.84 to 4.42. The average rating for each competency domain was 4.01. Table 9 outlines the average rating of each of the nine clusters.

Cluster	Average rating of importance
Communication skills	4.39
Engaging specialist services	4.17
Medicolegal affairs	4.39
Components of specialist gerontology	3.84
Falls and bone health	4.16
Managing hospitalisation	4.02
Universal principles of care	3.95
Delirium	4.42
Prescribing	4.27

Table 9 Average rating of importance for each of the nine clusters/competency domains

Figure 4 shows the layers representing the rating outcomes. High rating results are shown as a high number of cluster layers.

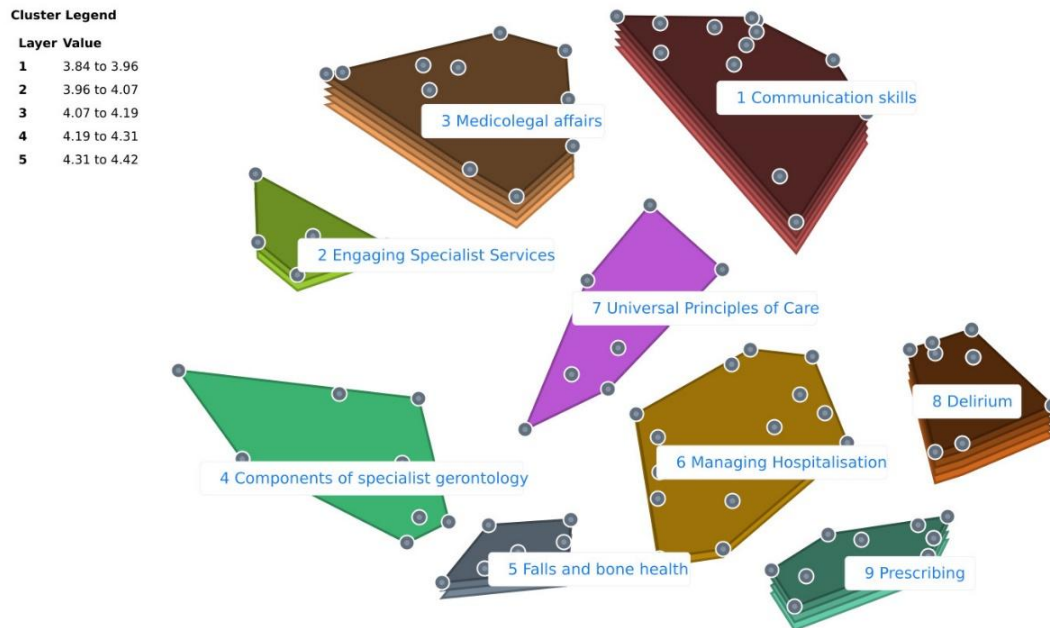


Figure 4 Cluster rating map for importance ratings

3.5 Summary

3.5.1 Main findings

By seeking the perspectives of a diverse group of stakeholders in Ireland, we identified a set of competency domains for hospital doctors caring for older adults. A shared conceptualisation resulted in the development of a visual mapping of these competencies in the form of a concept map of 88 statements within nine clusters.

Our secondary aim was to determine which of these statements should be prioritised for further development of generalist competencies. Of note, all competency domains were rated as important or very important based on mean cluster rankings ranging from 3.84 to 4.42. Statements within **delirium, communication skills, medicolegal affairs** domains were rated as the most important. To ensure targets for promoting healthy ageing are achieved and to avoid unnecessary morbidity and mortality appropriate action to support hospital doctors development of these competencies must be taken (215).

Some statements included may be considered more specialist than generalist. For example, 'Assess *global health and risk of receiving anti-cancer medications*' would probably be more relevant to hospital doctors working in oncology or those who

subspecialise in oncogeriatrics. However, most of the statements and domains in this study could be considered generalist. The broader, more conceptual statements in domains such as **universal principles of care** and **managing hospitalisation** indicate a focus on foundational knowledge and skills required for caring for older adults. Statements such as knowledge of disease epidemiology in older persons, understanding the 5 Ms of age-friendly healthcare systems, distinguishing normal from pathological ageing, and addressing individual patient needs and local challenges suggests that participants believe that comprehensive generalist competencies are required by hospital doctors to care for older adults. Additionally, the inclusion of statements related to basic care tasks, recognising barriers to discharge, and knowing when to refer to geriatric medicine services further underscores the importance of providing comprehensive and patient-centred care to older adults.

3.5.2 Similarities between the main findings of the GCM study and scoping review

Unrecognised and subsequently untreated **delirium** increases the risk of morbidity and mortality in older adults (287) with the prevalence of delirium in older hospitalised patients 32% and up to 53% in older hip fracture patients (288, 289). Indeed, 'identifying and managing delirium' as well as 'implementing risk reduction strategies for patients at risk of delirium' were ranked of high importance by participants in this study. The importance of addressing delirium in older adults was also noted in the scoping review with postgraduate training bodies' competency frameworks, quality improvement projects and educational events at multiple sites (141, 165, 290, 291).

Participants highlighted the complexity that can be encountered when addressing older adults' **medicolegal affairs** and rated these statements as highly important. This is a topical issue globally. Participants' statements indicated requirement to be competent in assessing capacity and obtaining adequate knowledge of medicolegal issues e.g. Enduring Power of Attorney, advance healthcare directives reflect the dynamic landscape of ethics and law pertaining to older adults -most recently with the introduction of the '*Assisted Decision-Making Act*' in Ireland (59). Similarly in chapter two, competencies regarding creating goals of care and facilitating advanced care planning were frequently highlighted in the competency domain chronic disease and

comorbidities management (25, 59, 139, 140, 150, 152, 154, 161, 165, 170, 171, 176, 177, 179, 180, 183, 185, 186, 189, 244, 245, 252, 254, 255).

3.5.3 Differences between the main findings of the GCM study and scoping review

Somewhat in contrast to the scoping review results in chapter two, **communication skills** comprised the largest cluster. This domain included a large variety of statements with ‘being able to communicate appropriately’ the highest ranked individual statement, followed by ‘bearing in mind the specific challenges in this age group (cognitive impairment, hearing loss, vision loss, etc)’ and ‘understanding when to have a clear conversation with the patient +/- family about their (potentially imminent) demise or palliative course and not abdicate from the hard conversations of same’. Calls for improving communication with older adults are not new (213, 226). Policy reports emphasise shared decision making and communication as key competencies to enhance interprofessional collaboration and improve the care received by older adults (215, 292). This has also been echoed by older adult patients and carers who would like to be more involved in decision-making (293). Despite this, competencies outlining communication skills were only described in one third of sources identified in the scoping review, with few postgraduate training body curricula in particular highlighting the recognition and management of communication barriers with older adults and the importance of obtaining a collateral history (61, 238, 241). Competencies pertaining to sarcopenia and malnutrition in older adults were identified within **managing hospitalisation of an older adult** and given an average importance rating of 4.01 (out of 5) by participants in the GCM. However, neither emerged in the scoping review. It is defined as the age-related loss of strength, muscle quality and/or quantity and physical performance (294). Sarcopenia ultimately leads to poor outcomes for older adults including increasing risk of falls and fractures and decreased function (295-297) and is a significant cost to the healthcare service (298) and therefore may warrant inclusion in a generalist competency framework.

3.5.4 Reflection on findings from the scoping review and GCM study

What was expected?

Given the heterogeneity of older adults, I did expect that a large variety of competencies were identified, which reflects the diverse needs of older adults. The identification of certain competency domains including medication management within the scoping review and delirium within the GCM were unsurprising. The importance of developing these competencies is frequently highlighted in the literature, postgraduate training curricula and local and national quality improvement studies.

What was unexpected?

Although all competencies within the GCM were ranked as important, I was surprised to observe that competencies pertaining to medicolegal skills were ranked as more important than prescribing and delirium. This may suggest that although these competencies are frequently addressed in the literature and postgraduate training framework, there may be a gap in ensuring training for developing medicolegal competencies when caring for older adults. This likely reflects the landscape within which healthcare professionals in Ireland which has experienced a recent change in law regarding advance care planning.

What was missing?

Only two competencies within the GCM study and three competencies in the scoping review highlighted the importance of identifying continence care in the older adult. Acknowledging that urinary incontinence is a common problem in older adults and that hospital-acquired incontinence often resulting in increased morbidity and increased length of stay (299) this would be an important domain to explore in future studies.

Steps to develop a more comprehensive list

Although varied competencies were identified in both research studies, it may be possible to develop a more comprehensive list. This could be achieved through a broader inclusion of healthcare workers from different disciplines and specialties both within and outside of Ireland. Additionally, including a selection of older adults who

have frequent contact with the acute setting would also be useful to ensure all possible competencies are identified.

Both the GCM study and scoping review provide a variety of competencies, however complementary studies could be incorporated to capture the ‘how and/or ‘why behind each competency suggested. This could be achieved by carrying out more qualitative studies including a focus group or in-depth semi-structured interviews to help explain the ‘how’ and ‘why’ behind each of the participants suggestions and rankings.

Ultimately, these steps could help further refine the list of competencies.

3.5.5 Strengths and limitations

3.5.5.1 Limitations

Our study contained some limitations. Firstly, the term ‘competency’ although clearly defined(33), many participants may not be familiar with the technical term. We attempted to circumvent this by providing a specific definition for a competency along with the focus prompt and an accompanying example. Secondly, although the prompt highlighted, we were exploring non- specialist competencies, we did not refer explicitly to generalism. Although we sought as many perspectives as possible on the competencies required by all hospital doctors to care for older adults from multiple specialties, there are most likely some perspectives that are underrepresented. Efforts were made to harness Patient and Public Involvement with the inclusion of advocacy groups, and this should be further extended to patients and carers in future studies. Our study focused on healthcare professionals and patient advocacy groups within Ireland only. This may limit the generalisability to other geographical areas, however it should be noted that the Irish healthcare system is similar to many other countries and the Irish postgraduate training system undergoes similar accreditation to other jurisdictions including the UK, Australia and New Zealand (227-230). Finally, we asked participants to rate the statements from one to five based on perceived importance only. Although not strictly an essential part of GCM additionally requesting participants to rate the statements based on relevance and/or feasibility may have provided further opportunity to focus on the most pertinent competencies relevant to all hospital doctors caring for older adults. Due to a limited number of participants completing the rating exercise, subgroup analysis was not carried out. However, if numbers were sufficient,

observations could have been made in whether differences existed between participants working within and outside geriatric medicine as well as between doctors and allied health professionals. This should be considered in future similar studies.

3.5.5.2 *Strengths*

The stress value fell within the acceptable range, indicating that the point map effectively represents the participants' initial sorting. A broad range of HCPs from a variety of specialities and disciplines were recruited. This provided multiple perspectives on healthcare delivery to older adults in the acute setting. The use of a GCM web-based tool granted anonymity and independence to participants, ensuring group conformity and peer influence could be avoided. While did not include older patients, we did include patient advocacy groups to provide a voice for the care needs of older adults.

3.6 Conclusion

This chapter describes a series of statements within competency domains suggested for hospital doctors caring for older adults as defined by key stakeholders. Some statements were recognised that did not directly correlate with the findings of the scoping review, but some similarities were also observed. Similarly to the literature, a large number of statements describing potential generalist competencies were identified. This again reinforces the heterogenous nature of older adults and the challenge of providing adequate care. Critically, participants ranked the statements of most perceived importance for competency development. This represents an important step in determining which competencies should be prioritised for future educational initiatives to develop these competencies.

Chapter 4: Use of simulation-based education to develop a subset of generalist competencies for hospital doctors caring for older adult

4.1 Introduction

In chapter two and three we explored the proposed generalist competencies for hospital doctors caring for older adults. Even with the identification of these competencies, how best to overcome the challenge of delivering these generalist competencies remains uncertain. As outlined in chapter one, most postgraduate education occurs as experiential learning in the clinical learning environment. However, not all CLEs are equal and therefore cannot successfully achieve all learning outcomes for hospital doctors (80, 81). Lack of feedback, inadequate time with patients and supervisors as well as uncertainty around roles and responsibilities within the CLE are cited as some of the reasons for inadequate training experiences (99, 300). A scoping review has recommended that multicomponent educational initiatives that include experiential learning approaches such as SBE as best practice for training those who are not specifically trained in geriatric medicine-including hospital doctors (123, 137-141, 268). Combinations of multicomponent educational initiatives identified included direct observership ward experience combined with didactic teaching and group debriefing (183) or nominal group technique e.g. journal club combined with semi structured interviews (301). Reasons for identifying competencies to care for older adults included lack of formal geriatric medicine training (25, 65, 136, 138-141, 148, 150-152, 154, 155, 158-171, 174-183) and curricula requirement (65, 66, 150, 151, 154, 170, 178, 185-187, 189-193). Simulation-based education could potentially be used to fill this gap and provide structured, formal geriatric medicine training to hospital doctors caring for older adults where the opportunity to develop these competencies in the CLE does not exist. Other specialties including surgical, obstetrics and gynaecological, emergency medicine and anaesthetics training have successfully incorporated SBE to develop competency in procedural skills where the CLE lacks sufficient opportunities to practice these competencies (101-105).

Simulation-based education is increasingly recognised as a potentially useful tool for training non-specialist hospital doctors in the competencies to care for older adults (268). However, there is lack of methodically robust and theoretical aligned research exploring the use SBE for hospital doctors to develop generalist competencies to care for older adults. Research studies utilising SBE to teach geriatric medicine vary significantly with most lacking a comprehensive description of the simulation modality, study methods and resources used, including a complete description of the simulation cycle (136-141, 147, 269). Furthermore, outcome measurements are generally limited to learner satisfaction, knowledge and confidence (136-141, 147, 269). Simulation-based education could be used to potentially provide a structured formal educational initiative for hospital doctors to develop competencies required to care for older adults where traditional, opportunistic workplace learning does not. However, how simulation-based education can facilitate this is unknown. Acknowledging that I was completing a fellowship focusing on simulation-based education and geriatric medicine, in this research study I wished to explore how it could facilitate transformative learning of a specific subset of generalist competencies for hospital doctors to care for older adults.

Other educational initiatives such direct observership on wards, lectures or case-based learning were also considered. Although direct observership would provide experiential learning, the CLE is unpredictable and may lack structure and standardisation. Not all learners may be exposed to the same clinical experience and therefore not have the opportunity to develop the desired competencies. Case-based learning involves discussing real or hypothetical patient cases in a small group. It encourages critical thinking and the application of knowledge to complex patient presentations, however, lacks experiential learning experience.

The effectiveness of SBE can be demonstrated through specific outcomes. In this research study we focused on the development of competencies as an outcome and specifically used the definition *that 'a competency is an observable ability of a healthcare professional, integrating multiple components such as knowledge, skills, values, and attitudes'* (33). Outcomes are shaped by training programs e.g. RCPI and accreditation programmes e.g. Irish Medical Council as well as professional and patient need. Many outcomes are evaluated in medical education through The New World

Kirkpatrick Model which describes four levels of evaluation (302). These levels include reaction (the extent to which learners were satisfied with the initiative), learning (the extent to which learners acquire new knowledge) behaviour (the extent to which what learners have learned is applied clinically) and results (the extent to which outcomes occur as a result of the initiative). In order to achieve these outcomes, reliable scenarios with the appropriate simulation modality (e.g. role play, simulated patient, virtual/augmented reality) must be developed (303, 304) .

Multiple successful outcomes can demonstrate the attainment of competency through a successful education initiative such a simulation-based education. Simulation-based education has been shown to improve patient safety by providing safe and risk free environment where learners have the opportunity to make (and learn from) mistakes as well as perform a task repeatedly without any harm to a real patient (305). A study demonstrating the effectiveness of SBE in developing competence in central venous catheter insertion showed a reduction in complications including pneumothorax and infection (306). Similarly SBE has also helped to reduce errors e.g. medication errors with one study showing an improvement in medication safety among learners who participated in SBE (307) Clinical outcomes have also benefitted from learners who participate in SBE with frequent in-situ SBE training for paediatric cardiac arrests resulting in improved survival rates (308).

Simulation-based education has also been shown to a useful initiative to develop non-technical skills i.e. cognitive, social, and personal skills required by healthcare professionals which underpin successful teamwork, decision-making, and situational awareness in complex and dynamic healthcare environments (312). Inadequate non-technical skills amongst healthcare professionals significantly contribute to adverse medical events (313, 314). There is growing recognition that sufficient NTS are considered essential to provide high quality healthcare including improving interdisciplinary relationships, communication skills and ultimately resulting in improved patient outcomes (315-317). Successful outcomes for non-technical skills can be considered at both an individual and collective level. At an individual level this can include a change in behaviour such as the consistent application of communication and teamwork frameworks e.g. Team STEPPS (described in section

4.4.1) (309). At a collaborative level, simulation scenarios often require participants to work together, assign tasks and communicate effectively. These scenarios encourage the development of interpersonal skills that are essential for a function healthcare team and have been shown to improve clinical decision-making and outcomes. This has been particularly the case within obstetric emergencies with one study showing the use of simulation to develop non-technical skills can greatly reduce neonatal injuries (310).

Specific outcomes pertinent to the education of the management of the older adults involving demonstrating non-technical skills such as clinical decision making, situational awareness communication and collaboration include:

- Screening for delirium using a validated tool e.g. 4AT; Avoiding the use of sedation unless clinically indicated and implementing non-pharmacological interventions e.g. reorientation, reassurance and music therapy. (clinical decision making, situational awareness). This is an integral competency for doctors to develop as delirium in hospitalised older adults can be as high as 33% (311)
- Formulating and communicating a clear plan to deprescribe medications to a patient and caregiver in the case of polypharmacy and potentially inappropriate medications (communication). This is an important competency as potentially inappropriately prescribed medications are associated with an increased mortality in older adults (312)
- Performing a functional assessment of gait and balance screen and collaborating with multidisciplinary team members for a comprehensive mobility assessment of an older adult at risk of falls (collaboration, communication and clinical reasoning). This is an integral competency for trainees to develop as World guidelines for falls recommend consulting with physiotherapy as part of a management (313). Furthermore, falls in older adults affect quality of life and are associated with increased morbidity and mortality (314).

4.2 Study aim and research question

In this study I wished to answer the research question:

‘How can simulation-based education support the transformative learning of generalist competencies to care for older adults?’

4.3 Conceptual framework

4.3.1 Phases of transformative learning theory

Learning theories can provide a framework to support instructional design by explaining the effectiveness of specific educational initiatives under various circumstances (125). As this research study was developed various learning theories were considered. Although Kolb’s experiential learning theory could be applied to an SBE scenario, it tends to focus more so on the cyclical nature of experiencing, reflecting and conceptualising and subsequently experimenting. This aligns well with skills acquisition. The broad aim of our study was to determine how exactly SBE could facilitate transformative learning of a specific set of competencies. I wished to go beyond increasing knowledge and confidence and instead explore how SBE could serve as a catalyst for transformative learning of these competencies under a specific set of conditions and design. Mezirow’s TLT offers a theoretical roadmap to explain how the learning process can occur in this context and allows us to fully capture a more in depth understanding of each step of the transformation process and how this may contribute to the acquisition of the specific set of geriatric medicine competencies by all hospital doctors I wished to explore. Additionally, the phases of TLT closely align to stages of the simulation cycle (figure 6), allowing interrogation of each of the different stages of transformation that the learner may or may not experience during and following participating in the SBE scenario. Through SBE learners are exposed to a concrete experience (disorientating dilemma). They can immediately reflect on the experience both as an individual and in a group setting (debriefing). This reflection leads to the development of new ideas or theories that they can then test and apply in future (346). This process aligns to the inductive process steps in Mezirow’s perspective transformation (370). Furthermore, the ten phases of TLT provide a structured way to

guide the debrief and interview questions and analyse the qualitative data collected. Existing studies highlight that the use of Mezirow's transformative learning theory (TLT) by faculty in the design of SBE promotes reflection on previous beliefs, clinical approaches and biases prompting planning for different approaches to future clinical situations (90, 91, 126, 298). These studies have focused on developing both technical and non-technical competencies in undergraduate pharmacy and medical students (90, 126). I chose Mezirow's transformative learning theory as a lens through which we could determine how SBE can facilitate learning of a subset of generalist competencies for all hospital doctors caring for older adults. As outlined in chapter one, Mezirow proposed that an adult learner's experience may challenge their current beliefs and understanding of the world, encourage reflection and impact on their future actions (130, 131). Mezirow suggested that the process of transformative learning took place within ten steps (figure 4.1) (134, 135).



Figure 5 Mezirow's ten steps of transformative learning theory

4.3.2 Core concepts of Transformative learning theory

Mezirow's transformative learning theory contains several key concepts that are integral to understanding and applying the theory to any educational initiative:

- *Frames of reference* are the “underlying assumptions or beliefs through which we understand our experiences. They selectively shape and delimit expectations, perceptions, cognition, and feelings” (315).
- *Habits of mind* are defined as “broad, abstract, orienting, habitual ways of thinking, feeling, and acting influenced by assumptions or beliefs that constitute a set of codes. These codes may be cultural, social, educational, economic, political, or psychological” (315).

- *Points of view* are defined as “the constellation of belief, value judgment, attitude, and feeling that shapes a particular interpretation” (315).
- *Meaning perspective* refers “to the structure of cultural and psychological assumptions within which our past experience assimilates and transforms new experience” (316).
- *Meaning scheme* is the “constellation of a concept, belief, judgement, and feeling which shapes a particular interpretation” (317).

4.4 Methods

4.4.1 Study design

Several methods to determine whether participation in an SBE scenario facilitated transformative learning were considered. These included Rapid cycle deliberate practice (RCDP) and ‘Think Aloud’ (318, 319). Rapid cycle deliberate practice is a simulation-based instructional strategy developed by John Hopkins University, utilising simulation as an instructional tool and incorporating simulation and crisis resource management (318). Learners engage in repeated practice of a SBE scenario, with brief, targeted feedback sessions provided by the facilitators throughout (318, 320). This is repeated until a learning outcome is achieved. It has shown to be suitable for both technical and NTS training. However, whether RCDP is effective or superior to traditional simulation remains uncertain (321, 322). Similarly, the ‘Think Aloud’ method involves learners verbalising their thoughts as they perform a task allowing the researchers to gain insight into the cognitive processes underlying a task performance (319). Post-simulation debriefs could be incorporated to further clarify the learners’ thought processes and decision-making. I hypothesised that ‘Think Aloud’ would align with the earlier phases of TLT, particularly a disorientating dilemma, critical reflection and planning a course of action. However, given there were a maximum of 60 minutes available to deliver a full SBE event including a prebrief, scenario and debrief, this would not be feasible.

Certain phases of Mezirow's TLT closely align to stages of the simulation cycle (table 10). This allows to examine each of the different stages of transformation that the learner may or may not have experienced during and following participating in the SBE scenario. Through SBE learners are exposed to a concrete experience (disorientating dilemma). They can immediately reflect on the experience both as an individual and in a group setting (debriefing). This reflection leads to the development of new ideas or theories that they can then test and apply in future (323). This process aligns to the initial phases in Mezirow's perspective transformation (134). While debriefing encourages reflection, using TLT to guide the debrief can result in ensures a more profound and targeted outcome. The addition of structured inquiry around TLT's ten components can encourage additional deeper reflection in various ways.

Using TLT to guide the debrief can begin with the disorientating dilemma. The facilitator can explore the specific moment in the simulation that challenged the learner's assumptions and provided the catalyst for transformative learning. Transformative learning theory emphasises critical self-reflection, which goes beyond just reviewing actions. It prompts learners to consider the underlying beliefs and assumptions that guided their decisions, encouraging the participants to move past a simple review of their actions. The use of TLT to guide a debrief can specifically influence participants to explore new roles, relationships, and actions. This can encourage them to consider alternative ways of thinking and acting, which can lead to a fundamental change in their professional perspective. Incorporating TLT into the debrief guide can allow participants to plan how they will apply new knowledge to future practice. Although not guaranteed this reflection can help to influence future clinical behaviour as a result of participating in the SBE scenario and debrief. Through SBE learners are exposed to a concrete experience (disorientating dilemma). They can immediately reflect on the experience both as an individual and in a group setting (debriefing). This reflection leads to the development of new ideas or theories that they can then test and apply in future (346). This process aligns to the inductive process steps in Mezirow's perspective transformation (370). We wished to empower all hospital to care for older adults with reference to this specific set of geriatric medicine competencies. Critical reflection plays an integral role in the promotion of autonomous thinking in adult learners (375).

Similarly to SBE, transformative learning theory focuses on both the experience of the individual learner through self-reflection as well as the discourse with peers.

Specifically, the debrief stage of the simulation cycle can facilitate key phases in TLT - 'critical assessment' and 'recognition' of dissatisfaction of others as a mechanism for transformative learning with successful transformation achieved through significant exploration of alternative perspectives with others (376). The acquisition of new perspectives requires validation through the viewpoints of others. Self-reflection and encouraging the sharing of peer experience are often similarly promoted in the vital debriefing stage of the simulation cycle under the guidance of established debriefing tools encouraging reflection (360, 361). The ten phases of Mezirow's TLT and how they align to the simulation cycle are outline below in table 10.

	PHASES OF MESIROW'S TRANSFORMATIVE LEARNING THEORY	STAGES OF SIMULATION CYCLE AND SEMI-STRUCTURED INTERVIEW
1	<i>Disorientating dilemma</i>	SBE scenario
2	<i>Self-examination (of assumptions)</i>	Debrief
3	<i>Critical assessment (of assumptions)</i>	Debrief
4	<i>Recognition (that others have negotiated similar challenges)</i>	Debrief
5	<i>Exploration of potential new roles, relationships and actions</i>	Debrief
6	<i>Plan future actions for similar clinical situations</i>	Debrief
7	<i>Acquisition of knowledge and skills</i>	Post-simulation scenario accessing guidelines, literature and other resources
8	<i>Describing how learners trialled new roles</i>	Semi-structured interview
9	<i>Describe how learners confidently executed a new approach to similar clinical scenarios</i>	Semi-structured interview
10	<i>A reintegration into ones life on the basis of the conditions dictated by the learners new perspective</i>	Semi-structured interview

Table 10 Mezirow's ten phases of Transformative Learning Theory aligned to the simulation cycle

To address the research, question a bespoke SBE scenario was designed to determine whether this facilitated transformative learning of subset of generalist competencies for hospital doctors. The decision to develop and focus on a single simulation scenario was pragmatic in nature. To optimise participation and reach as many different hospital

specialties as possible we carried out the simulation part of our study at already established educational activities including specialty journal clubs and dedicated intern and SHO teaching. Different hospital specialty departments were unable to offer more than one slot at their regular educational events. Additionally, we acknowledged the time demands already placed on our target participants and therefore decided not to run a number of simulation scenarios outside of clinical working hours or as an additional activity within their clinical working hours. Therefore, we focused on developing and designing one scenario. A qualitative approach focusing on the 'how' of the learning process was required in order to answer the research question. Using a single SBE scenario facilitated a rich, in-depth analysis of each participant's experience, reflections and subsequent changes in perspective and habit (if any). In addition, developing and focusing on a single scenario ensured that the design and development was meticulous, ensuring fidelity by replicating as close an authentic experience as possible. Finally, the single scenario was carefully designed to align to certain phases of transformative learning theory. This may have been difficult guarantee consistently across multiple scenarios.

Acknowledging that the competencies we wished participants within this study to develop were primarily non-technical skills, a number of methodologies to achieve this were considered. Theoretical methodologies include the incorporation of frameworks with theoretical underpinnings for the design and evaluation of the simulation intervention to develop non-technical skills. For example, the Team Strategies and Tools to Enhance [performance and Patient Safety (Team STEPPS) theoretical framework provides a framework and set of tools for participants to develop non-technical skills (309). The framework is based on five principles which participants are encouraged to practice in a simulation scenario. These principles include defining clear roles and responsibilities, communication, leadership, situation monitoring and mutual support (324). A post simulation debrief follows to determine how effective the team incorporated the principles, examining how their actions may have affected outcomes. Non-theoretical methodologies to quantify the evidence include pre and post assessments. Behavioural checklists e.g. Non-technical Skills for Surgeons (NOTSS) provides a standardised framework for assessing and training surgeons to develop in

non-technical skills including decision making, leadership and teamwork (325). This framework utilises behavioural markers to identify observable behaviours and help the observer to provide structured feedback to the learner (325). Qualitative methods include observer reports to provide detailed qualitative feedback on participant behaviours, although this may be subjective. Other qualitative methods include interviews and surveys can also be used following participating in a simulation to gain deeper insights into their experiences and determine the effectiveness of the simulation intervention in developing non-technical skills.

For this research study, I chose to align the phases of Mesirow's TLT to a simulation scenario followed by a group audio recorded debrief approach and subsequent audio recorded individual semi-structured interviews with reflexive thematic analysis (rTA) to answer the research question.

4.4.2 Setting and resources

This study was carried out in University Hospital Waterford (UHW) in Ireland. University Hospital Waterford provides clinical training to multiple HCPs at both undergraduate and postgraduate level and has a dedicated gerontological simulation laboratory. Although UHW is part of larger hospital group- South/Southwest Hospital Group (SSWHG), given the available timeframe to complete our research study, and the personnel and resources required to successfully run a SBE event, it was not feasible to run the event across a number of sites. I therefore decided to run the same SBE scenario a number of times in UHW.

Recognising the limited time and competing demands faced by hospital doctors and to maximise participation and reach as many different hospital specialties as possible, I opted to implement a "simulation on the go" approach, bringing the SBE scenario directly to participants during their regularly scheduled educational activities e.g. journal club rather than in the simulation laboratory. I chose to carry out the SBE scenario using simulated participants (SP) in two adjoining classrooms on the hospital site, thereby facilitating the prebrief, debrief, and observation of the SBE scenario in a separate room. In-situ audiovisual (AV) equipment- InSitu Scotia Medical Observation

and Training System (SMOTS)- was used to facilitate this. This included three wireless cameras with built in hi fidelity microphones and a wireless network. This allowed us to broadcast the SBE scenario the observer room.

Considering the space is used for other educational activities, I prioritised a minimalist approach to the resources required ensuring an efficient setup while maintaining sufficient fidelity to provide a meaningful learning experience for the learners.

Resources included a plinth which was already in the classroom, a vital signs monitor, a UHW drug Kardex, UHW patient notes, Irish National Early Warning Score (INEWS) chart (to monitor patients' vital signs and detect early signs of deterioration), a phone, 4AT screening tool (326), Parkinson's disease 'Nil by mouth' medication dose calculators and guidelines (327) and the 'Health Service Executive (HSE) Delirium on General Hospital Wards Algorithm' (328) and a British National Formulary (BNF) (provides information about prescribing and pharmacology) (329) and the results of relevant investigations including radiological imaging e.g. a chest x-ray and abdominal x-ray, and laboratory results e.g. blood tests. All materials were sourced from the WICOPSIM laboratory.

The semi-structured interviews were also audio recorded and took place face to face two to four weeks after the learners had participated in the SBE scenario. The interviews took place in a boardroom in UHW. All interviews were carried out by EB at a time convenient for the participants.

4.4.3 Participants and recruitment

4.4.3.1 *Participants*

We purposely recruited participants from a range of hospital specialties and grades including interns, senior house officers (SHO), registrars and specialist registrars. To achieve this, we purposively recruited departments with regular educational activities (including grand rounds and journal clubs) as well as routine SHO and intern teaching events.

4.4.3.2 *Recruitment for scenario and group debrief*

Each departmental lead was contacted via email (using the UHW directory) by researchers EB and JC for recruitment regarding available activities in their educational

timetable for a SBE scenario to take place. In the case of intern and SHO teaching, the relevant medical, surgical and intern tutors were also contacted via email using the UHW directory. Two tutors and nine departmental leads were approached. Both tutors and seven departmental leads agreed to the research team using a slot in their educational timetable. Departmental leads and tutors were asked to disseminate an invitation including the participant information leaflet inviting them to participate in the SBE scenario and debrief and semi-structured interview (Appendix H). This document outlined the nature of the study, what participating would involve, and how data would be collected and managed. Diverse observers provided alternative perspectives including approaches to patient care and provide a wider team communications (330, 331). Potential participants were informed that even if they didn't participate as a learner, they were welcome to participate as observers and participate in the debrief. Participants were informed that the debrief would be audio recorded but no identifiable information would be collected. They were advised they could opt out of the study at any stage and that written consent would be obtained prior to the event. Participants were also informed that those who participate as a learner in the SBE scenario would subsequently be invited to participate in an interview at a later date. In keeping with 'Healthcare Simulation Standards of Best Practice' participants were provided with preparation materials including the relevant resources and guidelines to enhance and build upon learners' existing knowledge and experience, remove any unnecessary surprise element and to promote meaningful engagement in the debrief (332-334).

4.4.3.3 Recruitment for individual semi-structured interviews

Those who participated as learners in the SBE scenario were asked immediately prior to taking part if they could be contacted via email (which they provided) to participate in the semi-structured interview at least two weeks post the SBE event. These participants were contacted via email and invited to participate in an interview. The email included the study participant information leaflet (Appendix H) outlining the purpose of the study, how data would be collected and managed and that they could opt out of the study at any stage. If participants were happy to participate a follow-up email was sent to schedule the interview.

4.4.3.4 Sample size

Taking into account the scope of the research topic and nature of the study, the research team decided an approximate sample size of 8 to 10 debriefs and subsequent interviews (335).

4.4.4 Data management

Both the debriefs and semi-structured interviews were audio recorded and transcribed by a professional transcription company. Files were transferred using a secure encrypted file transfer system. All audio files were uploaded using a file transfer protocol (FTP) server which could only be accessed by the transcription service and returned via this server. All data (transcriptions, audio file) was stored on a UCC MS OneDrive account accessible to students and research team. The storage period will be ten years in line with the UCC research data management policy.

4.4.5 Consent

4.4.5.1 Debrief

Written consent for the audio recording and analysis of the debrief was obtained immediately prior to all SBE scenarios (Appendix I). In instance that participants wished to observe the scenario but did not participate in the audio recorded debrief, they were asked to leave after the SBE scenario but before the debrief began. The importance of supportive and trusting environment were reiterated i.e. psychological safety as outlined in the prebrief before commencing each debrief as learning can only be achieved through social discourse if these conditions exist (130, 336).

4.4.5.2 Semi-structured interviews

For those who had participated as the learner in the SBE scenario written consent was obtained immediately before the interview began (Appendix J).

4.4.6 Ethical approval

This study and subsequent amendment were approved by the Research Ethics Committee, Health Service Executive South- East (Appendix K and L).

4.4.7 Scenario design

To develop a SBE scenario that enhances the learning for study participants I used an instructional design model. Instructional design is the principles and procedures by

which instructional, materials, lessons and whole systems can be developed in a consistent and reliable fashion (337). A simulation-based education scenario was developed using the Waterford Integrated Care for Older People Simulation (WICOPSIM) template. Having spent 18 months developing and writing gerontological-based SBE scenarios for healthcare professionals as the simulation fellow at WICOPSIM, I was able to leverage my prior experience and existing scenario outlines to create a SBE scenario focusing on the learning objectives outlined above. The initial draft was reviewed by members of the research team (JC and AB) and members of the WICOPSIM faculty. Clarity on how learning outcomes were determined and concerns regarding the duration of the SBE scenario and the complexity (the requirement to switch Parkinson's disease medications from oral to alternative route) of the SBE scenario were discussed. The final version included a ten-minute prebrief, fifteen-minute SBE scenario, allowing for a thirty-five minute debrief. A full description of the SBE scenario design process including learning objectives is described in appendix M. The SBE scenario is outlined in appendix N.

4.5 Data collection

4.5.1 Debrief

A debrief is a reflective discussion that occurs following an educational experience and is the foundation of learning in SBE and enables learners to reflect upon, share and discuss the experience that has just occurred as well as plan for future similar events(338). The structure of the debrief was a blended approach consisting of questions based on phases one to six of TLT and the Promoting Excellence and Reflective Learning in Simulation (PEARLS) debriefing tool (339). This provided a structured, yet flexible framework that combines directive and non-directive debriefing strategies with five distinct phases including reactions, descriptions, analysis and summary and application. Each debrief with the learner and observers was conducted by EB immediately following the SBE scenario.

A pilot debrief was carried out immediately following a pilot SBE scenario with a group of interns. The audio recording was interrogated by EB and AB. To foster a supportive environment and assist the learners in recognising that their peers have also undergone

comparable experiences in similar clinical scenarios, we decided in future debriefs that an emphasis should be placed on involving all participants in both the initial reaction and future planning aspects of the debrief.

Appendix O demonstrates the questions used to guide the debrief.

4.5.2 Semi-structured interviews

A research interview is a guided conversation between the researcher and participant and are considered the cornerstone of qualitative methods, challenging the researcher to pose questions that encourage the participants to share their narratives (281). Semi-structured interviews were selected as a data collection method for this part of the study due to their inherent flexibility and adaptability. This approach allowed for a dynamic exchange between the researcher and participants, enabling exploration of and in-depth probing of specific responses relevant to our study (340). In addition, acknowledging that participants varied in both grade and specialty, worked in a single clinical site and may or not have a working relationship, semi-structured interviews were considered more appropriate than a focus group to explore what can be delicate topics in the absence of peers. This allowed us to gain detailed meaningful insights into each learner's experience within the SBE scenario and its subsequent effects (if any), whether positive or negative in participating in future similar clinical encounters.

This allowed adequate time for the learners to encounter a similar clinical scenario. In keeping with the nature of semi-structured interviews, questions were open-ended and with aim to foster participants to discuss their experiences and thoughts openly, with prompts to encourage further discussion when necessary while also not influencing the participant to provide certain answers that may reflect my own opinion as the researcher (281). The interview guide aligned with phases one to ten of TLT (Appendix P).

A pilot interview took place with the learner who participated in the pilot SBE scenario and debrief. The recording was reviewed by researchers AB and EB. Questions were refined to ensure a more focused line of enquiry of what particular elements of the simulation scenario exactly may have influenced the participants subsequent approach in a similar scenario, to explore their perceived value and perceptions to having taken part in this particular simulation.

Conceptual and practical preparations were undertaken to prepare for interviewing the learners including background reading on Transformative Learning Theory , its application to simulation-based education as well as how to successfully conduct semi-structured interviews (341, 342). I had prior experience conducting semi-structured interviews as part of a Master of Sciences (MSc) in Health Professions Education National University of Ireland Galway (NUIG) and utilised this experience to inform this research study. These considerations collectively informed the development of the interview guide for the semi-structured interviews, as detailed in Appendix. The interview guide was reviewed by members of the research team. In keeping with TLT, we particular wished to explore what elements of the simulation may have led to any self-reflection, change in behaviour or how the participant approached a clinical scenario and whether their perception of the role of other HCPs in working through a clinical scenario had altered in any way. Questions that touched on phases one to four were also revisited to enable the participant to recall the simulation scenario.

4.6 Timeline

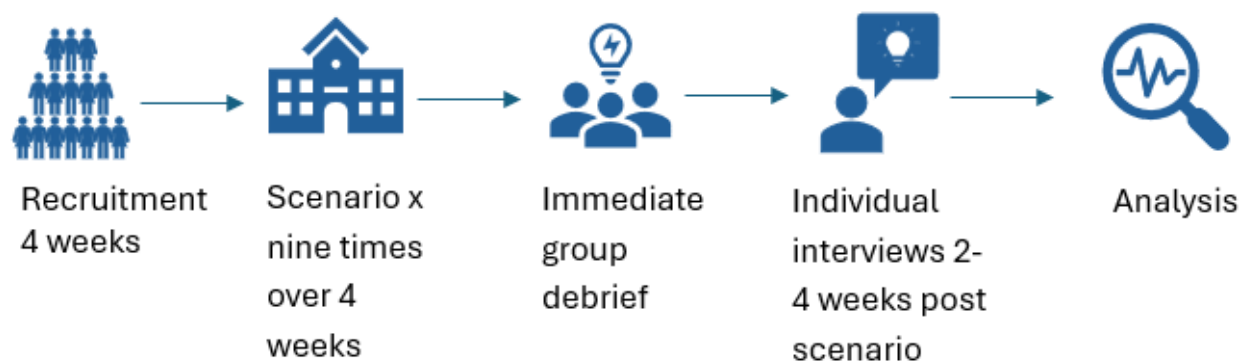


Figure 6 Timeline of study from recruitment to analysis

4.7 Analysis

I chose Braun and Clarke's reflexive thematic analysis for the collective analysis of the debrief and interview datasets (343). Thematic analysis (TA) involves identifying and analysing patterns or themes within qualitative data (343). It organises and describes data in rich detail with the opportunity to interpret various aspects of a research topic (343). Reflexive thematic analysis serves as a valuable method for comprehending the

experiences, thoughts, or behaviours present within a dataset. The flexible approach of rTA meant that our initial analysis could be informed by the pre-existing theoretical framework provided by Mezirow's TLT, allowing us to align coding and theme generation to our broader research question and determine if our data supported Mezirow's theory. However, to ensure we were not limiting our ability to capture any unique participant perspectives and unanticipated themes we also used an inductive approach. This combined approach offered a more nuanced understanding of whether SBE could be used to facilitate transformative learning of a particular subset of generalist competencies for hospital doctors.

I began the first step of **familiarisation**, fully immersing myself into the dataset by reading and rereading the interview transcripts (343). Annotations were added to segments of data that were considered relevant to the research question. My initial interpretations and observations were predominantly deductive. As I progressed through the more structured second stage of analysis **coding**, I was determined to attempt to be inductive in my approach and avoid actively identifying and searching for elements that may relate to transformative learning theory but instead persist with an open mind to allow descriptors to be generated, whether relevant to TLT or not. Coding was carried out using NVivo 12. AB and EB openly coded the data with the research question in mind and TLT as a sensitising influence. Notably, AB is a medical educator and working within a different specialty. This provided an external viewpoint which helped to mitigate any potential views stemming from shared assumptions I may have had with the participants, ensuring an authentic representation of the participant's perceptive throughout the analysis (344). Data segments were labelled with descriptors relevant to the research topic. Candidate themes were then developed in next phase **generating initial themes** and collected appropriate data extracts. Microsoft Word was used to visually map and cluster codes into initial themes wherein the codes were deemed to relate a similar meaning. Coded data was reviewed to determine relationships between the codes and develop themes. In the next phase **developing and reviewing themes** we reviewed and developed our initial themes, particularly exploring the nature of each theme, what the boundaries of each themes were and whether enough data to support the theme was present. The process of **refining**,

defining and naming themes continued and overlapped in phases five and six with the process of writing up the analysis and formatting the report. Throughout these phases we carefully redefined each theme, the central concept of each theme and the boundaries of each theme. Throughout the process of analysis, we met regularly and worked together supporting each other's reflexivity. Disagreements were openly communicated and acknowledged. When required data was re-examined, alternative perspectives considered, and consensus negotiated.

4.8 Reflexivity

The chosen methodological approach required recognition of the researcher's active involvement in shaping knowledge along with participants. I was acutely aware that I held multiple blended identities in relation to the data including the interviewer, SBE facilitator, geriatric medicine specialist registrar and one of the researcher team members. This fostered some inherent views when reading the responses but also, I acknowledged that the participant responses may have been influenced by my position. Given the nature of the topic, my background and I was compelled to examine my own assumptions and beliefs (345). Personal reflexivity included my ongoing specialist training in geriatric medicine, prior experience in simulation, my previous position as a fellow and my motivation for the simulation laboratory to be successful, as well as the outside influence of developing policy for simulation-based education in Ireland and globally. I recognised that research ideas may have stemmed from my professional experiences as a specialist registrar in geriatric medicine and my professional experience with simulation e.g. co-ordinating departmental educational activities and a hospital group simulation-based competition. This professional and personal experience also helped me write a simulation scenario around the dedicated learning outcomes.

4.9 Results

4.9.1 Overview

A total of nine debriefs were carried out with the learner and observers of the nine SBE scenarios. There was one learner in each SBE scenario and between four and eleven participants in each debrief. The duration of the debrief sessions were between 12 and

37 minutes with a median of 22 minutes. All interviews were conducted face to face with participants. They ranged from between 16 and 35 minutes in duration with a median of 24 minutes. The interval between participating in the scenario and semi-structured interview ranged from 16 to 42 days with a median interval of 23 days. Most learners were internal medicine hospital doctors from a range of specialties. Table 11 the different specialties and grades of the participants.

Participant	Grade	Specialty
P1	Intern	Infectious Diseases
P2	SHO	Surgery
P3	SHO	Renal
P4	SHO	AMAU
P5	Registrar	OBGYN
P6	SHO	Endocrinology
P7	SHO	Renal
P8	SHO	Haematology
P9	SHO	ID

Table 11 Specialty and grade of each participant (p-participant; SHO-senior house officer; AMAU-acute medical assessment unit; OBGYN- obstetrics and gynaecology; ID- infectious disease

Although we interpreted the participants' narratives as being varied and reflective on their experience in the SBE scenario focusing on caring for older adults with delirium and Parkinsons disease, we identified four themes in the data relating to participant learning discussion:

- 1.) Creating a realistic clinical challenge;
- 2.) Simulation acts as a catalyst for reflective learning;
- 3.) Planning for future clinical scenarios
- 4.) A paradigm shift

4.9.2 Results of thematic analysis

4.9.2.1 Theme 1: Creating a realistic clinical challenge

Definition: The theme 'creating a realist clinical challenge' is illustrated in multiple ways throughout the dataset highlighting the physical, emotional and psychological elements of a simulation scenario that under certain conditions work synergistically to create a 'disorientating dilemma' and mimic a real-world clinical scenario.

Fidelity is the central idea of this theme and repeatedly arose throughout the dataset. Participants frequently reflected on the notion of how closely the SBE scenario mimicked previously experienced clinical scenarios. Participants highlighted various aspects of the scenario that created a sense fidelity including physical, psychological and conceptual fidelity which helped to successfully created a high sense of fidelity for the participants caring for an older adult with delirium and ultimately contributed to a 'disorientating dilemma' (346).

Physical fidelity was achieved for participants through the presence of items including a drug Kardex, hospital bed, test results and radiological imaging.

'So why did it feel real- because the room where the scenario was managed, it looked like a ward or an patient's private room, there was a couch, there was a patient, we had his notes, there was a drug Kardex, which was written completely with all of his medications or something was missing, there was a nurse who was attending, there were actual notes from his vital signs, there was a phone and the family was online to speak to the doctor on call, so it felt very real and I felt like I'm actually treating a patient' (P2) (Participant interview two)

The participant's experience of the SBE scenario aligned with their expectations of a similar clinical scenario ranging from interactions and relationships with other HCPs and the presentation of the patient's signs and symptoms, suggesting a high degree of conceptual fidelity.

'The whole atmosphere. So, I was in a room with a nurse and a patient. The patient was very agitated. We had all the results. I knew the whole scenario as well. The nurse was really kind in the beginning anyway. She told me everything that I needed to know. I think that is how the most scenarios go even in clinical practice. You just go in. The patient is really agitated. You have to see the notes, and you have to collect all the information... It is the skills that I require on the job, because you are constantly under pressure by the nursing staff and by the patient and by the patient's family as well' (P9)

'I wasn't sure what to do if the person is refusing all his meds and pulling off his cannula. I was going to say to give him some sedation, but I am not sure that is the right thing to do' (D2) (Debrief two)

Participants described elements of psychological fidelity that transcended the physical environment evoking emotions and cognitive processes. Particularly stress and frustration relating to other HCPs and perceived barriers to providing the desired level of care while simultaneously attempting to assess the situation and create a management plan. Heightened emotions and anxiety in the setting of SBE can augment cognitive load and potentially hinder the participants performance and is often typical of such experiences (347-349). Conversely, intensified emotions and anxiety caused by such a 'disorientating dilemma' can also be fundamental to transformative learning as it not only prompts a reflection on previous actions and preconceived notions but can also initiate a search for new meaning and increase participant motivation which in turn increases any potential learning (350, 351). Presented together the different aspects of fidelity help to create an SBE scenario that represents Mezirow's step one 'a disorientating dilemma' to the participant wherein they are confronted with a scenario that sets into motion a journey where their current knowledge and beliefs are challenged, altered and expanded (133, 315).

'I think that like the decision making was real, I suppose it is all process about kind of like what would I do? It's the same job process I would have if I was actually seeing a real person' (P7)

'The challenging part was the patient was very agitated. She was coming out of the bed. I thought it was really difficult to brainstorm and to keep the patient calm at the same time. I think that was the most challenging part and even clinically that was the most challenging part, I guess, because you have to make quick decisions, but she was not harming anyone... I think that is how the most scenarios go even in clinical practice. You just go in. The patient is really agitated' (D9)

4.9.2.2 Theme 2: Simulation acts as a catalyst for reflection

Definition: Throughout the dataset participants considered how participating in the SBE scenario encouraged reflection on their previous preconceptions, how they previously approached similar clinical scenarios involving older adults with delirium, how this may have changed and how they are exploring this new knowledge and will adapt their approach to assessing an older adult with delirium. Subthemes within this theme include 'learners critically examine their own performance', 'reflection on knowledge

limitations', 'reflection on bias, assumptions and preconceptions', 'sharing experience with peers and recognition that others have had similar experiences', 'reflection on the role of other healthcare professionals'.

Learners critically examine their own performance

Participants held themselves to very high standards and critically evaluated their performance and sought areas for improvement through introspection. They were self-aware and acutely focused on mistakes they may have made in the SBE scenario. Mezirow's initial framework highlighted the presence of shame and guilt in the second phase of transformative learning that prompts self-reflection of their own performance and roles (133). In keeping with the ethos of SBE, we were not attempting to stimulate negative feelings or emotions but instead prompt self-reflection on actions and explore why these actions were taken by the participant.

'I did well but I think I missed something as well maybe I overlooked that she could have been in pain as well, you know. I think I didn't ask for the medication. That is what I think about, yeah'. (P9)

'So, I should have probably examined her to see how stiff or rigid she was but so when they had told me she was in Sinemet and not eating and drinking...PINCH ME, I forgot to use that'. (D2)

Reflection on knowledge limitations

Participants identified a sense of vulnerability when faced with an SBE scenario that was somewhat outside of their comfort zone, prompting participants to consider their knowledge limitations. This is even further enhanced by an awareness of also being observed by peers.

'Well, I can deal with any medical stuff but if they have surgical complication, I am not experienced one in recognising them. I can recognise that a patient is unwell, but I guess I am not experienced in figuring out what the specific surgical complication is. Obviously, no means to actually intervene if there is a surgical complication.' (P3)

'I actually don't know what Sinemet is. I was pretending the whole time to know what it is. (Laughter)...I think with Parkinsons Disease, I'm very uncomfortable' (D1)

Reflection on bias, assumptions and preconceptions

Critical reflection plays an integral role in the promotion of autonomous thinking in adult learners (352). Participating in the SBE scenario provided the opportunity for participants to examine their previous approach to older adults with delirium and Parkinson's disease, any preconceived notions and search for how this could be transformed as a result of the SBE scenario. Participants realised that alternative approaches to caring for older adults with delirium exist. They reconsidered their new position and attempted to rationalise this new point of view.

'Yeah, I think the way that I stood there and tried to understand, like to organise myself, I think that's the way it should be all the time, because when we're on call, it is just running, running... And trying to make the nurses happy rather than actually dipping into the problem because you just want to make sure, they don't call you again for that. But this was very calm and focused, and I just felt I had the time to think' (P4)

'There could be a few factors for delirium in the background and when you're on call you wouldn't really do that.... the Sinemet for example I would be more distracted by a patient who is post op, thinking you know, they have an infection and then to consider medication held. Or if you're called about a patient who's just admitted, their medications aren't yet written in their Kardex, you could think of that as like a lower priority job, but it's actually quite important for the same reason because they could downstream you know' (D1)

Sharing experience with peers and recognition that others have had similar experiences

Certain phases of Mezirow's TLT have been shown to align well with the debrief stage of the simulation cycle (94, 129, 353). This is particularly the case for phases four (recognising dissatisfaction) and five (exploration) as a mechanism for transformative learning. Successful transformation can be achieved through significant exploration of alternative perspectives with others (354). The acquisition of new perspectives requires validation through the viewpoints of others. Self-reflection and encouraging the sharing of peer experience are often similarly promoted in the vital debriefing stage of the simulation cycle under the guidance of established debriefing tools encouraging reflection (339, 355). Debriefing sessions that foster analysis of problems encountered

during clinical scenarios promote learner engagement in the critical reassessment of their problem-solving processes, aligning with Mezirow's concept of perspective transformation (356). Participants in the debrief reflected immediately as a group after the event and searched for shared meaning in their experience through reflection with peers. They looked to senior HCPs as a guide for future clinical encounters with older adults with delirium.

Learners and observers within the debrief group shared previous encounters that involved difficult decision making such as sedating a patient in the knowledge that it may have undesirable consequences for them, creating an uncomfortable clinical situation. Through the debrief peers were forthcoming with similar challenges and solutions in previous clinical encounters prompting the participant to acknowledge that their peers have also navigated similar clinical dilemmas. Sharing such experiences and identifying meaning the transformation of the learner's perspective as successful transformation can only be achieved through significant exploration of alternative perspectives with others (354).

'Once I met a hyperactive delirious patient and she was just literally carrying an oxygen cylinder. And she was a high falls risk and like nothing was working, so I had to give her haloperidol, I know that's the last option, but she was a risk to herself and others as well, so like that was my last resort, so I just gave her Haloperidol' (D8)

In the debrief participants shared previously perceived interpersonal and communication difficulties with family members but concluded that ultimately good communication optimises patient care.

'The family were saying, "you are the one to answer those questions." So, then I had to pull back and communicate with them, and say yes, but just if you could help me too...So, it can be a tough one, but I think communication is the key in here to take the family on board and kind of go through it all with them' (D9)

Participants in the debrief shared their knowledge of available resources and how to apply them with their peers that are useful in similar clinical scenarios with older adults.

‘So, there is a document for the perioperative pain management, and everyone should be on unless contraindicated like paracetamol...and like you should keep people on oxynorm PRN rather than oxycontin especially older people with pain because it will, it has longer duration it will make them more confused’ (D9)

Participants also shared with each other the barriers to providing desired care and the frustrations they have encountered by trying to do the right thing when they know resources that can help are not always available and other HCPs contradict your recommendations.

‘I think from my experience one of the biggest challenges IS having a contingency plan because unfortunately it doesn’t matter whether pharmacy is not on site. You just want to give, and you realise that there’s nobody...The ICU upstairs they are oblivious to all your recommendations, and they say - well do you want them pulling out all their alarms and so they get into the ICU’ (D7)

Other participants in the debrief suggested to peers alternative means to dealing with this situation that has been helpful for them in the past.

‘Try to talk them through a state that’s going to be very distressing for themselves (the patient) and try to get them to cooperate with what the plan is. I think even if they know who you are. From our point of view trying to get to know the individual in a holistic way helps all of this kind of stuff’ (D7)

The influence of the group provided some insight into social and cultural norms. Participating in an SBE scenario promoted collaborative reflection and interpretation acting as a catalyst to transform participant’s understanding and approaches to similar clinical situations (357).

Reflection on the role of other healthcare professionals

Participants acknowledged the value of interprofessional collaboration in approaching the care of an older adult with delirium. They found it helpful to leverage other healthcare professional expertise including escalating to senior help or involving other disciplines to ensure older adults receive optimal care.

'I believe involving the geriatric medical doctors is essential if you're stuck with a patient's care who is elderly or I could have done, what I could have done, I should have informed my superior...Yeah, I would involve multidisciplinary I mean teams from other departments not just geriatric medicine but also dietitian, probably ringing pharmacy for alternative medicines, we obviously have help from nursing staff and asking the family to come.' (P2)

4.9.2.3 Theme 3: Planning for future clinical scenarios

Definition: This theme explored how participants having participated in the SBE scenario examined the various ways in which they planned to integrate this experience into future clinical scenarios following reflection and acquisition of new knowledge.

By participating in this integral process of reflection, participants considered their new plans for future SBE or clinical scenarios (358, 359). They searched for knowledge from their peers and facilitators aligning with Mezirow's phase five 'Exploration of options of new roles, relationships and actions' for themselves and other healthcare professionals prompted by the development of a new perspective after taking part in the SBE scenario. Participants discussed how they would approach a similar situation in the future maps significantly to phase six 'planning a course of action' (133). This is important because to truly transform one's behaviour, the learner must develop a plan of action. Subthemes within this theme include *'future approach to older adults with delirium and/or Parkinson's disease'*, *'role of other healthcare professionals'*, *'role of next of kin'*, *'educating other healthcare professionals'*.

Future approach to older adults with delirium and/or Parkinson's disease

Participants planned to use a systematic approach when assessing older adults with delirium in the future based on the knowledge, they acquired from participating in the SBE. Participants planned to focus solely on the task at hand, optimising the care they provide to a specific older adult by using a step wise approach to achieve this.

'Like as I said, I think I kind of got the idea of how to collect things together in one place... you'll have a lot of things running in your mind, but maybe try and focus with this one patient for now, since you're already here and you're already spending the time' (P4)

Participants described the knowledge they have gained in terms of resources to use when they encounter an older adult with delirium and a background history of Parkinson's disease. Participants in recognising the new knowledge aimed to be more careful in the medication management of older adults.

'The other thing is the Parkinson's medication can also cause delirium when they are acutely withdrawn. I think I would keep that in mind as well. I know it is very common in geriatrics to see patients with Parkinson's who develop delirium after we discontinue the Parkinson's medications because of surgery but it is not very common in general medicine.' (P9)

Role of other healthcare professionals

Participants reconceptualised their own viewpoint of the role of other healthcare professionals in this clinical encounter including senior doctors and health and social care professionals. They realised that other HCPs could play an active and valuable role when faced with this scenario. It is not simply transactional. Participants planned to seek advice from other healthcare professionals when managing older adults with delirium, acknowledging that effective teamwork and shared decision making with other healthcare professionals will be integral when they encounter future older adults with delirium and Parkinson's disease.

'I can maybe call my pharmacist. I can call my registrar or maybe even speak to the Geri's reg or the SPR' (P9)

'Yes, I suppose in addition to using the PINCH ME and 4AT in a delirium assessment, calling a pharmacist is actually quite a good idea, especially if you are not sure. I know that is not always available, a pharmacist is not always available on call, but you would have confused patients on polypharmacy prescriptions during the day as well' (D6)

Participants considered their approach and when would be the optimal and most useful time to involve other healthcare professionals in a patient's care.

'We can start the regular medication, if we think that the route of the medication is where it can act as quickly as possible. I think that is what I would do before calling the other team members.' (P5)

Role of next of kin

Participants also reconceptualised how they view patient's next of kin and recognised their involvement can be integral to successfully managing an older adult with delirium in the future. They acquired new interpersonal skills through participating in the SBE scenario and appreciated their applicability in the future management of older adults with delirium.

'So, while you're assessing somebody with delirium you have to have a collateral history from one of their family members, so I learned this from the SBE scenario that collateral has its own importance in this, and we can take this opportunity to give the family an update as well' (P2)

Participants recognised that next of kin can not only provide invaluable information regarding the patient which can be useful to ensuring the patient receives appropriate care but can also be an active part of the management plan. They intend to proactively engage with next of kin to gather patient information.

'When the family is there, I think telling them that it is useful if someone can stay with the patient definitely during the day, and if someone was able to stay with them while they were agitated at night, that would help a lot'. (P7)

Educating other healthcare professionals

A combination of new knowledge, heightened self-assurance and recognition of their new roles and others led to a subtle reframing of the relationship of the participants with other HCPs. Although initially frustrated with their colleagues' approach to an older adult with delirium, participants realised the potential to leverage their interpersonal skills to educate peers. They planned to advocate for older adults by highlighting those at risk of delirium, acknowledging the importance of interprofessional communication to ensure older adults with delirium receive adequate care.

'She is very vulnerable to delirium and there is a very high likelihood she would have become delirious from the operation alone. Had they told the family this beforehand then it wouldn't have been a big shock, you know...I think definitely I would encourage; you know, if I was consulting for a surgical team or something I would encourage them

going forward to pre-warn families more about delirium...so if I had a Parkinson's patient that was going for surgery you know, making sure that they are informing their team about the Parkinson's, and it is really important that they get their meds...those kinds of things are pretty relevant' (P3)

4.9.3 Theme 4: A paradigm shift

Definition: This theme described the transformative implications of participating in a SBE scenario and the extent to which this has translated to real-world clinical practice. In response to the SBE scenario participants described a shift in perspective and feel confident when confronted with a similar clinical case involving an older adult. Subthemes include *'shift in perspective', 'empowerment' and 'real world application'*.

Although transformative learning theory is partly cognitive, observing a change in participant's subsequent behaviour is equally important to determine the extent of transformative learning that has occurred (349). Some participants acted on their new knowledge, views and reframed relationships with other healthcare professionals resulting in a shift in world view for the participants (360). The participant's subsequently experimented with new knowledge gained and alternative approaches acquired from participating in the SBE scenario in subsequent clinical encounters with older adults (133). Subsequently some participants graduated to step nine 'competence building' with the new shift in perspective, building confidence in their capacity for to execute new learning and approaches to caring for older adults with delirium and/or Parkinson's disease (133).

Shift in perspective

Following reflection participants experienced a subsequent shift in perspective in how they should manage an older adult with delirium. They have actively sought similar clinical scenarios, observing what other healthcare professionals do and trialling a similar approach themselves.

'Then it percolated with me how will I actually do it? How should I properly do it? Sometimes I just walk past. You see a confused person in the corridor. You are not really that equipped, and you think it is not your problem really, so you just skip it. I am really looking now to see what I actually should be doing specifically nurses who are really

good at it and there is one person in ED when I was on call that said exactly the same thing...So, I sort of started cataloguing things that anybody does really that is successful to use on people. Then I had an opportunity to use it.’ (P6)

Empowerment

Participating in an SBE scenario that focuses on teaching a particular subset of generalist competencies to care for older adults empowered the participants to apply these skills in subsequent clinical scenarios. Participants described a new self-confidence in assessing and managing older adults with delirium and Parkinsons disease ranging from applying screening tools to assessing various contributing factors.

‘I suppose moving forward I am more confident of assessing delirium and just managing delirium in general from the sims. Just knowing the PINCH ME factors, applying for the 4AT score to get a diagnosis and just managing the different aspects to delirium. It has made me more confident in managing delirium because I have been in that kind of situation, and I know where I am and just what areas to improve...The whole scenario just sticks in your mind, and it also gives you a little confidence boost that you are doing okay’ (P8)

Real world application

Aligning with phases nine and ten of TLT, participants described how they applied their new knowledge and skills gained in clinical scenarios. In particular they used a systematic approach and enlisted the recommended screening tools e.g. 4AT

‘I assessed whether the patient was delirious or no and then tried to find the possible causes of delirium, yeah. It did (P2)

‘So, I suppose those were two scenarios where patients were actually delirious after the 4AT scores secondary to UTI with hyperactive delirium. Then another lady who was not confused. These were the two areas where I applied the 4AT score... I was more confident to manage the delirium as a result of the sims... Just knowing the PINCH ME factors, applying for the 4AT score to get a diagnosis and just managing the different aspects to delirium. It has made me more confident in managing delirium because I

have been in that kind of situation, and I know where I am and just what areas to improve' (P8)

Participants applied a more comprehensive approach to identifying and reducing the risk of an older adult developing delirium, addressing risk factors and seeking the help and recognising the value of other healthcare professionals in managing this type of patient.

'So, they had septic shock from we don't know exactly where from, so the registrar was involved. There was another team - a surgical team involved also. There was a multidisciplinary approach to this on call. And then I think - I don't know if it is just that I am now thinking about it more, or that my patients have maybe had an element of poor nutrition since I had the SIM. So, I have slightly more frequently contacted the dieticians doing a nutritional assessment, and I have slightly more frequently asked for a food and a bowel and a fluid chart' (P6)

Participants used the screening tools and memory aids applied the systematic approach to an older adult with delirium in a subsequent real life clinical scenario.

'I have always known about it, but I have never really used it or applied it. Since the sims I have been more conscious of applying this...Literally on my nights last weekend, I applied it...I decided I would go through all the PINCH ME factors. Then I brought in my med cards and calculated the 4AT scores' (P8)

4.10 Limitations

Our study is subject to some limitations. This research study focused on exploring the transformative learning of a single subset of generalist competencies to care for older adults using SBE in a single site. Our study has quite a specific sample specificity i.e. hospital doctors from intern to registrars working in different hospital specialties.

Although we recognise that optimal learning in simulation takes place when more than one learner from different disciplines participates, to ensure a focused examination of the SBE scenario and that objectives were met, we chose to include one learner only.

Although some participants did report a change in their behaviour in subsequent clinical encounters, I acknowledge that assessing the later phases of TLT including

reintegration and a sustained behaviour change was a significant methodological challenge and represents a limitation of the study. It is difficult to determine whether these are achieved in the long-term for a number of reasons. Firstly, data was self-reported, which may not accurately reflect how successfully what they learned was reintegrated into their practice or sustained over time. Secondly, data pertaining to the later stages of TLT was collected relatively quickly (two to four weeks) after participating in the simulation scenario. The later phases of TLT may occur over a longer time. Such a longitudinal follow-up was not possible in this study. Finally, this study did not control for external influences in the real-world CLE including workload or team dynamics, which may affect long-term behaviour changes. We recommend that future studies could incorporate this through repeating the simulation scenario, direct observation and chart review.

Strengths

We used purposive sampling to ensure that participants from various specialties ranging from IM to obstetrics and gynaecology were represented. Furthermore, studies informed by an established theory require fewer participants than those not informed by a theory (361). We aligned our SBE event to Mezirow's transformative learning theory. Keeping a theory in mind throughout the process ensured an in-depth analysis of the findings. To maximise our insights into the extent of transformative learning we used both debriefs and semi-structured interviews to explore our research question. To our knowledge, a SBE specific competency framework of generalist competencies to care for older adults does not exist. Therefore, in line with best practice of simulation design, competencies for the SBE scenario were chosen based on a comprehensive scoping review, a needs assessment in the form of expert consensus through a GCM study, alignment with the Irish Medical Council (IMC) 'Eight Domains of Professional Practice'

and consultation with content experts with experience in simulation-based education (227, 362).

4.11 Discussion

The premise of this study was to explore how SBE could support the transformative learning of generalist competencies for hospital doctors to care for older adults. We chose Mezirow's ten phases of transformative learning theory as a lens to examine this. While progression through all ten phases varied among participants, some demonstrated clear evidence of transformative learning by reintegrating their newly developed generalist competencies in assessing and managing older adults in similar clinical scenarios (133). Furthermore, many did experience a shift in perspective on how to approach this clinical scenario in the future even if they didn't yet have the opportunity to do so. Participating in the SBE scenario may have influenced this transformation, however, it is important to acknowledge the different levels of clinical experience in doctors who participated in the study. Some participants may have already experienced particular phases of transformative learning before participating in the SBE scenario. Therefore, not all learning and subsequent change in clinical approach can be attributed to participating in this SBE scenario alone. This is consistent with the view that transformation is a gradual process that can occur through the accumulation of connected experiences (358). In this study I used a qualitative approach to explore the research question. The addition of a pretest would provide a quantifiable baseline of participants' existing knowledge, skills, and attitudes before the simulation, particularly for participants who may have already experienced similar previous clinical encounters prior to participating in the simulation scenario. A pretest could facilitate the influence of prior experience when measuring the effect of the simulation scenario. Additionally, it would allow comparison of the learning gains of novice participants versus those with more experience. Finally, pre-test data may have enriched the qualitative analysis. E.g. if a participant with a high pre-test scores still reported a "disorientating dilemma" during the simulation, it may imply that their prior knowledge was theoretical and not yet integrated into a practice and may suggest that simulation facilitates transformative learning by moving knowledge from the cognitive to the behavioural domain. Not all participants encountered a subsequent similar clinical

scenario, making it difficult to determine the extent (if any) that a true transformative change in clinical behaviour occurred for each participant.

Transformative learning theory is not without its criticisms. The theory primarily focuses on adult learners and may not fully translate to the experiences of younger learners. Although it examines an individual's internal cognitive processes it doesn't fully consider the social and cultural context of learning (363). As I developed the research study for the SBE activity other theories were considered. Although other learning theories e.g. Kolb's experiential learning theory could be applied to an SBE scenario, it tends to focus more so on the cyclical nature of experiencing, reflecting and conceptualising and subsequently experimenting. This aligns well with skills acquisition however Mezirow's TLT allowed us to fully capture a more in depth understanding of each phase of the transformation process and how this may contribute to the acquisition of a subset of generalist competencies for hospital doctors to care for older adults. Additionally, some of the phases of TLT closely aligned to stages of the simulation cycle as outlined above in table 10. This enabled us to interrogate each of the different stages of transformation that the learner may or may not have experienced during and following participating in the SBE scenario. Through SBE learners are exposed to a concrete experience (disorientating dilemma). They can immediately reflect on the experience both as an individual and with a group (debriefing). This reflection leads to the development of new ideas or theories that they can then test and apply in future (323). This process aligns to the initial steps in Mezirow's perspective transformation (134).

It is clear that further evidence to examine consistent clinical behavioural change is required. This study does however expand on previous research that used TLT to determine if SBE can be used to foster transformative learning. While these studies focused on the initial six phases of TLT, our study attempted to explore the ten phases proposed to Mezirow. Future studies may require a longer interval to maximise the number of participants encountering a similar real-world clinical scenario and older adults as patients. Although using faculty as patients rather than a mannequin was received well, we do acknowledge that this might not entirely represent the real older adult experience with delirium and/or PD. To reflect as true an experience as possible to

that of an older adult we recruited faculty members of the local geriatric medicine department as SPs and ESPs given their experience and expertise.

In keeping with the best practice recommendation of experiential learning (268), this study showed promise that SBE can be used to facilitate transformative learning of this particular subset of generalist competencies for hospital doctors caring for older adults. Acknowledging that not all competencies are suitable to be taught via SBE, future studies should focus on exploring which exact generalist competencies highlighted in chapters two and three could be developed using SBE.

4.12 Conclusion

There is some evidence that SBE in this study for this subset of hospital doctors facilitated transformative learning. This represents an important step in informing the educational initiative approach for doctors to develop competencies to care for older adults. Future research should focus on confirming our findings and also determining which of the other competencies identified in chapter two and three can be developed by hospitals doctors using transformative learning theory and SBE.

Chapter 5: Discussion

5.1 Overview of research

The aim of this research programme was to answer the following research questions:

- (i) What are the generalist competencies proposed in the literature for hospital doctors caring for older adults?*
- (ii) What are the generalist competencies identified by key stakeholders for hospital doctors to care for older adults?*
- (iii) How can simulation-based education support the transformative learning of generalist competencies to care for older adults?*

These questions were explored through three individual but connected research studies. Recognising the challenges of caring for an ageing demographic, we aimed to advance education in this field by drawing attention to the competencies needed to safely and effectively care for this patient cohort. If not addressed, older adult contact with hospital doctors may have negative repercussions including increased risk of adverse outcomes and poor quality of life despite increased longevity (6, 364-367). We also recognised that this research is taking place in the context of overburdened healthcare services and systems, therefore the inclusion of education initiatives and innovations can be severely hampered, inadequate time and exposure with patients and supervisors often hindering learning in the clinical learning environment (99).

Simulation-based education has been identified as a potentially useful measure to complement within many specialties traditional educational initiatives and help doctors to develop competencies to which they may not have been exposed in the workplace environment (101-105). Some studies have proposed that SBE is also useful for hospital doctors to develop competencies to care for older adults in domains such as advance care planning, dementia, delirium, palliative care, communication skills, medication management and multimorbidity in relation to older adult care (136-141, 147). However, although promising, evidence is limited as a complete description of the methods

incorporated including the simulation cycle are incomplete and outcome measurements are generally confined reaction and knowledge (136-141, 147).

The identification of the generalist competencies proposed for hospital doctors caring for older adults through a scoping review and GCM study were crucial first steps to answering our research questions. By systematically selecting a number of these generalist competencies, the final study in this research programme was to determine if SBE could facilitate transformative learning of a subset of generalist competencies for hospital doctors caring for older adults.

In this chapter, I will discuss the main finding from the three research studies and their potential implications for training hospital doctors and fostering the development of the generalist competencies required to care for older adults. These findings are of relevance to hospital doctors, policymakers and medical educators.

5.2 Main research findings

The scoping review in **chapter two** aimed to map the landscape of generalist competencies for caring for older adults that have been proposed over the last ten years. While we did not identify any existing overarching frameworks, the review confirmed that the issue of caring for an ageing population globally is recognised; we identified multiple attempts at competency framework design and educational initiatives culminating in two hundred and two generalist competencies mapped to twenty-three competency domains. The number and breadth of competencies reflects the complexity of treating older adults and the scale of the challenge facing hospital doctors as well as those that organise and provide postgraduate education. Within the twenty-three competency domains, **medication management, cognitive impairment and chronic disease and co-morbidities management** were most frequently addressed. Notably, **communication skills** were described in one third of sources in line with growing recognition of the importance of communication to deliver effective healthcare (179, 183). A key underpinning theme across these included sources was that all hospitals doctors should be equipped with communication skills that place the patient at the centre of shared decision making and determining their own goals of care, particularly before they are too unwell to participate in such a conversation (147, 267).

Two hundred and two competencies are a significant number of competencies and highlight that there have been substantial efforts to develop generalist competencies for hospital doctors caring for older adults. However, a major finding of this review is that a gap remains in the lack of an agreed set of generalist competencies that hospital doctors should demonstrate in providing safe and effective care to older adults. Of note, the scoping review purposely focused on sources that would be considered generalist and not specialty-specific. However, some of the competencies outlined may not necessarily be considered generalist for hospital doctors caring for older adults e.g. 'recognising and managing acute stroke' (65, 66, 154, 189) may be considered an essential generalist competency for doctors working in IM but recognition alone of acute stroke could be argued sufficient for doctors working in surgery and obstetrics and gynaecology. Furthermore, some of the competencies described could be considered more of a specialist geriatric medicine competency rather than generalist e.g. 'Identify different gait patterns associated with cognitive impairment' (255).

Internal medicine doctors in certain jurisdictions (e.g. Ireland and the UK) are dual trained i.e. in a certain speciality and general internal medicine. As a result, they may often encounter emergencies in older adults e.g. acute stroke and therefore are required to be equipped in the relevant competencies. Hospital doctors who are not trained in internal medicine or geriatric medicine are likely to still care for older adults. They will frequently encounter older patients with complex, age-related issues (e.g., delirium, polypharmacy, or functional decline) that can complicate acute presentations and need to be equipped with certain competencies to address these care needs in a timely manner. Ultimately, we chose to identify and include core, high-priority set of competencies that would be beneficial to all hospital doctors, including acute presentations.

Although results are comprehensive, it is possible that the literature is inadequate and/or the search did not reach all relevant sources. Therefore, the next step was to seek expert opinion regarding the generalist competencies required by hospital doctors to care for older adults. Given the extensive generalist competencies for caring for older adults outlined in chapter two, it was also essential to understand which of these generalist competencies should be prioritised for education and training. We therefore

proceeded in the next study (**chapter three**) to employ a group concept mapping exercise to seek multiple perspectives from as many stakeholders as possible to determine the generalist competencies that hospital doctors should be equipped with to provide care to older adults. In this study, we invited stakeholders to complete the prompt '*A specific competency I think is required by hospital doctors caring for older adults is...*' and to prioritise them in order of perceived importance.

Eighty-eight generalist statements within nine competency domains were identified through this process. Competency domains varied from what may be considered more specialist aspects of geriatric medicine e.g. assessment and management of dementia to more generalist competencies relating to the management of the hospitalised older adult with competency domains relating to medicolegal affairs, delirium and communication skills were considered most important for all hospital doctors to acquire.

Thirteen of the participants in the GCM were healthcare professionals working in geriatric medicine. This may have resulted in 'expertise bias' given they are subject matter experts who have undergone specialist geriatric medicine training. Although it is important to acknowledge that this may have led to an overemphasis on specialist geriatric medicine knowledge and that there may be inherent assumptions about how other hospital doctors care for older adults, some contribution from geriatricians is integral. This is highlighted by Mary Tinetti, who described how the responsibility lies with those trained in geriatric medicine to ensure other doctors are trained in essential geriatric competencies (58, 368). Therefore, geriatricians are in a unique position to highlight the competencies that hospital doctors should acquire to care for older adults. The GCM study may help bridge this gap between 'big G' and 'little g' by defining and prioritising the competency domains required by hospital doctors to care for older adults.

The GCM study identified some competencies that were not explicitly captured in the scoping review in chapter two. This may be attributed to several reasons but ultimately highlights the importance of incorporating stakeholder opinions to supplement existing literature. For example, competencies pertaining to sarcopenia and malnutrition in older adults were both identified within managing hospitalisation of an older adult and

given an average importance rating of 4.01 (out of 5) by participants in the GCM. However, neither emerged in the scoping review. Sarcopenia is defined as the age-related loss of strength, muscle quality and/or quantity and physical performance (294). Sarcopenia ultimately leads to poor outcomes for older adults including increasing risk of falls and fractures and decreased function (295-297) and is a significant cost to the healthcare service (298). Competencies were also identified in the scoping review that did not arise in the GCM study. e.g. 'demonstrate knowledge of the physiology of ageing its impact on older adult functional capacity' (148, 174, 244, 245, 248, 250). Although this may be perceived as a specialist competency, it is fundamental for all doctors to comprehend why the care required for older adults is different from that of the general population. The different competencies identified in the scoping review and GCM may reflect a mismatch between competency framework content and what is perceived to be required clinically to ensure all older adults receive optimal care. Despite these differences the competencies identified in the scoping review and the GCM study do align in many ways. Medication management and cognitive impairment were two of the most frequently identified competency domains in the literature. Similarly prescribing and delirium were rated as highly important by participants in the GCM study. Findings within both the GCM and scoping review highlight emphasise the importance of delivering patient centred care to older adults. The scoping review described generalist competencies within domains of communication and comprehensive geriatric assessment e.g. 'communicate effectively with older adults and/or caregivers including demonstrating shared-decision making in the acute care setting' (59, 148, 151, 152, 164, 177, 178, 180, 240, 255) and 'understand the importance of the patient's home circumstances on his or her functional' (148, 152, 244) and participants within the GCM study suggested competencies within domains including universal principles of care and medicolegal affairs e.g. 'Address the needs of individual patients and address local challenges and resource constraints' and 'understand basic principles including that all older adults have a right to autonomy'. Both studies also highlighted the importance of incorporating a multidisciplinary approach within domains including engaging specialist services and interface and community of practice with competencies including 'understand when to seek multi- and interdisciplinary input when coordinating an integrated and individualised care plan specific to the older adult's needs' (GCM) and

‘understanding the value of working within the multidisciplinary team including specialists in geriatric medicine and other health professionals in optimising the care of older adults’ (238). Finally, both studies emphasise the impact of illness on older adults’ functional status e.g. ‘assess and document the presence of comorbid conditions (e.g., pressure ulcers, cognitive status, falls in the past year, ability to walk and transfer, renal function, and social support)’ (139, 152) and ‘recognise how chronic disease, medications and geriatric syndromes can impact physical performance and function, negatively impacting independence, and quality of life’ (GCM).

For the final study in this research programme (**chapter four**), I wished to determine if SBE could be utilised to facilitate transformative learning of a particular subset of generalist competencies for hospital doctors caring for older adults. The results generated in chapters two and three respectively formed the basis of the learning outcomes developed for the SBE scenario. Four main themes were generated including *‘creating a realistic clinical challenge’*, *‘simulation acts as a catalyst for reflection’*, *‘planning for future clinical scenarios’* and *‘a paradigm shift’*. These four themes broadly reflect the phases of transformative learning theory as proposed by Mezirow and the pillars of the wider metatheory transformative learning theory as a pedagogy including exposure to an unfamiliar situation, prompting of reflection, challenging preformed conceptions and empowering future action (98, 349, 369-371). The themes demonstrate transformative learning of generalist competencies for caring for older adults- namely recognition and management of delirium, medication management and interpersonal communication skills to varying degrees for each of the participants. The findings of our research study support previous studies exploring the use of TLT through SBE through evidence that exposure disorientating dilemma (SBE scenario) can promote reflection on previous beliefs, clinical approaches and biases prompting planning for different approaches to future clinical situations (94, 95, 129, 372). Our evaluation also revealed that some participants did in fact experience a change in perspective that impacted subsequent clinical encounters with reported implementation of what they learned following participation in the SBE scenario.

Whilst this is extremely promising some caveats are attached to this. Firstly, this clinical behavioural change has been self-reported by participants, therefore we cannot say

with certainty that this is the case. Secondly, despite the positive nature, it is challenging to attribute any behaviour change to a participating in a single event. To wholly demonstrate progression through each stage of transformative learning, resulting in a sustained behavioural change, a longitudinal study design with several data collection points is necessary.

5.3 Implications for postgraduate medical education and training

5.3.1 Curriculum

In Ireland, a health and social care professionals (HSCP) framework describing generalist competencies to care for older adults has been developed but did not include hospital doctors. Similarly in the U.K, a framework of core capabilities for HSCPs including doctors but focuses on solely on older adults with frailty and not older adults as a heterogeneous group (373). Despite the existence of various competency frameworks the extent to which the healthcare workforce is suitably trained to deliver remains a concern (31). The identification of proposed generalist competencies represents the initial step to addressing this gap. The findings from this study serves as a foundation for the development of a generalist competency framework for hospital doctors caring for older adults. Given a comprehensive scoping review and stakeholder process has been completed as part of this research programme, a generalist competency framework could be completed by assembling a panel of experts to review the competencies generated by the scoping review and GCM, summarise and collect their findings until a consensus on a final list of competencies is obtained (374). Following this feedback could be sought from postgraduate training bodies and hospital doctors to refine the proposed framework. This framework would ultimately be integral to informing the development of postgraduate training programmes for hospital doctors regardless of specialty.

5.3.2 Integration of simulation-based education into workplace learning

Appendix M outlines each step of developing an SBE event for teaching generalist competencies for hospital doctors of different grades and specialties caring for older adults. In particular, this highlighted how to execute a SBE scenario focusing on a subset of generalist competencies utilising common clinical resources that can be

easily accessed across almost all clinical sites in a classroom environment. Costs associated with SBE are variable and depend on a number of factors including resources such as technology, faculty to participate in the planning and delivery of a SBE scenario and fidelity of the scenario. This can make SBE appear inaccessible and costly. However, adapting the steps outlined in appendix M can inform faculty to deliver SBE for developing generalist competencies for hospital doctors caring for older adults.

By demonstrating the flexibility and potential low resource requirement of SBE we can give hospital doctors the opportunity to develop the generalist competencies required to provide adequate care to older adults.

5.4 Implications for policy

5.4.1 Curriculum reform

Increasingly calls have been made by policymakers for all HCPs to be adequately prepared to care for older adults (212, 213, 215). What exactly this response would look like varies from increasing the number of specialist training positions in postgraduate geriatric medicine training to developing strategies to identifying older adults at risk of frailty (31, 375, 376). However, in order to adequately care for the ageing population, it is essential that all hospital doctors, regardless of specialty develop the generalist competencies to care for this population. The generalist competencies outlined in the scoping review and GCM can serve as an initial step for curricular reform and standardisation of the generalist competencies required by all hospital doctors caring for older adults and their formal inclusion postgraduate medical education for hospital doctors regardless of specialty.

5.4.2 Resource allocation

Both in Ireland and around the world, SBE has been identified by policymakers and postgraduate training for inclusion in regular postgraduate medical education (107, 377, 378). In the U.K, SBE is now mandated for hospital doctors training in IM with increasing evidence that it is cost effective, improves confidence and competence, requires minimal staffing and equipment and can result in improved patient outcomes (108-111). It has not been described what exactly this would look like for enabling hospital doctors to develop generalist competencies to care for older adults. Although our research

study in chapter four describes a single SBE scenario in a single site to nine learners, we have nonetheless presented how a subset of generalist competencies can be taught to hospital doctors, what resources and faculty are required and how this may result in transformative learning. Given the growing evidence of the efficacy of SBE in postgraduate training, the rapidly aging population and urgent requirement for hospital doctors to develop generalist competencies to care for older adults, SBE may present a pragmatic and effective solution to addressing this training need.

Although the physical resources used in our study could be found on most hospital wards, the most significant challenge perhaps lies in recruiting faculty to develop and deliver SBE. Institutions are increasingly investing in simulation, however faculty development is often overlooked with many institutions failing to prepare faculty pedagogically (379, 380). Faculty development encompasses all activities that HCPs participate in to develop their knowledge, skill and behaviours as educators, leaders and researchers (381). Developing a core trained interprofessional group of educators across multiple sites ensure consistency and quality in SBE scenarios, with learners experiencing a similar atmosphere and environment regardless of location (382, 383). Faculty development therefore should be considered a key focus of resource allocation in order for SBE to successfully facilitate transformative learning of generalist competencies to hospital doctors caring for older adults.

5.5 Future research

Both the GCM study and scoping review highlighted competencies which suggest an interdisciplinary approach is an integral aspect to delivering adequate care to older adults. The final research study focused on a single learner participating in a SBE scenario. In future iterations we suggest including more than one learner from different disciplines and also explore how this could be replicated for non-hospital doctors caring for older adults (e.g. general practitioners).

From a comprehensive scoping review and group concept mapping study several generalist competencies for hospital doctors caring for older adults have been identified. To gather a more in- depth analysis of why these competencies should be included, future studies should include focus groups of multiple participants from

various backgrounds, specialties, disciplines and older adults. As noted above, some of the competencies highlighted vary from discipline to discipline and it is worth noting that although they may be considered generalist, in real world clinical practice this may not be the case and some of the competencies identified may apply more generically across all hospital specialties and grades more than others. Therefore, there is a need to further define which generalist competencies should be developed by hospital doctors caring for older adults and which should be reserved for those specialising in geriatric medicine. This could be addressed by assembling a panel of experts working in a clinical capacity and/or postgraduate education to review the competencies generated by the scoping review and GCM, summarise and collect their findings until a consensus on a final list of competencies is obtained (374). Although we did include older adult advocacy groups, future studies would ideally include older adult participants e.g. through a number of focus groups.

Further to this we plan to develop a dedicated generalist competency framework for hospital doctors caring for older adults for simulation-based education only. We have demonstrated that under certain conditions SBE can facilitate the transformative learning of a subset of generalist competencies pertaining to delirium and Parkinsons' disease for all hospital doctors. Acknowledging that SBE may not result in transformative learning of all identified competencies, we plan to determine which of these competencies may be successfully taught through SBE. Although we have demonstrated transformative learning in our study we suggest that future research should focus on more longitudinal and larger studies that explore if SBE facilitates a sustained transformation in clinical behaviour changed (370). Even though they were not used in this research programme specifically rapid cycle deliberate practice and 'Think Aloud' strategies may be useful methods to examine this (318, 319). Post-simulation debriefs could be incorporated to further clarify the learner's thought processes and decision-making. Other methods of observing a more sustained behavioural changes include chart audits, assessment techniques such as direct observation or objective structured clinical examinations (OSCEs). Direct observations can be carried out in real-world clinical and/or SBE scenarios incorporating checklists or rating scales to standardise observations of a participant's behaviour. Similarly,

participants could partake in OSCEs before and after a SBE scenario, comparing performance.

Although the results of the final study were encouraging, I acknowledge that there were nine learners for one simulation scenario (with five learning outcomes). Future studies could be scaled up to increase generalisability and robustness for policymakers in a number of ways. Firstly, to increase the number of participants, the simulation scenario could be replicated in a number of other hospital sites e.g. within a hospital group or nationally. This would assist in confirming our results and also add a greater diversity of specialties and disciplines, potentially providing further insights and enriching our dataset. This should also involve investment in upskilling and training faculty particularly in designing and executing a simulation scenario along with developing skills to carry out an effective debrief. Developing a large-scale randomised controlled trial in which participants are randomised to a simulation scenario or control group e.g. direct observation may help to further demonstrate the effectiveness and value of SBE to policymakers. Thirdly, developing a curriculum that integrates SBE along with other educational initiatives may help to demonstrate how SBE can fit into a training program and compliment other educational initiatives in order to achieve the desired learning outcomes. Additionally, the final research study included minimal resources and faculty to carry out the simulation scenario. Future studies could include a cost-effectiveness analysis i.e. comparing the cost of carrying out the simulation intervention to the potential benefits e.g. improved patient care through reduction in medication errors or length of stay etc. Finally, a study could be developed that includes multiple scenarios with other learning outcomes identified within the GCM study and scoping review. This could potentially demonstrate that incorporating SBE to help develop the competencies required to care for older adults may extend beyond those described in the final study of this research programme.

5.6 Limitations of the research

In chapter one I outlined that the aim of the research programme was to determine the generalist competencies required by hospital doctors to care for older adults and subsequently explored the use of SBE to facilitate transformative learning of a subset of these competencies. I sought to answer these questions by employing a mixed

methods approach. At each stage of this process, I endeavoured to ensure that all our research methods were robust. To ensure a breadth and depth of the competencies required for hospital doctors caring for older adults I employed multiple methods including a scoping review to summarise the competencies in the existing literature, the recruitment of a diverse stakeholders to triangulate findings as well as the focus of the application of a subset of these competencies through SBE. Nevertheless, I recognise the inherent nature of research uncertainty and in this section, I will describe how these findings may be interpreted otherwise within different research contexts (384, 385).

The scoping review was chosen to determine what are the generalist competencies already proposed for hospital doctors required to care for older adults. This study's timeframe spans ten years, and only English-language sources were considered, potentially leading to the unintentional exclusion of relevant sources. The review included thirty-three sources that identified local practice gaps and addressed them through developing educational initiatives or competency frameworks. While these sources do not explicitly reference published competency frameworks, they meet inclusion criteria by addressing competencies not necessarily addressed in the other sources e.g. competencies regarding perioperative care for older adults. However, as this was not the original purpose of the review it is plausible that other similar sources were not captured.

The group concept mapping study was designed to develop a list of generalist competencies for hospital doctors based on expert consensus and describe their preferences regarding how these competencies should be prioritised. The term 'competency' (or 'competence') may be interpreted differently by each participant. We attempted to circumvent this by providing a specific definition (33) for a competency along with the focus prompt and an accompanying example. Although we sought as many perspectives as possible, there are most likely some perspectives that are underrepresented. Public and patient interest contributors were of particular importance, and we actively sought engagement from advocacy groups for this study. The inclusion criteria included jurisdictions with similar healthcare systems and accreditation standards to Ireland. However, it is worth noting that geriatricians within Ireland have actively contributed to a number of international statements and policies

regarding both undergraduate and postgraduate education of geriatric medicine (270, 271, 386).

As part of this research programme, I wished to explore the role of SBE to facilitate the transformative learning of a specific subset of the generalist competencies required by hospital doctors to care for older adults. Multicomponent educational initiatives that include experiential learning approaches as best practice for training those who are not specifically trained in geriatric medicine-including hospital doctors (123, 137-141, 268). I acknowledge that other experiential educational initiatives could have been explored instead including observership of clinical experience or clinical experience with tasks, review or output action. It has been suggested that multicomponent educational initiatives including experiential learning would be the best method for doctors who have not specialised in geriatric medicine to develop the require competencies. I acknowledge that this research programme delivered one educational initiative only. Future similar studies should include at least a second educational initiative e.g. didactic lecture. Finally, we acknowledge that some participants may have already experienced particular phases of transformative learning before participating in the SBE scenario and not all learning and subsequent change in clinical approach can be attributed to participating in this SBE scenario alone. This is consistent with the view that transformation is a gradual process that can occur through the accumulation of connected experiences (358).

5.7 Conclusion

The rapidly ageing population indicates that older adult care will be delivered by doctors not specifically trained in geriatric medicine- particularly in the acute setting. This is a heterogenous population with varying and complex needs. It is now essential to ensure that all hospital doctors develop the generalist competencies to care for older adults. This research programme set out to describe the generalist competencies required by hospital doctors to care for older adults and explore how simulation-based education could support the transformative learning of a specific subset of these competencies. We did this by employing a pragmatic philosophical viewpoint and mixed methods approach. This has resulted in numerous generalist competencies and a suggestion that SBE is a potentially effective educational initiative to support the transformative

learning of these competencies. Further research should focus on refining and selecting the most relevant generalist competencies. Equally further research is essential to determine which generalist competencies are most suitable to be developed by hospital doctors through SBE and how this can be implemented into the postgraduate training of hospital doctors. Finally, this research programme represents a first step in ensuring hospital doctors are in a position to develop generalist competencies to care for an ageing population regardless of their chosen specialty and in turn improving the care for the older adult population.

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Appendices

A Scoping review: search strategy

B Scoping review: data extraction sheet

C Scoping review: summary of the title, first author, country, year and design of each source

D Scoping review: competency domains present in each source

E Scoping review: each competency identified in the scoping review

F GCM: participant information leaflet

G GCM: ethical approval from Clinical Research Ethics Committee of the Cork Teaching Hospitals

H semi-structured interview and audio-recorded debrief participant information leaflet

I debrief audio recording participant consent form

J semi-structured interview participant consent form

K Ethical approval from Research Ethics Committee, Health Service Executive South-East

L Ethical approval for amendments from Research Ethics Committee, Health Service Executive South- East

M Scenario design outline

N Simulation-based education scenario

O Guide for debrief questions

P Guide for semi-structured interview questions

Appendix A

Key words (KW)

Physician; doctor; resident; intern	Competencies; curriculum; education; entrustable professional activities	geriatric medicine; gerontology; medicine for the elderly
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PubMed 13122022

Gerontology / geriatric medicine/ Medicine for the Elderly (no mesh) KW: geriatric medicine/gerontology MeSH: geriatrics	1	" geriatric medicine"[Title/Abstract]	3,334
	2	gerontology [Title/Abstract]	4,691
	3	"Medicine for the elderly"[Title/Abstract]	91
	4	geriatrics [MeSH Terms]	24,705
	5	geriatrics [Title/Abstract]	31306
	6	#20 OR #21 OR #22 OR #23 OR #24	42424
KW: Physicians/ Doctors MeSH: physician KW: Resident/ Intern-no MH	7	physician*[Title/Abstract]	447,467
	8	doctor*[Title/Abstract]	147748
	9	intern [Title/Abstract]	2581
	10	resident [Title/Abstract]	84259
	11	physicians [MeSH Terms]	171657
	12	"Hospital Medical Staff*"[Title/Abstract]	572
	13	"Staff*, Hospital Medical"[Title/Abstract]	0

MeSH: Physicians; medical staff, hospital (synonyms): Hospital Medical Staff; Hospital Medical Staffs; Staff, Hospital Medical; Staffs, Hospital Medical; Medical Staffs, Hospital; Physicians, Junior; Junior Physician; Junior Physicians; Physician, Junior; Registrars, Hospital; Hospital Registrar; Hospital Registrars; Registrar, Hospital; Attending Physicians, Hospital; Hospital Attending Physician; Hospital Attending Physicians; Attending Physician, Hospital	14	"Medical Staff*, Hospital"[Title/Abstract]	26
	15	"Physician*, Junior"[Title/Abstract]	0
	16	"Junior Physician*"[Title/Abstract]	294
	17	"Registrar*, Hospital"[Title/Abstract]	0
	18	"Hospital Registrar*"[Title/Abstract]	11
	19	"Attending Physician*, Hospital"[Title/Abstract]	0
	20	"Hospital Attending Physician*"[Title/Abstract]	12
	21	#7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20	731,905
Competenc* /Curriculum/a/education KW: Competence MeSH: Clinical competence/Competency-based education Synonym Competency, Clinical; Competence, Clinical; Clinical Competency; Clinical Competencies; Competencies, Clinical; Clinical Skill; Skill, Clinical; Skills, Clinical; Clinical Skills; Competency Based Education; Education, Competency-Based;	22	competenc*[Title/Abstract]	104738
	23	curricul*[Title/Abstract]	70077
	24	education [Title/Abstract]	586,377
	25	"Clinical competence"[MeSH Terms]	103781
	26	"Competenc*, Clinical"[Title/Abstract]	4255
	27	"competenc*, clinical [Title/Abstract]	0
	28	"Clinical Skill*"[Title/Abstract]	7464
	29	"Skill*, Clinical"[Title/Abstract]	0
	30	"Competency Based Education"[Title/Abstract]	967
	31	"Education, Competency-Based"[Title/Abstract]	29

Competency-Based Educations; Education, Competency Based; Educations, Competency-Based KW: curriculum MH: Curriculum (synonym): Curricula KW: education MH: education (synonym): Workshops; Workshop; Training Programs; Program, Training; Programs, Training; Training Program. KW: education -> graduate education MeSH: internships and residency: (synonym): Residency and Internship; House Staff; Staff, House; Medical Residencies; Residencies, Medical; Residency, Medical; Medical Residency; Residency; Residencies; Residency, Dental; Residencies, Dental; Dental Residencies; Dental Residency; Internship, Medical; Internships, Medical; Medical Internship; Medical Internships; Internship; Internship, Dental; Internships,	32	"Competency-Based Education*"[Title/Abstract]	4509
	33	curriculum [MeSH Terms]	96363
	34	education [MeSH Terms]	933328
	35	workshop*[Title/Abstract]	45785
	36	"Training Program*"[Title/Abstract]	52307
	37	"Program*, Training"[Title/Abstract]	0
	38	"Education, graduate"[MeSH Terms]	80094
	39	"Graduate education"[MeSH Terms]	96509
	40	"Education, medical, graduate"[Title/Abstract]	67
	41	"internship* and residency"[Title/Abstract]	0
	42	"Residenc* and Internship*"[Title/Abstract]	0
	43	"House Staff"[Title/Abstract]	1350
	44	"Staff, House"[Title/Abstract]	7
	45	"Medical Residenc*"[Title/Abstract]	646
	46	"Residenc*, Medical"[Title/Abstract]	0
	47	residenc*[Title/Abstract]	98484
	48	"Internship*, Medical"[Title/Abstract]	0
	49	"Medical Internship*"[Title/Abstract]	135
	50	internship*[Title/Abstract]	5427
	51	"Medical education"[Title/Abstract]	57131

Dental; Dental Internship; Dental Internships	52	"Medical education"[MeSH Terms]	182163
MH tree:	53	"Education, medical"[Title/Abstract]	7379
Education ->education medical:	54	"Entrustable professional activities"	720
Use for:	55	#22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54	3585984
Medical education			
MH further tree to:			
-Internships and residency			
Used for: as above			
	56	#54 AND #21 AND #6	1194
	56	#75 2012-2022; English only	584

CINAHL

Search concept	# Line	Search strategy	# Results
KW: Physician*	1	TI physician* OR AB physician*	169,539
MeSH: physician->medical staff->medical staff hospital	2	TI doctor* OR AB doctor*	71,064
Use for:	3	TI intern OR AB intern	5,751
Attending Physicians, Hospital; Hospital Medical Staff; House Officers; Physicians, Junior; Registrars, Hospital; Staff Physician; Staff Physicians (all individually searched in title	4	TI resident OR AB resident	68,863
	5	(MH "Physicians")	67,194

and abstract and for MeSH terms). KW: Doctor MeSH: use physicians KW: interns, residents, interns, and residents, MeSH: interns and residents Use for: Intern; Interns; Resident; Residents Related: internship and residency -Used for: Internship; Nursing Internships; Residencies; Residency; Traineeships (all searched in title and abstract and for MeSH)	6	(MH "Medical Staff, Hospital")	5,161
	7	TI "medical staff, hospital" OR AB "medical staff, hospital"	3
	8	TI "attending physician*, hospital" OR AB "attending physician*, hospital"	2
	9	TI "hospital medical staff" OR AB "hospital medical staff"	34
	10	TI "house officer*" OR AB "house officer*"	588
	11	TI "physician*, junior" OR AB "physician*, junior"	6
	12	TI "registrar*, hospital" OR AB "registrar*, hospital"	0
	13	TI "staff physician*" OR AB "staff physician*"	307
	14	TI ("intern* and resident*") OR AB ("intern* and resident*")	958
	15	(MH "Interns and Residents")	10,098

	16	TI ("internship* and residenc*") OR AB ("internship* and residenc*")	24
	17	TI internship* OR AB internship*	2,640
	18	TI residenc* OR AB residenc*	29,447
	19	TI traineeship* OR AB traineeship*	97
	20	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19	360, 118
KW: geriatric medicine/gerontology/medicine for the elderly MeSH: geriatrics -> geroscience. Gerontology-> gerontologic care (Aged Care; geriatric Care; Gerontological Care) and health services for older adults; (all searched in title and abstract and for MeSH)	21	TI " geriatric medicine" OR AB " geriatric medicine"	1,254
	22	TI gerontology OR AB gerontology	2,866
	23	TI "medicine for the elderly" OR AB "medicine for the elderly"	119
	24	(MH " geriatrics")	6,821
	25	TI geriatric* OR AB geriatric*	29,908
	26	(MH "Gerontologic Care")	26,019
	27	TI "gerontologic care" OR AB "gerontologic care"	3

	28	TI "aged care" OR AB "aged care"	5,548
	29	TI " geriatric care" OR AB " geriatric care"	1,283
	30	(MH "Health Services for Older Persons")	7,028
	31	TI "health services for older adult*" OR AB Health services for older adult*"	813
	32	S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31	66,609
KW: entrustable professional activities No MeSH Key word: Competency SH: clinical competence (used for: Clinical Competency; Clinical Incompetence; Clinical Incompetency; Clinical Skill; Clinical Skills; Competence, Clinical; Competency Clinical; Education, competency-based (used for CBE; Competency-	33	TI "entrustable professional activities" OR AB "entrustable professional activities"	291
	34	TI competenc* OR AB competenc*	56,704
	35	TI curricul* OR AB curricul*	40,164
	36	TI education OR AB education	326,347
	37	TI "clinical competenc*" OR AB "clinical competenc*"	2,439
	38	TI "clinical skill*"	4,205

Based Education; Education, Competence-Based; (all searched in title and abstract and for MeSH) KW: Curriculum MeSH: Curriculum Development (used for: Curriculum Developments; Curriculum Planning; Lesson Planning); Curriculum (Course content, course evaluation, course development, integrated curriculum); integrated curriculum (all searched in title and abstract and for MeSH) KW: education MeSH: education; clinical education; medical education (all searched in title and abstract and for MeSH)		OR AB "clinical skill*"	
	39	TI "competenc*, clinical" OR AB "competenc*, clinical"	61
	40	TI "skill*, clinical" OR AB "skill*, clinical"	193
	41	(MH "Clinical Competence")	46,965
	42	(MH "Education, Competency-Based")	3,325
	43	TI "education, competency based" OR AB "education, competency based"	11
	44	TI "competency-based education" OR AB "competency-based education"	378
	45	TI CBE OR AB CBE	505
	46	(MH "Curriculum")	30,690
	47	(MH "Curriculum Development")	8,168
	48	TI "curriculum development" OR AB "curriculum development"	1,455
	49	TI "curriculum planning" OR AB "curriculum planning"	201

	50	TI "course content" OR AB "course content"	984
	51	TI "course development" OR AB "course development"	237
	52	TI "integrated curriculum" OR AB "integrated curriculum"	235
	53	(MH "Integrated Curriculum")	557
	54	(MH "Education")	11, 593
	55	TI "clinical education" OR AB "clinical education"	2, 883
	56	TI "medical education" OR AB "medical education"	16,200
	57	(MH "Education, Clinical")	12,545
	58	TI "education, clinical" OR AB "education, clinical"	469
	59	(MH "Education, Medical")	34, 167
	60	TI "education, medical" OR AB "education, medical"	251
	61	S33 OR S34 OR S35 OR S36 OR	456,216

		S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60	
	62	S20 AND S32 AND S61	1,518
	63	62: English:2012- 2022	871

CINAHL 14122022

ERIC 14122022

Search concept	Line #	Search strategy	Result
KW: Physicians MeSH: Used for DE Physicians. Medical doctors. KW: doctor MeSH: physician	1	TI physician* OR AB physician*	5,593
	2	TI doctor* OR AB doctor*	15,885
	3	TI intern OR AB intern	3,231
	4	TI resident OR AB resident	11,557
	5	DE "Physicians"	4,371
	6	TI "medical doctor*" OR AB "medical doctor*"	147

KW: Intern	7	DE "Graduate Students"	22, 503
MeSH: intern (medical) uses graduate student	8	TI "graduate student*" OR AB "graduate student"	12,748
KW: resident	9	TI "intern (medical)" OR AB "intern (medical)"	0
MeSH: residents (medical) use graduate students (not exploded as included law etc.), fellows (medical).	10	TI "resident* (medical)" OR AB "resident* (medical)"	9
	11	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10	59, 743
geriatric medicine/gerontology/medicine for the elderly	12	TI " geriatric medicine" OR AB " geriatric medicine"	46
KW: geriatric medicine	13	TI gerontology OR AB gerontology	1,041
MeSH: geriatrics	14	TI "medicine for the elderly" OR AB "medicine for the elderly"	0
KW: medicine for the elderly	15	TI geriatric* OR AB geriatric*	900
MeSH: nil suitable	16	DE " geriatrics"	1,058
	17	DE "Gerontology"	2,299
KW: gerontology	18	S12 OR S13 OR S14 OR S15 OR S16 OR S17	3,633

MeSH: gerontology (exp terms not relevant)			
KW: entrustable professional activities No MeSH	19	TI "entrustable professional activities" OR AB "entrustable professional activities"	6
KW: competency	20	TI "competenc*" OR AB "competenc"	64, 291
MeSH: competence; competency-based education	21	DE "Competence"	10,968
	22	DE "Competency Based Education"	9, 333
KW: education	23	TI "competency-based education" OR AB "competency-based education"	1,068
MeSH: education; competency-based education.			
SH: medical education; graduate medical education; residency programs; internships	24	DE "Education"	4,483
	25	DE "Medical Education"	10,096
KW: curriculum	26	TI "medical education" OR AB "medical education"	3, 011
MeSH: curriculum (used for curriculum content, curriculum problems; teaching areas: curriculum development (use for curriculum planning).	27	DE "Graduate Medical Education"	1, 323
	28	TI "graduate medical education" OR AB "graduate medical education"	250
	29	DE "Internship Programs"	5, 029

	30	TI "internship program*" OR AB "internship program*"	1, 342
	31	TI "residency program*" OR AB "residency program*"	566
	32	TI internship* OR AB internship*	6, 559
	33	DE "Curriculum"	18, 446
	34	DE "Curriculum Development"	58, 127
	35	TI "curriculum development" OR AB "curriculum development"	10, 651
	36	TI "curriculum content" OR AB "curriculum content"	1, 910
	37	TI "curriculum planning" OR AB "curriculum planning"	1, 858
	38	S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37	164, 948

	39	S11 AND S18 AND S38	119
	40	39: English; 2012-2022	13

Embase 14122022

Search concept	Line #	Search strategy	# results
geriatric medicine/gerontology/medicine for the elderly Emtree: geriatrics, gerontology (used for geroscience) Synonyms: geriatry, geriatric aspects, geriatric practice	1	'geriatric medicine': ab, ti	3,997
	2	'gerontology': ab, ti	5,453
	3	'medicine for the elderly': ab; ti	187
	4	'geriatrics'/exp	56,942
	5	'gerontology'/exp	2,072
	6	'geriatric*': ab, ti	91,539
	7	'geriatry': ab, ti	93
	8	'geriatric aspect*': ab, ti	91
	9	'geriatric practice*': ab, ti	490
	10	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9	132,700
Physician/doctor/intern/resident Emtree: doctor use physician Synonym: doctor; medical doctor; medical practitioner; physician associate; physicians; practitioner; private physician	11	'physician*': ab, ti	641, 776
	12	'doctor*': ab, ti	214,322
	13	'intern': ab, ti	5,116
	14	'resident': ab, ti	116,795
	15	'intern* and resident*': ab, ti	573
	16	'resident doctor*': ab, ti	831

Emtree: resident use resident Synonym: interns and residents; resident doctor; resident physician; resident surgeon; surgery resident; surgical resident	17	'resident physician*': ab, ti	4,634
	18	'resident surgeon*': ab, ti	451
	19	'surg resident*': ab, ti	0
	20	'physician'/exp	921,122
	21	'medical doctor*': ab, ti	8,463
	22	'medical practitioner*': ab, ti	9,217
	23	#11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22	1,518,083
Competenc*/curriculum/education/ KW: Competenc* Emtree: clinical competence; professional competence KW: entrustable professional activity Emtree: entrustable professional activity KW: Curriculum Emtree: curriculum Synonyms:	24	'competenc*': ab, ti	129,551
	25	'curricul*': ab, ti	89,618
	26	'education': ab, ti	731,112
	27	'entrustable professional activit*': ab, ti	998
	28	'Clinical competence'/exp	67,186
	29	'clinical competenc*': ab, ti	4,317
	30	'Professional competence'/exp	33,860
	31	'professional competenc*': ab, ti	2,608
	32	'Entrustable professional activity'/exp	26
	33	'curriculum'/exp	105,795

competency-based education; integrated curriculum (candidate terms no emtrees) KW: education Emtree: education; medical education; curriculum development; educational program Medical education- emtree: Medical education Synonym: area health education centers; education, medical; education, medical, graduate; education, medical, undergraduate; education, premedical; education, public health professional; fellowships and scholarships; internship and residency; medical instruction; medical program; medical programme; medical teaching; medical training; training, medical (emtree for all synonyms- medical education)	34	'Curriculum development'/exp	5,408
	35	'curriculum development': ab, ti	2,862
	36	'development, curriculum': ab, ti	132
	37	'competency- based education': ab, ti	684
	38	'integrated curriculum': ab, ti	620
	39	'education'/exp	1,680, 272
	40	'Medical education'/exp	385, 608
	41	'medical education': ab, ti	57, 969
	42	'educational program*': ab, ti	25,460
	43	'Education program'/exp	54, 401
	44	'education medical': ab, ti	766
	45	'education, medical, graduate': ab, ti	3
	46	'fellowship*' AND scholarship*: ab, ti	377
	47	'fellowship*': ab, ti	21, 684
	48	'scholarship*': ab, ti	8,762
	49	'internship* and residenc*': ab, ti	174
	50	'internship*': ab, ti	5,609

	51	'residenc*': ab, ti	123, 815
	52	'medical program*': ab, ti	2,067
	53	'medical teaching*': ab, ti	1,759
	54	'medical training*': ab, ti	7,692
	55	'training*, medical': ab, ti	969
	54	#24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55	2,107,926
	55	#10 AND #23 AND #56	4,892
	56	#10 AND #23 AND #56 AND [English]/lim	4,640
	57	#58 AND (2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py OR 2018:py OR 2019:py OR 2020:py OR 2021:py OR 2022:py)	3,057

Search concept	Line #	Search strategy	# Results
KW: "geriatric medicine" TT: geriatrics, gerontology, KW: Medicine for the elderly TT: geriatrics KW: gerontology TT: gerontology; geriatrics Did not include TT: geriatric assessment or geriatric psychiatry as definitions not suitable/relevant.	1	TI " geriatric medicine" OR AB " geriatric medicine"	510
	2	TI gerontology OR AB gerontology	3, 535
	3	TI "medicine for the elderly" OR AB "medicine for the elderly"	28
	4	DE " geriatrics"	14,032
	5	DE "Gerontology"	10,048
	6	TI geriatric* OR AB geriatric*	17,153
	7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	36,054
KW: physician TT: Physicians use for doctor; clinicians; internists. KW: Doctor TT: physician KW: resident	8	TI physician* OR AB physician*	67, 959
	9	TI doctor* OR AB doctor*	43, 131
	10	TI intern OR AB intern	3, 135
	11	TI resident OR AB resident	51, 018
	12	DE "Physicians"	26,738
	13	TI clinician* OR AB clinician*	103,031
	14	TI internist* OR internist*	1, 318

TT: medical residency uses for residency (medical) KW: intern TT: internship TT: medical internship used for internship medical; internship programme REMOVE CLINICAL PSYCHOLOGY INTERNSHIP	15	DE "Medical Residency"	4,946
	16	TI "medical residency" OR AB "medical residency"	132
	17	TI "residency (medical)" OR AB "residency (medical)"	6
	18	TI internship* OR AB internship*	4,380
	19	DE "Medical Internship"	549
	20	TI "medical internship*" OR AB "medical internship*"	43
	21	TI "internship* (medical)" OR AB "internship* (medical)"	1
	22	TI "internship* program*" OR AB "internship*, program*"	511
	23	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22	256, 481
KW: Competenc* TT: competence-> professional competence	24	TI competenc* OR AB competenc*	92, 802
	25	DE "Competence"	17,315
	26	DE "Professional Competence"	12,812
	27	TI "professional competenc*" OR AB	1,837

KW: Entusting professional activities TT: No MeSH terms KW: Education TT: Education-> higher education-> graduate education; postgraduate education-> medical education KW: Curriculum TT: curriculum; curriculum development		"professional competenc*"	
	28	TI "entrustable professional activities" OR AB "entrustable professional activities"	71
	29	TI education OR AB education	382, 592
	30	DE "Education"	46, 093
	31	DE "Higher Education"	21, 134
	32	TI "higher education" OR AB "higher education"	32,115
	33	DE "Graduate Education"	2,958
	34	TI "graduate education" OR AB "graduate education"	1,385
	35	DE "Medical Education"	19,577
	36	TI "medical education" OR AB "medical education"	7,922
	37	TI curricul* OR AB curricul*	68,934
	38	DE "Curriculum"	36,547
	39	DE "Curriculum Development"	7,085
	40	TI "curriculum development" OR AB "curriculum development"	2,088
	41	S24 OR S25 OR S26 OR S27 OR S28 OR	531,065

		S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40	
	42	S7 AND S23 AND S41	1,041
	43	42: English; 2012- 2022	435

#1	(physician*):ti,ab,kw	S ▼	Limits	51192
#2	(doctor*):ti,ab,kw	S ▼	Limits	17633
#3	(intern):ti,ab,kw	S ▼	Limits	648
#4	(resident):ti,ab,kw	S ▼	Limits	6677
#5	MeSH descriptor: [Physicians] this term only	MeSH ▼	Limits	1026
#6	MeSH descriptor: [Internship and Residency] explode all trees	MeSH ▼	Limits	1393
#7	("house staff"):ti,ab,kw	S ▼	Limits	103
#8	("staff, house"):ti,ab,kw	S ▼	Limits	0
#9	("residenc" and internship"):ti,ab,kw	S ▼	Limits	0
#10	(internship):ti,ab,kw	S ▼	Limits	1578
#11	(residenc):ti,ab,kw	S ▼	Limits	6289
#12	("internship", medical):ti,ab,kw	S ▼	Limits	2
#13	("medical internship"):ti,ab,kw	S ▼	Limits	6
#14	("residenc", medical):ti,ab,kw	S ▼	Limits	0
#15	("medical residenc"):ti,ab,kw	S ▼	Limits	0
#16	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15		Limits	75514
#17	MeSH descriptor: [Geriatrics] this term only	MeSH ▼	Limits	213
#18	(geriatric):ti,ab,kw	S ▼	Limits	9899
#19	(gerontology):ti,ab,kw	S ▼	Limits	209
#20	("medicine for the elderly"):ti,ab,kw	S ▼	Limits	14
#21	("geriatric medicine"):ti,ab,kw	S ▼	Limits	208
#22	#17 OR #18 OR #19 OR #20 OR #21		Limits	10037
#23	("entrustable professional activities"):ti,ab,kw	S ▼	Limits	9
#24	(competenc):ti,ab,kw	S ▼	Limits	11293
#25	(curricul):ti,ab,kw	S ▼	Limits	6392
#26	(education):ti,ab,kw	S ▼	Limits	83143
#27	MeSH descriptor: [Clinical Competence] this term only	MeSH ▼	Limits	3737
#28	("clinical competenc"):ti,ab,kw	S ▼	Limits	0
#29	("competenc", clinical):ti,ab,kw	S ▼	Limits	0

#30	("clinical skill"):ti,ab,kw	S ▾	Limits	99
#31	("skill", clinical):ti,ab,kw	S ▾	Limits	13
#32	MeSH descriptor: [Competency-Based Education] this term only	MeSH ▾		89
#33	("competency-based education"):ti,ab,kw	S ▾	Limits	118
#34	("education, competency-based"):ti,ab,kw	S ▾	Limits	10
#35	MeSH descriptor: [Curriculum] this term only	MeSH ▾		1595
#36	("short-term course"):ti,ab,kw	S ▾	Limits	53
#37	("course", short-term):ti,ab,kw	S ▾	Limits	7
#38	MeSH descriptor: [Education] this term only	MeSH ▾		605
#39	("program", training):ti,ab,kw	S ▾	Limits	150
#40	("training program"):ti,ab,kw	S ▾	Limits	12263
#41	(workshop):ti,ab,kw	S ▾	Limits	5012
#42	MeSH descriptor: [Education, Graduate] this term only	MeSH ▾		29
#43	("education, graduate"):ti,ab,kw	S ▾	Limits	37
#44	("graduate education"):ti,ab,kw	S ▾	Limits	25
#45	MeSH descriptor: [Education, Medical] this term only	MeSH ▾		481
#46	("education, medical"):ti,ab,kw	S ▾	Limits	3262
#47	("medical education"):ti,ab,kw	S ▾	Limits	3236
#48	#23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47	Limits		103592
#49	#16 AND #22 AND #48	Limits		226
with Cochrane Library publication date from Jan 2012 to Dec 2022				
#50	Type a search term or use the S or MeSH buttons to compose	S ▾	MeSH ▾	Limits
				N/A

Appendix B

Title	Author, what speciality are they.	Publication/what type of study and where did they get competencies/decide they were looking at those particular competencies	Country	Year	Study population (including speciality, discipline, grade of participants)	Study design approach	Study objective	Competencies explored (sub divide)	Competencies: list v narrative	Outcomes	Limitations	Accessed via: (e.g. institution)
								CGA				
								Medication management				
								Cognitive, affective and behavioural health				
								Complex or chronic illness in older adults				
								Palliative/EOL				
								Hospital patient safety				
								Transition of care				
								Falls/syncope				

Appendix C

	Author	Title	Year	Country	Study design
1	Danesh et al.	The role of the dermatologist in detecting elder abuse and neglect	2015	USA	Review article
2	Berns et al.	Goals of Care Ambulatory Resident Education: Training Residents in Advance Care Planning Conversations in the Outpatient Setting	2017	USA	Quantitative prototype study; curricular design
3	Brown et al.	Advanced geriatrics Evaluation Skills	2020	USA	Mixed methods; Educational intervention
4	Caton et al.	Academic detailing to teach aging and geriatrics	2015	USA	Mixed methods; Educational intervention
5	Hsu et al.	Identifying geriatric Oncology Competencies for Medical Oncology Trainees: A Modified Delphi Consensus Study	2020	USA	Mixed methods; modified Delphi consensus Curricular design
6	Faulk et al.	Implementing a Multidimensional geriatric Curriculum in a Physical Medicine and Rehabilitation Residency Program	2012	USA	Quantitative; Curricular design
7	Gosch et al.	Design and Evaluation of a Hospital-Based	2021	Copenhagen, Colombia,	Mixed methods;

		Educational Event on Fracture Care for Older Adult		Paraguay, Switzerland and the Dominican Republic	Educational intervention
8	Kumar et al.	Curriculum on Resident Education in Care of Older Adults in Acute, Transitional and Extended Care Settings	2016	USA	Mixed methods; curricular design
9	Van de Pol et al.	Shared decision making with frail older patients: Proposed teaching framework and practice recommendations	2017	Netherlands	Qualitative: international Delphi consensus; Curricular design
10	Wu et al.	Teaching geriatrics and Transitions of Care to Internal Medicine Resident Physicians	2020	USA	Quantitative; Educational intervention
11	Young et al.	Posthospital home visit as teaching tool for internal medicine residents	2020	USA	Qualitative; curricular design
12	Roberts et al.	Communication Skills Training for Surgical Residents: Learning to Relate to the Needs of Older Adults	2018	USA	Mixed methods; Educational intervention
13	Lunsford et al.	geriatric education utilizing a palliative care framework	2017	USA	Quantitative; Educational intervention

14	Bellou et al.	European Curriculum of geriatric Emergency Medicine (ECGEM)	2016	Europe	Mixed methods: modified Delphi consensus; curricular design
15	Lally et al.	Interprofessional training: geriatrics and palliative care principles for primary care teams in an ACO	2018	USA	Mixed-methods; curricular design
16	McEwan et al.	Palliative Care in the Emergency Department	2016	USA	Literature review
17	Kossioni et al.	An Expert Opinion from the European College of Gerontology and the European geriatric Medicine Society: European Policy Recommendations on Oral Health in Older Adults	2018	Greece, Poland, Italy, Northern Ireland, Belgium, Switzerland, Lithuania	Expert opinion piece which discusses of created competency framework
18	Denson et al.	geriatrics Education Team Model Results in Sustained geriatrics Training in 15 Residency and Fellowship Programs and Scholarship	2016	USA	Quantitative; curricular design
19	Pavon et al.	Resident learning across the full range of core competencies through a transitions of care curriculum	2018	USA	Mixed Methods; curricular development

20	Mate et al.	Creating Age-Friendly Health Systems - A vision for better care of older adults	2018	USA	Commentary piece
21	Siegler et al.	Assessing Effectiveness of a geriatrics Rotation for Second-Year Internal Medicine Residents	2014	USA	Mixed methods- Educational intervention
22	Kocman et al.	Can comprehensive geriatric assessment be delivered without the need for geriatricians? A formative evaluation in two perioperative surgical settings	2019	UK	Qualitative; educational intervention
23	Molnar et al.	Update: the public launch of the geriatric 5Ms	2017	Canada	Descriptive piece
24	Blachman et al.	EM faculty development: Keeping older patients safe	2022	USA	Mixed methods; Curricular design
25	Barbas et al.	Development and Implementation of a Formalized geriatric Surgery Curriculum for General Surgery Residents	2014	USA	Mixed methods; educational intervention
26	Kotsani et al.	Feasibility and impact of a short training course on frailty destined for primary health care professionals	2021	Greece	Quantitative- Educational intervention
27	Lingum et al.	ECHO Care of the Elderly: Innovative	2021	Canada	Mixed-methods;

		Learning to Build Capacity in Long-term Care			Educational intervention
28	Miller et. Al	Effect of a community-based service-learning experience in geriatrics on internal medicine residents and community participants	2017	USA	Mixed methods- Feasibility study. Educational intervention
29	Mushero et al.	An Interactive Workshop on Managing Dysphagia in Older Adults with Dementia	2022	USA	Quantitative- Educational intervention
30	Mills et al.	An educational program to assist clinicians in identifying elder investment fraud and financial exploitation	2012	USA	Mixed method; Educational intervention
31	Ozturk et al.	Interactive online learning on perioperative management of elderly patients	2018	Netherlands	Quantitative; Educational intervention
32	Olveczky et al.	Use of a geriatric Quality Initiative to Educate Internal Medicine Residents about Delirium and Its Risk Factors	2017	USA	Quality improvement design piece; Educational intervention
33	Roitto et al.	Delirium Café: interactive learning to enhance delirium care	2019	Finland	Qualitative: Educational intervention
34	Wilkerson et al.	An educational intervention to improve internal medicine interns' awareness of	2014	USA	Mixed methods study;

		hazards of hospitalization in acutely ill older adults			Educational intervention
35	Schoenborn et al.	Getting out of silos: an innovative transitional care curriculum for internal medicine residents through experiential interdisciplinary learning	2013	USA	Quantitative study; Curricular design
36	Singler et al.	Development and initial evaluation of a point-of-care educational app on medical topics in ortho geriatrics	2016	Germany, Austria, Switzerland	Mixed methods; curricular design
37	Rogerson et al.	A Foundation Programme educational placement in peri-operative medicine for older people: mixed methods evaluation	2018	UK	Mixed methods; Curricular design
38	Allen et al.	Advanced Care Directives: Overcoming the Obstacles	2015	USA	Mixed methods; Educational Intervention
39	RCPI	Basic Specialist Training in General Internal Medicine	2022	Ireland	Consensus method
40	RCPI	HST Cardiology	2022	Ireland	Consensus method
41	RCPI	HST Clinical Genetics	2022	Ireland	Consensus method
42	RCPI	HST Clinical Pharmacology	2021	Ireland	Consensus method

43	RCPI	HST Dermatology	2022	Ireland	Consensus method
44	RCPI	HST Endocrinology and Diabetes Mellitus	2021	Ireland	Consensus method
45	RCPI	HST Gastroenterology	2022	Ireland	Consensus method
46	RCPI	HST Infectious Diseases	2022	Ireland	Consensus method
47	RCPI	HST Medical Oncology	2022	Ireland	Consensus method
48	RCPI	HST Nephrology	2021	Ireland	Consensus method
49	RCPI	HST Neurology	2022	Ireland	Consensus method
50	RCPI	HST Palliative Care	2022	Ireland	Consensus method
51	RCPI	HST Pharmaceutical Medicine	2022	Ireland	Consensus method
52	RCPI	HST Rehabilitation Medicine	2022	Ireland	Consensus method
53	RCPI	HST Respiratory Medicine	2022	Ireland	Consensus method
54	RCPI	HST Rheumatology	2021	Ireland	Consensus method
55	RCPI	BST Obstetrics and Gynaecology	2022	Ireland	Consensus method
56	RCPI	HST Obstetrics and Gynaecology	2022	Ireland	Consensus method
57	The Intercollegiate Committee for ACCS Training	Curriculum for Acute Care Common Stem Training Version 1.2	2021	UK	Consensus method
58	JRCPTB	Curriculum for Acute Internal Medicine	2022	UK	Consensus method

59	JRCPTB	Curriculum for Clinical Pharmacology and Therapeutics Training	2022	UK	Consensus method
60	JRCPTB	Genitourinary Medicine Curriculum	2022	UK	Consensus method
61	JRCPTB	Haematology Training Curriculum	2021	UK	Consensus method
62	JRCPTB	Curriculum for Cardiology Training	2022	UK	Consensus method
63	JRCPTB	Curriculum for Internal Medicine Stage 1 Training	2019	UK	Consensus method
64	JRCPTB	Curriculum for General Internal Medicine Stage 2 Training	2022	UK	Consensus method
65	JRCPTB	Curriculum for Palliative Medicine Training	2022	UK	Consensus method
66	JRCPTB	Sport and Exercise Medicine Training Curriculum	2021	UK	Consensus method
67	RCEM	The Royal College of Emergency Medicine Curriculum	2021	UK	Consensus method
68	RACP	Basic Training Program Curriculum Adult Internal Medicine	2013	Australia and New Zealand	Consensus method
69	RACP	Cardiology Advanced Training Curriculum Adult Medicine Division	2013	Australia and New Zealand	Consensus method
70	RACP	Dermatology Advanced Training Curriculum	2013	Australia and New Zealand	Consensus method
71	RACP	Endocrinology Advanced Training Curriculum	2013	Australia and New Zealand	Consensus method

72	RACP	Gastroenterology Advanced Training Curriculum Adult Medicine Division	2013	Australia and New Zealand	Consensus method
73	RACP	General and Acute Care Medicine - Advanced training curriculum	2013	Australia and New Zealand	Consensus method
74	RACP	Medical Oncology Advanced Training Curriculum	2013	Australia and New Zealand	Consensus method
75	RACP	Nephrology Advanced Training Curriculum	2013	Australia and New Zealand	Consensus method
76	ACEM	Fellowship of the Australasian College for Emergency Medicine curriculum	2022	Australia and New Zealand	Consensus method
77	RCPSC	Specialty requirements in internal medicine	2018	Canada	Consensus method
78	RCPSC	General Internal Medicine Competencies	2018	Canada	Consensus method
79	RCPSC	Physical Medicine and Rehabilitation Competencies	2020	Canada	Consensus method
80	RCPSC	Surgical foundations competencies	2018	Canada	Consensus method
81	RCPSC	Emergency Medicine Competencies	2018	Canada	Consensus method

Table: Summary of title, first author, country, year and study design of each source. (USA- United States of America; RCPI-Royal College of Physicians Ireland; HST-Higher specialist training; BST-Basic specialist Training; ACCS-Acute Care Common Stem; JRCPTB- Joint Royal College of Physicians Training Board; UK-United Kingdom; RCEM- Royal College Emergency Medicine; RACP- Royal Australasian College of Physicians; ACEM-Australasian College of Emergency Medicine; RCPSC-Royal College of Physicians and Surgeons of Canada)

Appendix D

Publication	Medication management	Cognitive impairment	Delirium	Depression	Frailty	Palliative Care	Falls/syncope/gait issues	Dx. and mgmt. chronic disease/comorbidities	Continence care	Advanced care planning	Pain management	Elder abuse	Basic science/gerontology	Cognitive Screening	Transitions of care	Pressure ulcer care	Orthogeriatrics	Communication Skills	Nutrition	Stroke	Rehabilitation	Discharge planning	Long-term care	Interface and Community practice	Capacity	Comprehensive geriatric assessment	Movement disorders	Atypical presentations	Hospital patient safety	Ambulatory care	Shared decision making
Denson et al.	X	X	X	X	X	X	X			X	X										X		X								
Caton et al.	X	X		X		X	X			X	X				X	X	X		X			X					X		X		
Pavon et al.															X						X										
Young et al.	X														X							X				X					
Roberts et al.																		X													
Wu et al.	X	X	X	X		X	X	X	X	X				X	X	X	X					X				X			X	X	
Kumar et al.	X	X		X			X		X	X	X			X	X														X		
Berns et al.										X																					
Brown et al.	X	X				X	X		X	X				X											X		X				
Hsu et al.	X	X	X		X	X	X	X	X										X							X	X				
Bellou et al.	X	X	X		X	X			X	X	X				X	X	X	X			X	X	X				X		X	X	
Van de Pol					X					X								X								X	X				X
Danesh et al.												X																			X
McEwan et al.	X					X				X	X							X													
Kossioni et al.																															X
Allen et al.								X										X													
Blachman et al. 2022	X		X																								X				
Barbas et al.	X	X	X			X					X																				
Faulk et al.	X	X	X	X			X				X					X	X				X									X	
Gosch et al.	X		X								X						X														

[illegible]

[illegible]

RACP Dermatology												X						X												
RACP Endocrinology	X								X				X										X	X						
RACP Gastroenterology	X	X				X		X	X				X					X		X		X	X	X						
RACP General and acute care	X	X	X	X	X			X					X		X			X	X		X		X	X						
RACP Medical oncology	X																													
RACP Nephrology								X																						
RCPSC Specialty requirements in IM	X	X	X	X	X	X	X		X			X							X											
RCPSC GIM	X	X			X			X																						
RCPSC Physical Medicine and Rehabilitation													X								X									
ACGME Physical Medicine and Rehabilitation Milestones																		X									X			
RCPI BST General internal medicine	X	X	X	X	X			X	X					X				X												
RCPI HST cardiology	X	X	X		X	X	X	X	X		X	X		X						X		X	X							
RCPI HST Clinical pharmacology	X	X	X		X	X	X	X	X		X	X								X	X		X							
RCPI HST Clinical genetics	X								X																					
RCPI HST Dermatology	X											X																		

RCPI HST Diabetes mellitus and endocrinology	X	X	X		X	X	X	X	X		X	X								X			X							
RCPI HST Gastroenterology	X	X	X		X	X	X	X	X		X	X								X			X							
RCPI HST Infectious diseases	X	X	X		X	X	X	X	X		X	X								X			X							
RCPI HST Med oncology	X							X																	X					
RCPI HST Nephrology	X		X		X	X	X	X	X		X	X		X						X										
RCPI HST Neurology	X	X										X		X				X					X							
RCPI HST Palliative Care	X							X																						
RCPI HST Pharmaceutical medicine	X																													
RCPI HST Rehabilitation																	X				X									
RCPI HST Respiratory medicine	X	X	X		X	X	X	X	X		X	X								X										
RCPI HST Rheumatology	X	X	X		X	X	X	X	X		X	X								X									X	

Table. Summary of the geriatric medicine competency domains highlighted in each source. (RCPI-Royal College of Physicians Ireland; HST-Higher specialist training; BST-Basic specialist Training; ISCP- Intercollegiate Surgical Programme Curriculum; ACCS-Acute Care Common Stem; JRCPTB- Joint Royal College of Physicians Training Board; RCEM- Royal College Emergency Medicine; RACP- Royal Australasian College of Physicians; ACEM-Australasian College of Emergency Medicine; RCPSC-Royal College of Physicians and Surgeons of Canada; ACGME- Accredited Council for Graduate Medical Education; IM-internal medicine)

Appendix E

Competencies identified in the scoping review categorised according to Williams et al and HST geriatric medicine curriculum
<i>Medication Management</i>
1. Demonstrate knowledge of principles of appropriate prescribing and pharmacology in older adults (60, 62-66, 139, 150, 154, 160, 161, 170, 171, 178, 189, 190, 218, 233, 235-240, 242-244, 255, 256) 2. Recognition of polypharmacy and inappropriate prescribing in older adults (59, 61, 148, 150, 154, 158, 160, 170, 174, 176, 245, 254) 3. Management of polypharmacy in older adults (59, 138, 148, 154, 174, 176, 235, 236, 240, 245, 254) 4. Identify and deprescribe inappropriate medications in older adults (59, 139, 148, 241, 255) 5. Recognise drug interactions and document reasons for use when prescribing drugs that present high risk either alone or in drug–drug or drug–disease interactions (e.g., benzodiazepines, digoxin, insulin, NSAIDs, opioids, and warfarin) (150, 152, 164, 165, 244, 245) 6. Demonstrate knowledge of pharmacological management of end-of-life care in older adults (155, 180) 7. Recognise changes in drug pharmacokinetics and pharmacodynamics with age (152, 154, 244, 248) 8. Demonstrate knowledge of pharmacology as it relates to optimal medication use in the frail older adult and patients with multiple comorbidities(68, 252) 9. Carry out a thorough medication reconciliation as part of a clinical assessment of older adults, including exploring non-compliance (152) 10. Prescribe appropriate drugs and dosages considering the current medication, acute and chronic diagnoses, functional status, and knowledge of age-related physiological changes (renal function, central nervous system sensitivity, risk of delirium) (138, 152, 238) 11. Provide education to patients and/or caregivers on newly prescribed medication at discharge, including dosage, side effect profile and circumstances around when to stop medications (152) 12. Demonstrate knowledge of perioperative medication management including anticoagulant management (25, 168, 175) 13. Consider current medication regimens and their impact on oral health (181) 14. Evaluate the current treatment recommendations and their applications for acute lymphoblastic and myeloid leukaemia in both the standard adult population and older people (188)
<i>Cognitive impairment</i>

15. Recognise cognitive impairment in older adults (65, 66, 148, 186, 189, 238, 245)
16. Evaluate and formulate a differential diagnosis and workup for older adults with changes in affect, cognition (65, 66, 154, 159, 170, 186, 189, 238, 244, 245)
17. Demonstrate knowledge of the epidemiology of dementia (68, 252)
18. Demonstrate knowledge of the diagnostic criteria for dementia syndromes (25, 159, 171, 238, 245)
19. Appropriately incorporate cognitive screening tools including (60, 150, 159, 161, 176)
20. Demonstrate knowledge of appropriate referral pathway in patients with suspected dementia (150)
21. Demonstrate knowledge of management (pharmacological and non-pharmacological) of cognitive impairment (174, 245)
22. Recognise and manage (pharmacological and non-pharmacological) behavioural and psychological symptoms in dementia (61, 152, 160, 165, 218, 234-236, 241, 256)
23. Provide access support for older adults with dementia and their caregivers, including post diagnostic support and advice, personalised services, peer support, housing support, housing-related services and telecare (152)
24. Identify different gait patterns associated with cognitive impairment(255)
25. Assess and manage pain in older adults with advanced dementia (176, 180)
26. Appropriately evaluate patients with dementia for dysphagia (162)
27. Recognise when a patient may not have the capacity to make a decision, and initiate appropriate referral (245)
28. Demonstrate knowledge of the four main components of capacity (148)
29. Determine whether a patient has capacity to decide, and participate in developing the plan of care (148, 150, 165, 177)
30. Demonstrate knowledge of the medicolegal aspects of care of the older person: competence, duty of care, guardianship, medical futility(154, 245)
31. Demonstrate knowledge of the indications for a feeding tube in context of neurocognitive disorders including cognitive impairment (255)
32. Demonstrate knowledge of investigation and management of various and global dysvascular pathologies and their functional impact, including vascular dementia in elderly amputee patients (240)

33. Discuss appropriateness of percutaneous endoscopic gastrostomy (percutaneous endoscopic gastroscopy) feeding in patients with dementia with staff and caregivers, and alternative options (248) 34. Demonstrate knowledge of obtaining informed consent in patients with dementia (248) 35. Differentiate between delirium and an established dementia (245)
<i>Delirium</i>
36. Promptly recognise delirium and appreciate it is a medical emergency (25, 61, 65, 66, 68, 141, 148, 150, 154, 160, 164, 165, 168, 174-176, 186, 189, 245, 254) 37. Describe and appropriately implement the management options (pharmacological and non-pharmacological) of delirium (61, 65, 66, 68, 141, 148, 152, 154, 158, 168, 174, 175, 186, 189, 218, 234-236, 241, 245, 254, 256) 38. Identify the various causes of delirium (25, 61, 68, 152, 164, 218, 234-236, 241, 245, 254, 256) 39. Identify and manage the risk factors for delirium (25, 141, 150, 175, 176, 245, 254) 40. Recognise importance of vision and hearing in delirium prevention and treatment and overall function (255) 41. Demonstrate appropriate use of screening tools in delirium e.g. CAM (60, 141, 254) 42. Knowledge of management of postoperative delirium (158)
<i>Frailty</i>
43. Understand the relationship between frailty and ageing (171) 44. Define frailty and identify an older adult who is frail (65, 66, 148, 154, 164, 186, 189) 45. Knowledge of presentation with multiple problems & atypical symptoms in frail, older people (244) 46. Manage frail older patient in the acute setting and intensive care unit (25) and long-term care (160, 183) 47. Demonstrate awareness of the evidence base underpinning the utility of investigations and interventions in frail older people (154) 48. Demonstrate ability to use frailty scores (60, 152, 159) 49. Describe the impact of frailty on outcomes of mortality (148) 50. Knowledge of principles of physical activity in disease prevention, maintenance of healthy weight in all age groups, and prevention of frailty in old age (148)
<i>Falls, instability, and gait disorders/syncope</i>
51. Conduct a gait assessment (25, 150, 174, 176)

52. Carry out a falls assessment including history and exam, vision assessment (59, 65, 66, 148, 154, 160, 170, 171, 186, 189, 245, 254)
53. Demonstrate a systematic approach to investigating and management recurrent falls in frail older adults including acknowledging the importance of a medication review (61, 152, 218, 234-236, 244, 245, 256)
54. Demonstrate knowledge to prevent and reduce falls in older adults (59, 148, 150, 160, 174, 245, 254)
55. Identify falls precipitants e.g. medications, sarcopenia (148, 160, 245)
56. Differentiate between syncopal falls from non-syncopal falls, cognisant of complicating factors such as associated amnesia or cognitive impairment (152, 244)
57. Follow locally devised pathways that lead to an enhanced multidimensional assessment in older people with falls (152)

Communication skills

58. Communicate effectively with older adults and/or caregivers including demonstrating shared-decision making in the acute care setting (59, 148, 151, 152, 164, 177, 178, 180, 240, 255)
59. Demonstrate ability to take a comprehensive history from an older adult (244)
60. Demonstrate ability to obtain a comprehensive collateral history (60)
61. Demonstrate knowledge of communication tools and models to aid communication (140, 180)
62. Provide education to patients and/or caregivers on newly prescribed medication at discharge, including dosage, side effect profile and circumstances around when to stop medications (152)
63. Identify and assess barriers to communication such as hearing and/or sight impairments, speech difficulties, aphasia, limited health literacy, and cognitive disorders. When present, demonstrate ability to use adaptive equipment and alternative methods to communicate (e.g., with the aid of family/friend, caregiver) (150, 152, 165)
64. Demonstrate ability to communicate with frail older people especially those with cognitive impairment and their caregivers (154)
65. Communicate risk with health professionals and patients/relatives (183)
66. Appreciate the importance of collaboration between geriatricians, anesthetists and surgeons in promoting high quality care (183)
67. Develop effective team working behaviours to ensure accountability, efficiency and quality care (e.g. between surgical foundation doctors, advance nurse practitioners) (183)

68. Actively communicate findings and interventions to other healthcare professionals as part of an integrated comprehensive care plan and collaborative practice (181)
69. Knowledge and implementation of the ten step model for effective communication and goal setting within a family and patient meeting (179)
70. Demonstrate ability to effectively conduct a family meeting (138, 139, 160)
71. Demonstrate ability to communicate bad news
72. Communicate effectively using legal and ethical guidelines with patients who may not have capacity in relation to certain decision-making; recognising a patient's right to decide, responds to a patient's needs (180, 238)
<i>Continence Care</i>
73. Detect, evaluate, and initiate management of bowel and bladder dysfunction in community-dwelling older adults (65, 66, 148, 150, 154, 170, 186, 189)
74. Identify urinary incontinence and retention in hospitalised older adults (186, 244, 245, 254)
75. Identifying constipation in older patients (68, 218, 234-236, 241, 245, 248, 256)
<i>Elder abuse</i>
76. Demonstrate ability to recognize patterns of trauma (physical/sexual, psychological, neglect/abandonment) that are consistent with elder abuse and neglect (25, 152, 155, 169)
77. Identify potential elder abuse (61, 68, 152, 218, 234-236, 241, 244, 246, 253, 256, 258)
78. Aware of safeguarding issues in older people (154)
79. Define financial capacity and financial abuse and investment fraud and demonstrate knowledge of screening for financial abuse (163)
80. Identify older adults vulnerable to financial abuse including biopsychosocial factors that may increase vulnerability, clinical and individual significance of financial abuse (163)
81. Identify risk factors for financial abuse (163)
<i>Depression/mood disorders</i>
82. Demonstrate knowledge of depression and mood disorders in older adults (65, 66, 68, 150, 152, 154, 186, 189, 244, 245)
83. Demonstrate ability to screen for depression in older adults including use of Geriatric Depression Scale (139, 159, 176, 254)
84. Assess for post- stroke Depression in older adults (25)
85. Demonstrate knowledge of the appropriate treatment for depression in older adults and/or knowledge of the appropriate referral pathways (152, 165)
86. Understand that alcohol abuse occurs in older people and alcohol intoxication can complicate the clinical presentation as well as being a risk factor for injury (152)
<i>Orthogeriatrics and bone health</i>
87. Knowledge of manage bone health in setting of recurrent falls(65, 66, 160, 186)

88. Knowledge of treatment of osteoporosis (66, 150, 174, 175)
89. Identify older adults at risk of osteoporosis (150, 170)
90. Demonstrate appropriate use of fracture risk assessment (FRAX) score (171)
91. Demonstrate knowledge of secondary prevention of osteoporosis (168)
92. Assess and manage common geriatric emergencies and presentations, including: (a)
Geriatric trauma, including falls and hip fracture (244)

Stroke

93. Knowledge of acute stroke thrombolysis delivery and criteria for referral for intravascular intervention (61, 218, 234-236, 241, 256)
94. Complete National Institute Stroke Scale (61, 218, 234-236, 241, 256)
95. Recognise and manage acute stroke (65, 66, 154, 189)
96. Demonstrate knowledge of acute stroke in older adults (65, 66, 154, 189)
97. Demonstrate knowledge of Transient Ischaemic Attack in older adults (65, 66, 154, 189)
98. Demonstrate knowledge of subarachnoid haemorrhage in older adults (65, 66, 154, 189)

Comprehensive Geriatric Assessment

99. Describe the domains of Comprehensive Geriatric Assessment (CGA) (148, 152, 177)
100. Perform a comprehensive geriatric assessment (170, 184)
101. Perform an initial assessment of oral health status and discriminate normal from abnormal findings in the oral cavity (181)
102. Awareness of local pathways to access CGA both in-hospital and in the community setting (152)
103. Understand the importance of the patient's home circumstances on his or her functional ability – this can be facilitatory (e.g. established care home resident with supportive care) or may need further considerations as part of the discharge planning process (e.g. no carer but increased dependency) (148, 152, 244)
104. Identify the role of a Visiting Nurses Agency, home delivered meals, personal emergency response devices (178)
105. Co-ordinate a functional assessment in the older patient, including mobility assessment, Activities of Daily Living (ADLs) and Instrumental ADLs, and incorporate findings into the management plan (152, 244)

106.	Assess the functional status of an older adult including mobility, grip strength, timed up and go, balance using Berg Balance assessment (65, 66, 154, 159, 176, 182, 186, 189, 240, 245)
107.	Demonstrate ability to assess for visual deficits, orthostatic hypotension, foot and oral health problems in older patients(159)
108.	Assessment of functional effect of disease and impact on ADLs (164, 170, 178)
109.	Recognise when appropriate to screen for malignancies (255)
110.	Identify and utilise available tools to assess a patient's nutritional status(65, 66, 148, 154, 186, 189)
111.	Identify available tools to assess a patient's psychosocial status(148)
112.	Understand the value of working within the multidisciplinary team including specialists in Geriatric Medicine and other health professionals in optimising the care of older adults (238)
113.	For older adults undergoing surgery, perform a preoperative clinical assessment with appropriate use of investigations and tools to assess for perioperative morbidity and mortality(including use of tools e.g. POSSUM and investigations, Cardiopulmonary exercise testing) (183)
114.	For older adults undergoing surgery, objectively assess the risk-benefit ratio of surgery for older patients without value-laden judgement through the use of appropriate scoring systems and quantification of comorbidity severity (183)
115.	Understand the models and pathways of care for older surgical patients including the use of inter-disciplinary and cross-specialty interventions to improve postoperative outcome (e.g. therapy delivered pre-habilitation) and knowledge of the role of interdisciplinary perioperative care (175, 183)
116.	Understand the various models of care delivery for improving quality of care for frail older people including frailty decision units, ambulatory frailty pathways, role of multidisciplinary teams in the ED (154)
117.	Understand the design principle for EDs to improve person-centred outcomes for older people including structure, resources and processes (154)
Discharge Planning	
118.	Understand and document the rationale for discharge destination (home, Long-term care facility, hospital) (178)
119.	Demonstrate knowledge and understanding of discharge risk assessment and multidisciplinary team assessment in older adults (244)

120. In planning hospital discharge, work in conjunction with other health care providers (e.g., social work, case management, nursing, physical therapy) to recommend appropriate services based on: the clinical needs, personal values and social and financial resources of the patients and their families (e.g., symptom and functional goals in the context of prognosis, care directives, home circumstances and financial resources); and the patient's eligibility for community-based services (e.g., home health care, day care, assisted living, nursing home, rehabilitation, or hospice) (150)
121. Ensure all healthcare professionals involved in the care of older adults receive adequate communication to ensure safe and effective discharge with instructions for comorbidities and follow-up care (152, 178, 186)
122. Determine patients' core values and incorporate their beliefs and expectations into the discharge plan (178)
123. Demonstrate ability to complete a discharge summary in a timely manner (171, 183)
124. Document history obtained from nursing homes about the acute events necessitating ED transfer including goals of visit, medical history, medications, allergies, cognitive and functional status, advance care plan, and responsible primary care provider(152, 244)
125. To assess and document suitability for discharge considering the ED diagnosis, including cognitive function, the ability in ambulatory patients to ambulate safely, availability of appropriate nutrition/social support, and the availability of access to appropriate follow-up therapies (152)

Rehabilitation

126. Knowledge of physiology of normal ageing its impact on older persons functions in a variety of medical and surgical conditions (67, 138, 174, 240, 245)
127. Assess patient equipment and rehabilitation needs (182)
128. Establish rehabilitation goals of an older adult and/or carer where relevant (240)
129. Understand the medical and biopsychosocial aspects of caring for older adults in rehabilitation (155)
130. Knowledge of the range of interventions such as physical treatments, aids(174), appliances and adaptations including prosthetics, orthotics (174)
131. Understand and recommend management of spasticity (174)
132. Work effectively with specialist multidisciplinary team to optimise care of older adults in rehabilitation (240)
133. Demonstrate knowledge of investigation and management of various and global vascular pathologies and their functional impact, including vascular dementia in older adult amputees (240)
134. Demonstrate effective decision making regards rehabilitation, and timely and effective discharge pertinent to the surgical patient (183)

Long-term care

135.	Demonstrate knowledge of long-term care services(25, 67)
136.	Demonstrate understanding of the long-term care assessment process(240)
137.	Demonstrate understanding of the biopsychosocial aspects of caring for older adults in long-term care (155)
138.	Demonstrate a knowledge of the medical management of older adults in long-term care including identifying aspiration risk (61, 218, 234-236, 241, 256)
<i>Movement disorders</i>	
139.	Demonstrate knowledge of movement disorders in older adults (65, 66, 154, 186, 189)
140.	Demonstrate knowledge of the management of movement disorders in setting of long-term care
<i>Interface and Community of Practice</i>	
141.	Demonstrate knowledge and understanding of the various community services including models of community geriatric care, outreach services, specialist early supported discharge and hospital and community based services for older adults (67, 155, 170, 238) (155, 240, 247)
142.	Understand the management structures that influence the development of community services for older people (155)
143.	Co-ordinate the care of older patients, involving multiple different agencies in both the community and residential care (235, 244)
<i>Chronic disease and comorbidities management</i>	
144.	Understand the impact of multi-morbidity, advanced ageing and frailty in people with life-limiting conditions (67, 185) and the presence of co- existing morbidities can have on an elderly individual's ability to undertake exercise (192)
145.	Understand the broad differential diagnosis and management of multiple co-morbidities in older adults and/or complex comorbidities (60, 61, 185, 218, 234, 236, 248, 256) (68, 244, 252)
146.	Knowledge of the epidemiology of the most common chronic conditions in older adults (240)
147.	Demonstrate knowledge and timely management of most common chronic diseases and comorbidities in older adults (183, 240)
148.	Document advance directives and DNR orders (2, 30, 33, 43, 48, 62)(136)
149.	In evaluating older adults with undifferentiated illness, generate differential diagnoses that include diseases that often present atypically in older adults including sepsis, fever and hypothermia abdominal pain and chronic wounds (60, 65, 66, 150, 152, 154, 158, 165, 185, 189, 235, 238, 241, 244, 245)
150.	Understand the management of frailty and co-morbidity in patients requiring treatment for haematological malignancies(193)

151.	Clarify an older adult's and/or carer's understanding of the patient's current health status and prognosis(140)
152.	Assess and document the presence of comorbid conditions (e.g., pressure ulcers, cognitive status, falls in the past year, ability to walk and transfer, renal function, and social support) (139, 152)
153.	Develop plans of care that anticipate and monitor for predictable complications in the patient's condition (e.g., gastrointestinal bleed causing ischemia)(152)
154.	Demonstrate knowledge of different disease presentation and progression in older adults including respiratory, cardiac (including Congestive cardiac failure), renal (Chronic kidney disease and dialysis), oncology and neurology, endocrine (diabetes mellitus, thyroid and lipid disorders, gastroenterology (including liver conditions, dysphagia, anorexia, weight loss, incontinence and constipation), infectious disease (e.g. HIV) (25, 160, 187, 191, 235-238, 241, 247-249, 257)
155.	Demonstrate knowledge of preventative health in older adults including cardiac disease, stroke, diabetes mellitus, dementia (61, 161)
156.	Recognition of the unwell post-operative patient, appropriate initial management and involvement of senior assistance(183)
157.	Recognise oral health as part of multimorbidity and consider its impact on the general health and quality of life of older adults (181)
158.	Discuss and document advance care planning and goals of care with all older patients with chronic or complex illness/life-limiting and/or rapidly escalating illness, and/or carer (59, 136, 140, 148, 150, 165, 170, 176, 180, 244, 254, 255)
159.	Demonstrate understanding of the local/national legal position of advance directives and Power of Attorney (152, 177)
160.	Formulate a best interest's decision for an older adult in the emergency context (152)
161.	Demonstrate understanding of medicolegal issues around standards of care versus goals of care (e.g. best practice management of an acute coronary syndrome may not be appropriate or relevant in an older person with end stage dementia who has a limited life expectancy for whom the goals of care may be comfort related)(152, 183)
162.	Demonstrate awareness of physiological pitfalls in assessment and management of frail older people including in trauma and resuscitation(154)
<i>Hospital Patient Safety</i>	
163.	Evaluate all hospitalised older adults for risks including falls risk, immobility, pressure ulcers, oral intake, weight loss, constipation, urinary incontinence, inappropriate medication prescribing, delirium (67, 68, 148, 150, 160, 171, 174, 175, 244, 248, 254, 255)
164.	Determine appropriateness for urinary catheter use in hospitalised older adults and discontinue when inappropriate (150, 159, 176)

165. Appreciate the risk of routine urinary catheters to assess fluid status, that may increase the risk of catheter associated UTI and sepsis(152)
166. Demonstrate awareness of the high prevalence of asymptomatic bacteriuria and to note that asymptomatic bacteriuria is not the same as a urinary tract infection, nor does it need treatment (152)
167. Demonstrate knowledge of pressure ulcers screening, prevention, staging and treatment (65, 66, 152, 154, 171, 186, 189, 255)
168. Demonstrate ability to consider risk vs. benefit of bleeding associated with 'triple therapy' (aspirin, clopidogrel and Low Molecular Weight Heparin) (152)
169. Demonstrate awareness of the altered laboratory findings and reference ranges that impact of data interpretation – e.g. reduced renal function, age-adjusted D Dimer and high-sensitive Troponins(152)

Perioperative:

170. Demonstrate knowledge of preoperative cardiac and pulmonary evaluation (138)
171. Demonstrate knowledge of perioperative pain management (25, 168, 175)
172. Demonstrate knowledge of perioperative antibiotic indication (25, 168, 175)
173. Demonstrate knowledge of perioperative anticoagulant management (25, 168, 175)
174. Management of post-operative sepsis (175)
175. Knowledge of prevention of perioperative nerve block trauma in treating older adult (25)
176. Understand basic detail of common surgical procedures in older adults(183)

Emergency medicine:

177. Identify and implement measures that protect older people from developing iatrogenic complications common to the ED including invasive bladder catheterisation, spinal immobilization, and central line placement (152)
178. Demonstrate knowledge of the prevalence of cognitive and sensory impairments in older patients and their impact on increased risk of accidental injury, increased risk of accidental overdose and assessment and management in the ED (244)
179. Demonstrate awareness that injuries in older adults can be under-recognised and under-managed, especially those with frailty or cognitive impairment, and their outcomes can be worse (152)
180. Demonstrate knowledge that older adults are at increased risk from traumatic brain injury because of more friable blood vessels and medication affecting bleeding status,

features of TBI may be masked in this population due to cerebral atrophy ‘accommodating’ intra-cranial collections (152)	
181.	Appreciate that older people are at greater risk of complication from blunt trauma, such as pneumonia following rib fracture or solid organ injury(152)
182.	Demonstrate an understanding that low-injury trauma is the commonest cause of pelvic fractures and such injuries are associated with an increased risk of haemorrhage
183.	Understand that earlier recognition of trauma and appropriate assertive management of older adults increase the chances of a good recovery (152)
<i>Transitions of Care</i>	
184.	Document history obtained from skilled nursing or extended care facilities of the acute events necessitating ED transfer including goals of visit, medical history, medications, allergies, cognitive and functional status, advance care plan, and primary care doctors (155)
185.	Demonstrate ability to write and review discharge summaries (176)
186.	Document accurate information on the acute events necessitating transfer, goals of transfer, medical history, medications, allergies, baseline cognitive and functional status, advance care plan and primary care doctors, a summary of hospital course be completed and transmitted to the patient and/or family caregivers as well as the receiving health care providers that accurately and concisely communicates evaluation and management, clinical status, discharge medications, current cognitive and functional status, advance directives, plan of care, scheduled or needed follow up, and hospital physician contact information (150) (152, 155)
187.	Optimising transitions of care including specific discharge needs of older persons living in long-term care(244)
188.	Communicate with the patient what they should expect throughout the care transition including any medication changes (182)
189.	Understand the different levels of care in a post-acute care facility, including the qualifications for each level of care, the structure of care in the post-acute care facility, with specific attention to resources, staffing, length of stay the types of patients who undergo such care, and the services patients may receive (167)
190.	Identify the important elements in the hospital discharge summary from the receiving providers’ perspective (167)
<i>Ambulatory Care</i>	
191.	Demonstrate knowledge of screening for falls or fear of falling (150, 170)
192.	Demonstrate knowledge of gait assessment and instability (161, 174)
<i>Palliative and End- of – life Care</i>	
193.	Manage acute and chronic pain in older adults (138, 139, 160, 174, 175, 180)

194. Manage severe chronic illness, assess pain and distressing symptoms (dyspnoea, nausea, vomiting, fatigue) In patients with life-limiting illness appropriately, taking into account their goals of care (158, 160, 170, 179, 180)
195. Demonstrate knowledge of pharmacological and non-pharmacological management of end-of-life care (155, 180)
196. Demonstrate knowledge of palliative care management in the acute setting (61, 171, 180, 218, 234-236, 241, 256)
197. Demonstrate ability to work as part of a team to deliver an older adult's goals of care including when escalation of care is/ is not appropriate (152, 179)
198. Demonstrate knowledge of referral pathways for hospice care and when to seek advice to develop a palliative care plan (152, 179, 180, 244)

Basic science and gerontology

199. Demonstrate knowledge of the physiology of ageing its impact on older adult functional capacity (148, 174, 244, 245, 248, 250)
200. Recognise modifiable and nonmodifiable factors that influence a patient's life expectancy (148)

Appendix F

Group Concept Mapping Participant Information Leaflet

Study Title

‘Determining the competencies required by non- geriatric medicine physicians caring for older adults’

Principal Investigator

Professor John Cooke, Consultant geriatrician, University Hospital Waterford

Co-investigators

Dr Emily Buckley, Specialist Registrar geriatric Medicine, University Hospital Waterford
Professor Deirdre Bennett, Head, Medical Education Unit, School of Medicine,
University College Cork

Dr Colm O’ Tuathaigh, Lecturer, School of Medicine, University College Cork

Dr Aileen Barrett, Assistant Director, Irish College of General Practitioners

You are being invited to take part in a qualitative research study involving group concept mapping. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Please ask questions if anything you read is not clear or if you would like more information. Take time to decide whether or not to take part.

WHO I AM AND WHAT THIS STUDY IS ABOUT?

My name is Emily Buckley; I am one of the investigators for this research study. This study is being conducted as part of an MD in Health Professions’ Education at University College Cork.

The aim of our study is to understand the competencies required by non- geriatric medicine trained doctors to adequately care for older adults.

The population of adults over 65 years old in Ireland is increasing and with this the number of older adults needing access to healthcare services is also rising. To ensure that all older adults receive appropriate care, it is imperative that all doctors are trained in the minimum skills to prepare them to adequately treat older adults.

WHAT WILL TAKING PART INVOLVE?

You are being asked to partake in a group concept mapping exercise. This will take place between June 2023 and October 2023. This is a type of study that will allow you, along with other participants to organise and represent your ideas about competencies required for caring for older adults visually in a series of interconnected map. By the end of the study, the group concept map will show all of the ideas of the group and how they relate to each other, and depending on the scale, which ideas are more relevant, important, or feasible.

Group concept mapping is carried out using software called Concept System Global and involves a number of stages. You will receive an email inviting you to complete each step.

Stage one: statement generation

-Using concept mapping software, you will be supplied with a web-based link (via email) inviting you to the online group concept mapping platform.

-First you will be asked to provide demographic information (including your job title, grade and organisation). This will assist with analysis of data.

-You will then be asked to complete the following sentence:

‘A specific competency I think is required by non- geriatric medicine doctors to care for older adults is...’

-You will be asked to provide a minimum of five statements. There will be no upper limit.

Stage two: sorting statements

-You will be asked to arrange the statements into similar groups.

Stage three: rating

-In this step, you will be asked to rate each statement for importance using the following prompt:

‘Rate the relative importance of each statement as a competency required by non-geriatric medicine doctors to care for older adults using a provided scale ranging from 1 (unimportant) to 5 (very important).

-You will be asked to repeat the process for each statement for ease of inclusion into curriculum.

Data analysis will be carried out by the research team.

WHY HAVE YOU BEEN INVITED TO TAKE PART?

You have been invited to take part in this study as you are a healthcare professional, an individual working in patient advocacy group focused on older adults or a clinician educator. Given the broad, complex and multidisciplinary nature of geriatric medicine we wish to learn as many views, experiences and opinions as possible. We want to know what you believe are the skills and attributes doctors should have when caring for patients in this age group. The results from this study will help us understand the training and education doctors need to adequately treat our aging population.

DO YOU HAVE TO TAKE PART?

No, participation is entirely voluntary. You can withdraw from the process at any time.

WILL MY INFORMATION BE CONFIDENTIAL?

When you sign up for this study you will be asked to provide an email address. This will not be shared with anyone outside of the PI and co-investigator EB. Your email address will only be used to issue reminders and clarification requests as required. It will be destroyed upon completion of the data collection process. Once data collection is complete (including quality check of data by the PI), your data will be anonymised prior to analysis, and all identifiers will be subsequently removed from the data collection

platform. All data (transcriptions, audio files, GCM data) will be stored on a UCC MS Onedrive account accessible to student and programme team and that the storage period will be ten years in line with the UCC research data management policy.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY?

1. The results of this study will help inform future educational strategies to improve the care provided to older adults by doctors.
2. The study will be submitted as part of the thesis for researcher (EB's) MD in Health Professions' Education, University College Cork.
3. We plan to publish the study in a peer reviewed education journal e.g., Medical Education
4. We aim to present study at medical education conference e.g., AMEE, ASME or simulation conference.

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION?

-Dr Emily Buckley, University College Cork

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-Professor John Cooke (PI)

Email: john.cooke@hse.ie

Appendix G

COISTE EITICE UM THAIGHDE CLINICIÚIL Clinical Research Ethics Committee of the Cork Teaching Hospitals

Tel: +353-21-4901901
Email: crec@ucc.ie

University College Cork
Lancaster Hall
6 Little Hanover Street
Cork
Ireland

CREC Review Reference Number: ECM 4 (L) 09/05/2023

Date: 26th May 2023

Professor John Cooke
Consultant Geriatrician /
South-Southwest Hospital Group Clinical Director for Education and Training
St Theresa's Unit
University Hospital Waterford
Dunmore Road
Waterford

Study Title: Determining the competencies required by non-geriatric medicine physicians caring for older adults

Dear Professor Cooke

Approval may be granted to carry out group concept mapping and focus group arms of the above study in:

Cork/Kerry Area and University College Cork

subject to receipt and approval of the following:

Revised Application Form	(a) "Recruitment" Clarify who the "study gate keeper" is referring to and how email addresses for potential participants will be obtained
Revised Study Protocol	(a) Revise as per (a) above
Revised Group Concept Mapping Information Leaflet	(a) Correct "that that"
Revised Focus Group Information Leaflet	(a) Correct "that that" (b) Change "interview" to "focus group" throughout (c) "What will taking part involve" how many participants will take part in the focus group (d) The leaflet appears to relate to patients only, the focus group will also include clinicians (as per application form)?
Revised Focus Group Consent Form	(a) Correct "that that" (b) Change "Cork Research Ethics Committee.." to the "Clinical Research Ethics Committee of the Cork Teaching Hospitals" (c) Change "interview/focus group" to "focus group"

You must submit the following by email to crec@ucc.ie:

- Only the documents listed above. Revised documents must show the changes clearly highlighted and the document version number and date must be updated (i.e. if the version number on the previously submitted document was 1, the updated version is version 2). The version and date must be visible as a header or footer on the document, not just on the filename.
- A copy of this letter.

No changes, other than those listed above, must be made to the documents. Should you wish to make further changes you must submit an amendment application. The amendment must only be submitted once full approval to carry out the study has been granted.

The following documents have been approved:

Document	Approved	Version	Date
Proof of Insurance (UCC)	Yes		13 th March 2023
CV for Chief Investigator	Yes		February 2023
Focus Group Interview Guide	Yes	1	3 rd April 2023

Please note that documents relevant to aspects of the study being carried out in University Hospital Waterford have not been reviewed.

We note that the co-investigator(s) involved in this project will be:

Name	Appointment Details
Dr Emily Buckley	Specialist Registrar in Geriatric Medicine
Professor Deirdre Bennett	Head, Medical Education Unit, School of Medicine, UCC
Dr Aileen Barrett	Assistant Scheme Director, South East Specialist Training Programme in General Practice
Dr Colm O'Tuathaigh	Lecturer, School of Medicine, UCC

Please note that permission is not yet granted to begin this study. When the document/documents required above have been submitted and approved by the CREC, you will receive a full approval letter. You cannot begin the study until you have received that letter. Original signed approval letters/conditional approval letters from the CREC must be kept in your study master file for audit purposes.

Yours sincerely



Professor David Kerins
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

Appendix H



UCC
Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Ospidéal Ollscoile Phort Láirge

University Hospital Waterford

Regional Cancer Centre South East

Semi-structured Interview and Audio-Recorded Debrief Participant Information Leaflet

Study title: ‘Determining the competencies required by non- geriatric medicine physicians caring for older adults’

Principal investigator’s name: Professor John Cooke

Principal investigator’s title: MB, BMedSc., PhD, FRCPI

Telephone number of principal investigator: (051) 842 545

Data Controller’s/joint Controller’s Identity: University College Cork

Data Controller’s/joint Controller’s Contact Details: (021) 4903411

Data Protection Officer’s Identity: Deputy Data Protection Officer South (excluding voluntary hospitals and agencies) Consumer Affairs, HSE South, Ground Floor East, Model Business Park, Model Farm Road, Cork. Eircode: T12 HT02

Data Protection Officer’s Contact Details: ddpo.south@hse.ie

You are being invited to take part in a research study to be carried out at University Hospital Waterford and University College Cork by Professor John Cooke (University Hospital Waterford/University College Cork) and research team including:

-Dr Emily Buckley MD student University College Cork and Specialist Registrar in geriatric Medicine University Hospital Waterford

-Professor Deirdre Bennett, Head, Medical Education Unit, School of Medicine, University College Cork

-Dr Colm O' Tuathaigh, Lecturer, School of Medicine, University College Cork

-Dr Aileen Barrett, Assistant Director, Irish College of General Practitioners

Before you decide whether you wish to take part, you should read the information provided below carefully and, if you wish, discuss it with your family, friends, or GP (doctor).

Take time to ask questions – don't feel rushed and don't feel under pressure to make a quick decision.

You should clearly understand the risks and benefits of taking part in this study so that you can make a decision that is right for you. This process is known as 'Informed Consent'.

You don't have to take part in this study. If you decide not to take part, it won't affect your future medical care.

You can change your mind about taking part in the study any time you like. Even if the study has started, you can still opt out. You do not have to give us a reason. If you do opt out, rest assured it will not affect the quality of treatment you get in the future.

Why is this study being done?

The population of adults over 65 years old in Ireland is increasing and with this the number of older adults needing access to healthcare services is also rising. To ensure that all older adults receive appropriate care, it is imperative that all doctors are trained in the minimum skills to prepare them to adequately treat older adults.

The aim of our study is to develop a clear competence framework required by doctors to adequately care for older adults and to explore the effectiveness of simulation-based training as a means to train non-specialist doctors the competencies of geriatric medicine.

Who is organising and funding this study?

My name is Emily Buckley; I am one of the investigators for this study. This study is being conducted as part of an MD in Health Professions' Education at University College Cork.

The aim of our study is to understand what older adults believe are the attributes and skills required by all hospital doctors to appropriately care for them.

There is no funding for this study and no one on the research team is receiving payment for the study.

Why am I being asked to take part?

- We will be delivering a number of simulation scenarios event to non-consultant hospital doctors in the dedicated gerontological simulation laboratory at University Hospital Waterford to explore this. Part of the simulation scenario event involves a debrief of the scenario that has just occurred. It is a discussion that occurs after a learning experience has occurred and involves conversation between the learners, observers, and audience facilitators. The debrief is an indispensable component of simulation-based training that supports reflective learning. Analysis of the debrief will enable us to explore the insights and

learning generated that can be integrated into future clinical behaviour, therefore we wish to audio record it.

- We are also asking that those who participate in the simulation-based scenarios also take part in the semi-structured interview to give us an in-depth view of the effectiveness of teaching geriatric medicine competencies via simulation-based training. Given the broad, complex, and multidisciplinary nature of geriatric medicine we wish to learn as many views, experiences, and opinions as possible. The results from this study will help us understand the training and education doctors need to adequately treat our aging population.

How will the study be carried out?

- You will be asked to participate in the audio recording of a debrief at the end of a simulation-based training scenario event. This will take place in University Hospital Waterford immediately following the simulation-based training scenario and will be 30-45 minutes in duration (between February 2024 and June 2024). No identifiable participant data will be collected. You will not be asked to identify yourself during the recording. In the case that this may occur, your name/identity will be removed from the transcript.
- The semi-structured interview will take place in-person in University Hospital Waterford. The interview will take place between February 2024 and June 2024, one to six weeks after participating in the simulation-based training scenarios in the dedicated gerontological simulation laboratory. The interview will be audio recorded and transcribed by a professional transcription company. You may be asked to take part in more than one (but no more than three) interviews.

What will happen to me if I agree to take part?

- If you agree to participate in this study, you will be contacted by a member of the research team to inform you of when the simulation scenario event is taking place. If you participate in the simulation-based training scenario, you may be asked to participate in each audio recorded debrief.

- You will be contacted by a member of the research team to arrange a time and date for the semi-structured interview. The interview will be carried out by a member of the research team and will last 20 to 30 minutes. The interview will take place between February 2024 and July 2024, one to six weeks after participating in the simulation-based training scenarios in the dedicated gerontological simulation laboratory. You may be asked to take part in more than one (but no more than three) interviews. You will be asked a series of open-ended questions designed to explore comfort level with task/competency, the effect on change in your practice and your perception on teamwork.

You do not have to take part in this study, and you may withdraw from the interview process at any point. If you do not wish to take part in this study, it will not impact on your career.

Video/and or Audio recordings?

The debrief and semi-structured interviews will be audio recorded. You will be asked to not identify yourself in the audio recording. In the case that this may occur, the name/identity will be removed from the transcript. All transcriptions of audio recordings will be carried out by a professional transcription service whose employees are vetted and required to sign confidentiality agreements prior to undertaking any work. Files will be transferred using a secure encrypted file transfer system. All audio files will be uploaded using a file transfer protocol (FTP) server which can only be accessed by the transcription service and returned via this server. Anonymised data will be transferred to a data management programme by the co-investigator EB. All data (transcriptions, audio files) will be stored on a UCC MS OneDrive account accessible to student and programme team and that the storage period will be ten years in line with the UCC research data management policy.

You do not have to take part in the study and can leave the study at any time.

What are the benefits?

1. The results of this study will help inform future educational strategies to improve the care provided to older adults by doctors.

2. The study will be submitted as part of the thesis for researcher (EB's) MD in Health Professions' Education, University College Cork.
3. We plan to publish the study in a peer reviewed education journal e.g., Medical Education
4. We aim to present study at medical education conference e.g., AMEE, ASME or simulation conference.

What are the risks?

There is a risk of breach of confidentiality and of your data.

Will it cost me anything to take part?

No there will be no costs incurred to take part in this study.

Is the study confidential?

Yes, every effort will be made to reduce any risk of a breach to your data and to maintain your confidentiality throughout the study.

You will be asked to not identify yourself in the audio recording. In the case that this may occur, the

name/identity will be removed from the transcript. All transcriptions of audio recordings will be carried out by a professional transcription service whose employees are vetted and required to sign confidentiality agreements prior to undertaking any work. Files will be transferred using a secure encrypted file transfer system. All audio files will be uploaded using a file transfer protocol (FTP) server which can only be accessed by the transcription service and returned via this server. Anonymised data will be transferred to a data management programme by the co-investigator EB. All data (transcriptions, audio files) will be stored on a UCC MS OneDrive account accessible to student and programme team and that the storage period will be ten years in line with the UCC research data management policy.

You do not have to take part in the study and can leave the study at any time.

Data Protection

1. We will not be using your personal information for this study. You are being asked to participate in an (audio recorded) debrief and interview. The debrief will be 30-45 minutes in duration. The semi-structured interview will be 20-30 minutes. Both will be in University Hospital Waterford. The interview will be carried out by a member of the research team. The debrief and semi-structured interview will take place between February 2024 and July 2024. The debrief will occur immediately after the scenario and the interview will occur one to six weeks after participating in the simulation-based training scenarios in the dedicated gerontological simulation laboratory. You may be asked to take part in more than one (but no more than three) interviews. You will be asked a series of open-ended questions designed to explore comfort level with task/competency, the effect on change in your practice and your perception on teamwork. You do not have to take part in this study, and you may withdraw from the interview process at any point. If you do not wish to take part in this study, it will not impact on your career.
2. The legal basis under which we are processing the data is legitimate interests' interest and for scientific research purposes – see Article 6 and 9 of the General Data Protection Regulation 2016.
3. Only members of the research team (named above) will have access to your data.
4. All data (transcriptions, audio files) will be stored on a University College Cork MS OneDrive account accessible to student and programme team and that the storage period will be ten years in line with the UCC research data management policy.

5. You will be asked NOT to identify yourself or other participants during the recording. If this does happen the name/identity will be removed from the recording. The recordings will be stored on the principal investigator's (PI) password protector computer. All transcriptions of audio recordings will be carried out by a professional transcription service whose employees are vetted and required to sign confidentiality agreements prior to undertaking any work. Files will be transferred using a secure encrypted file

transfer system. All audio files will be uploaded using a file transfer protocol (FTP) server which can only be accessed by the transcription service and returned via this server.

All data (transcriptions, audio files,) will be stored on a UCC MS OneDrive account accessible to student and programme team and that the storage period will be ten years in line with the UCC research data management policy.

6. You have the right to withdraw consent to your personal data being used in this research project. You will be able to do this by contacting Dr Emily Buckley (Co-investigator) at e.j.buckley@gmail.com or phone: (051) 842 545
7. You have the right to complain to the supervisory authority at 21 Fitzwilliam Square South, Dublin 2, Ireland, or email: <https://www.dataprotection.ie>
8. You have a right to request access to your data and a copy of it. If you wish to request access to your data or would like a copy of it, you will be able to do this by contacting Dr Emily Buckley (Co-investigator) at e.j.buckley@gmail.com or phone: (051) 842 545
9. You have a right to restrict or object to processing your data. You will be able to do this by contacting Dr Emily Buckley (Co-investigator) at e.j.buckley@gmail.com or phone: (051) 842 545.

10. You have a right to have any inaccurate information about you corrected or deleted. You will be able to do this by contacting Dr Emily Buckley (Co-investigator) at e.j.buckley@gmail.com or phone: (051) 842 545.
11. You have a right to have your personal data deleted. You will be able to do this by contacting Dr Emily Buckley (Co-investigator) at e.j.buckley@gmail.com or phone: (051) 842 545.
12. You have a right to move your data from one controller to another in a readable format. You will be able to do this by contacting Dr Emily Buckley (Co-investigator) at e.j.buckley@gmail.com or phone: (051) 842 545.
13. This study will not include automated decision making, including profiling. Profiling is any form of automated processing of personal data consisting of the use of personal data to evaluate certain personal aspects relating to the person, in particular to analyse or predict aspects of their performance at work, health, or behaviour.
14. You have a right to object to automated processing including profiling if you wish.
15. We the research team are obliged to inform you if we intend to further process your personal data and provide you with information on that other purpose.
16. We the research team must inform you if we wish to transfer your data to a country outside of the EU or an international organisation and advise you of the safeguards, we have in place to protect their data.

Where can I get further information?

If you have any further questions about the study or if you want to opt out of the study, you can rest assured it will not affect the quality of treatment you get in the future.

If you need any further information now or at any time in the future, please contact:

-Dr Emily Buckley

Email: e.j.buckley@umail.ucc.ie

-Professor John Cooke (PI)

Email: john.cooke@hse.ie

Address: St Theresa's Unit, University Hospital Waterford, Dunmore Road

Phone: (051) 842 545 (9am-5pm)

Appendix I



Ospidéal Ollscoile Phort Láirge
University Hospital Waterford
Regional Cancer Centre South East

Debrief Audio Recording Participant Consent Form

Study title: ‘Determining the competencies required by non- geriatric medicine physicians caring for older adults’

I have read and understood the Information Leaflet about this research project. The information has been fully explained to me, and I have been able to ask questions, all of which have been answered to my satisfaction.	Yes ☐	No ☐
I understand that I don't have to take part in this study and that I can opt out at any time. I understand that I don't have to give a reason for opting out and I understand that opting out won't affect my future medical care.	Yes ☐	No ☐
I am aware of the potential risks, benefits and alternatives of this research study.	Yes ☐	No ☐
I have been given a copy of the Information Leaflet and this completed consent form for my records.	Yes ☐	No ☐
I consent to take part in this research study having been fully informed of the risks, benefits and alternatives.	Yes ☐	No ☐
I give informed explicit consent to have my data processed as part of this research study.	Yes ☐	No ☐
I consent to be contacted by researchers as part of this research study.	Yes ☐	No ☐



ucc

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Ospidéal Ollscoile Phort Láirge

University Hospital Waterford

Regional Cancer Centre South East

Patient Name (Block Capitals) | Patient Signature | Date

Translator Name (Block Capitals) | Translator Signature | Date

Legal Representative/Guardian Name | Legal Representative/Guardian Signature

Date



UCC

Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Ospidéal Ollscoile Phort Láirge

University Hospital Waterford

Regional Cancer Centre South East

To be completed by the Principal Investigator or nominee.

I, the undersigned, have taken the time to fully explain to the above patient the nature and purpose of this study in a way that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them.

| | |

-----Professor John Cooke | MB, BMedSc.,PhD,FRCPI | Signature | Date

3 copies to be made: 1 for patient, 1 for PI and 1 for hospital records.

Appendix J



Ospidéal Ollscoile Phort Láirge
University Hospital Waterford
Regional Cancer Centre South East

Semi-structured interview participant consent form

Study title: 'Determining the competencies required by non- geriatric medicine physicians caring for older adults'

I have read and understood the Information Leaflet about this research project. The information has been fully explained to me, and I have been able to ask questions, all of which have been answered to my satisfaction.	Yes ☐	No ☐
I understand that I don't have to take part in this study and that I can opt out at any time. I understand that I don't have to give a reason for opting out and I understand that opting out won't affect my future medical care.	Yes ☐	No ☐
I am aware of the potential risks, benefits and alternatives of this research study.	Yes ☐	No ☐
I have been given a copy of the Information Leaflet and this completed consent form for my records.	Yes ☐	No ☐
I consent to take part in this research study having been fully informed of the risks, benefits and alternatives.	Yes ☐	No ☐
I give informed explicit consent to have my data processed as part of this research study.	Yes ☐	No ☐
I consent to be contacted by researchers as part of this research study.	Yes ☐	No ☐



UCC
Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Ospidéal Ollscoile Phort Láirge

University Hospital Waterford

Regional Cancer Centre South East

Patient Name (Block Capitals) | Patient Signature | Date

Translator Name (Block Capitals) | Translator Signature | Date

Legal Representative/Guardian Name | Legal Representative/Guardian Signature
Date

To be completed by the Principal Investigator or nominee.

I, the undersigned, have taken the time to fully explain to the above patient the nature and purpose of this study in a way that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them.

--Professor John Cooke | MB, BMedSc., PhD, FRCPI | Signature | Date

Appendix K



Oifig Éitice Taighde
Ospidéal Ollscoile
Port Láirge
X91 ER8E

Research Ethics Office
University Hospital Waterford
Waterford
X91 ER8E

<https://hseresearch.ie/>

Prof. John Cooke
St. Teresa's Unit
University Hospital Waterford
Dunmore Road
Waterford

21st June 2023

Re: "Determining the competencies required by non-geriatric medicine physicians caring for older adults"

Dear Prof. Cooke,

The Research Ethics Committee, REC, HSE, South East has reviewed the above study at the meeting dated 19th June 2023 and are happy to grant you Full Ethical Approval.

The following documents were reviewed and approved:

1. Research Ethics Standard Application Form (Received 10th May 2023)
2. Research Proposal (Received 5th May 2023)
3. Questionnaires (Received 5th May 2023); Pre and Post Event Evaluation Questionnaire and Questions for Semi-Structured Interview.
4. Participant Information Leaflet (Received 10th May 2023); Pre and Post Questionnaire Participant Information Leaflet, Semi-Structured Interview Participant Information Leaflet, Participant Healthcare Professionals/Doctors Information Leaflet: Group Concept Mapping, Participant Information Leaflet: Focus Group.
5. Consent Forms (Received 10th May 2023); Questionnaire Participant Consent Form, Semi-Structured Interview Participant Consent Form, Focus Group Consent Form.
6. Letter to: Prof. George Pope (Received 5th May 2023)
7. Declaration Form (Received 23rd May 2023)
8. C.V. of Principal Investigator – Prof. John Cooke
9. GDPR Certificate – Emily Buckley

In addition this study will be outlined at the next planned Research Ethics Committee Meeting for the HSE, South Eastern Area by the Research Ethics Committee Co-ordinator and any comments made at this meeting in relation to your study shall be communicated to you in writing.



There is a requirement to notify the REC, HSE, South East of any amendments to the study. A copy of the results or final report should also be sent to the REC on completion of the study.

We wish you all the best with your study.

Yours sincerely,

A handwritten signature in black ink, which appears to read 'P. Ruairi MacNiocaill', written over a horizontal line.

Prof. Ruairi MacNiocaill

Chairperson

Research Ethics Committee

HSE, South Eastern Area

Cc. Dr. Emily Buckley – WICOP, St. Patrick's Hospital, John's Hill, Waterford.

Appendix L



Oifig Eitice Taighde
Ospidéal Ollscoile
Port Láirge
X91 ER8E

Research Ethics Office
University Hospital Waterford
Waterford
X91 ER8E

<https://www.hseresearch.>

Prof. John Cooke
St. Theresa's Unit
University Hospital Waterford
Dunmore Road
Waterford

15th January 2024

Re: "Determining the competencies required by non-geriatric medicine physicians caring for older adults"

Dear Prof. Cooke,

A decision was made relating to the listed study:

Favourable ethical approval has been granted for the above study and constitutes full ethical approval.

The following documents were reviewed and approved:

1. Amendment Form
2. Research Proposal (Version 2, Dated 20/12/2023)
3. Observation Tool Adapted from NOTSS (Version 2, Dated 20/12/2023)
4. Consent Form - Debrief Audio Recording (Version 1, Dated 20/12/2023)
5. Consent Form Observation Tool (Version 1, Dated 20/12/2023)
6. Participant Information Leaflet - Debrief Audio Recorded (Version 1, Dated 20/12/2023)
7. Participant Information Leaflet - Observation Tool (Version 1, Dated 12/12/2023)
8. Letter to REC Chairperson – Prof. Ruairi MacNiocaill
9. Document Outlining Changes for Amendment

Ethical Approval is granted for the above application and listed documents. Should future amendments be required to this research, please submit an amendment request to the REC, HSE, South East. Retrospective approval for such amendments cannot be undertaken and any changes made to the study without amendment ethical approval will deem the previous ethical approval invalid.



With regards to ethical oversight for the duration of your research:

A report of changes to the progress of your research, a copy of your annual report, completed research or final report for this study is anticipated by HSE, REC, South East in compliance with the HSE National Framework RGMS.

We wish you every success with your research.

A handwritten signature in black ink, appearing to read 'R. MacNiocaill', written over a horizontal line.

Prof. Ruairi MacNiocaill

Chairperson

Research Ethics Committee

HSE, South Eastern Area

Dr. Emily Buckley – University Hospital Waterford.

Appendix M Scenario design outline

Designing a SBE Scenario

Instructional design: ADDIE model

We chose the ADDIE (Analyse, Design, Develop, Implement and Evaluate) model as our instructional design method. The ADDIE model involves five stages: Analyse, Design, Develop, Implement and Evaluate and is analogous with instructional design systems where knowledge gaps are identified and each phase in the development of the SBE scenario aligns to the learning objectives (337). The ADDIE model has been adopted successfully by SBE as it provides a structured framework for developing SBE scenarios, ensuring all components are addressed and enhancing the design of SBE scenarios, SBE curricula and faculty development courses (387, 388).

Stage 1: analysis

The first step involves determining the needs of the target learners. We carried out a needs analysis via a scoping review to gain an insight into the competencies already outlined in the literature as required by hospital doctors from various specialties when caring for older adults (chapter two) as well as identifying any gaps that may be present. We subsequently conducted a national group concept mapping study to gain expert insight into what exactly these competencies should be and how they should be prioritised (chapter three).

Stage 2: design

Determining learning objectives

Learning objectives for the simulation scenario were determined by selecting competencies that were most commonly identified in the scoping review and those which were rated as highly important by participants in the group concept mapping study. We utilised the different levels Bloom's Revised Taxonomy to design our learning outcomes (389). Bloom's Revised Taxonomy contains three domains of learning: (i) cognitive; (ii) skills and; (iii) affective and consists of a hierarchy of six learning levels ranging from 'remember' to 'create'. Although it is not essential to target each domain and level, aligning the learning objectives to a specific level ensures the learners have a clear understanding of what is expected of them and allows us to target a desired cognitive level promoting learning through a SBE scenario that is both engaging and challenging. Additionally, we endeavoured to align the learning objectives closely to the Irish Medical Council (IMC) 'Eight Domains of Professional Practice' (227) to ensure that competencies taught reflect the challenges and responsibilities reflect the realities of medical practice in Ireland and enhance professional development. This is a comprehensive framework for all doctors working in Ireland that serve as a guide for professional development, assessment and self-reflection, ultimately outlining the

medical professionalism that doctors should strive to meet to ensure that they are providing quality healthcare for the population through treatment, education, management, or governance. The eight domains include: (i) Patient Safety and Quality in Patient Care; (ii) Relating to Patients (iii) Communication and Interpersonal Skills; (iv) Collaboration and Teamwork; (v) Management (including self-management); (vi) Scholarship; (vii) Professionalism and; (viii) Clinical (Professional) Skills. The domains encourage doctors to reflect on their own practice, identify gaps in their practice, areas they wish to upskill and progress.

An effective scenario is one in which the desired learning outcomes and plan for execution of the simulation scenario are clear and align with current clinical practice and guidelines (390). We considered which learning objectives aligned to these competencies could be realistically simulated within the available resources including environment, required materials and available ESPs and timeframe. This was carried out by consulting the local gerontological simulation faculty. Finally, expert input from a geriatrician, a geriatric medicine trainee, clinical educator and advanced nurse practitioner in geriatric medicine as well as members of the research team was sought to ensure the chosen competencies and subsequent learning objectives were appropriate for our research study.

Table M.1 outlines the final subset of competencies for the SBE scenario; their source; importance rating and alignment to both Bloom's Revised Taxonomy and the IMC '8 Domain of Professional Practice'.

Competency	Learning objectives	Source	Priority rating	IMC domain	Bloom's Revised Taxonomy
Recognition and assessment of a post-operative patient with delirium	Knowledge-based: -Define delirium -Describe the key features of a patient with delirium Skills-based: -Demonstrate the appropriate use of screening tools for delirium (4AT) -Distinguish delirium from dementia -Identify potential contributing factors for delirium Attitude-based: -Appreciate the importance of prompt recognition of an older adult with delirium	GCM	4.57/5	Quality and Safety/Clinical skills	Level 2: Understanding
Demonstrate effective communication of diagnosis and management plan with staff, patient and next of kin/carers	Knowledge-based: -Understand the importance of clear and effective communication -Clearly communicate the diagnosis, and management plan to a patient's next of kin Skills-based: -Ensure patient and next of kin are involved in the decision-making progress -Communicate clearly with other HCPs involved in the patient care -Collaborate effectively with other HCPs to co-ordinate patient care Attitude-based:	GCM; SR	4.71/5	Communication/Collaboration and Teamwork	Level 3: Application

	-Demonstrate empathy and respect when communicating with the patient and next of kin				
Formulate and implement evidence-based interventions for delirium management, drawing upon understanding of pharmacological and non-pharmacological approaches tailored to patient needs	Knowledge-based: -Describe the different pharmacological and non-pharmacological treatments of delirium -Demonstrate knowledge of situations when pharmacological measures should be applied Skills-based: -Develop an individual management plan for a patient with delirium Attitude-based: -Demonstrate commitment to following best practice to treating older adults with delirium	GCM; SR	4.57/5	Management/ Communication and interpersonal skills/Collaboration and Teamwork/ Quality and Safety	Level 6: Create
Appropriately review and modify medications	Knowledge-based: -Recognise key medications in patients with Parkinson's disease -Identify polypharmacy -Describe the different treatment options for older adults with Parkinsons Disease -Demonstrate knowledge of appropriate antiemetic prescribing in older adults with Parkinsons disease Skills-based: -Recognise erroneous omissions from a patient's drug Kardex	GCM; SR	4.65/5	Quality and Safety/ Management /Scholarship	Level 5: Evaluate

	-Identify useful resources for the prescribing of medications in older adults with Parkinsons disease				
Demonstrate a patient-centred care approach to the care of this patient	Knowledge-based: -Demonstrate an understanding of the importance of shared-decision making Skills-based: -Facilitate discussion with the patient and next of kin to develop a management plan in line Attitude-based: -Demonstrate empathy and treat a patient with respect and dignity	GCM	4.57/5	Professionalism/Communication and Interpersonal Skills/ Relating to the patient	level 2: Understanding

Table M 1 Competency and associated learning objectives mapped to the source of the competency, importance ratings from the GCM study, IMC domains and Bloom' Revised Taxonomy (GCM-group concept mapping; SR-scoping review

Teaching strategy

As outlined in the main text in chapter four we used Mezirow's transformative learning theory as the theoretical foundation for this study (391).

Stage three: Develop

This stage outlines the instructional materials essential to delivering the SBE event including resources, personnel, participants and scheduling and scenario development. A full description of the settings, resources, participant selection and recruitment is outlined in the main text in chapter four.

Scenario

A simulation-based education scenario was developed using the Waterford Integrated Care for Older People Simulation (WICOPSIM) template. Having spent 18 months developing and writing gerontological-based SBE scenarios for healthcare professionals as the simulation fellow at WICOPSIM while simultaneously completing my MD, I was able to leverage my prior experience and existing scenario outlines to create a SBE scenario focusing on the learning objectives outlined above. The initial draft was reviewed by members of the research team (JC and AB) and members of the WICOPSIM faculty. Clarity on how learning outcomes were determined and concerns regarding the duration of the SBE scenario and the complexity (the requirement to switch Parkinson's disease medications from oral to alternative route) of the SBE scenario were discussed. The final version included a ten-minute prebrief, fifteen-minute SBE scenario, allowing for a thirty-five minute debrief. Appendix N outlines the final draft of the SBE scenario.

Simulated participants and embedded simulation participants

A simulated participant (SP) is a real individual who has been trained in the role of the patient, relative or healthcare professional to facilitate learning (338, 392). Whereas an embedded simulation participant (ESP) acts in role that guides the scenario and can influence the scenario's evolution- wither favourably or unfavourably (393). We required an SP (the patient) and three ESPs (the nurse, geriatric medicine specialist registrar +/- the pharmacist). Members of the gerontological simulation faculty were invited via email to participate as SPs and ESPs. Twelve faculty members including geriatric medicine registrars, tutors and advanced nurse practitioners agreed to participate as an SP or ESP. All had previous experience in participating in gerontological simulation previously either as a SP, ESP, observers, learners and in some instances all four. They were briefed on their roles and piloted their role. My experience in WICOPSIM involved utilising members of the gerontological simulation faculty as ESPs and SPs in SBE scenarios for a number of reasons. Primarily, in my experience members of the gerontological simulation faculty have copious experience with caring for older adults

and are attuned to common reactions, anticipated actions and co-morbidities of older adults. This allows them to anticipate how older adults might respond to various clinical decisions and behaviours, often drawing upon their past experiences with older adults. Secondly, a large amount of the SBE scenarios that take place in WICOPSIM are communication based. This offers a high degree of realism as the learner is interacting with a real person, augmenting their communication skills. Lastly, there can be difficulty in procuring an older adult actor for ten different SBE scenarios sessions due to fund and time constraints. However, we also acknowledge that despite the level of experience in geriatric medicine of these Healthcare professionals, they cannot replace the lived experience of older adults in hospital.

Phase four: Implementation

The first step of implementation involved piloting the scenario, debrief and semi-structured interviews in order to identify any unanticipated errors, the first group of learners scheduled to participate in the SBE scenario was designated the pilot implementation. A pilot study is a preliminary investigation conducted on a smaller scale to assess the feasibility and potential effectiveness of a larger, future study or a component thereof (394). They were made aware this was a pilot of the scenario and that their data would not be included in the study. They were reminded that if they did not want to participate, they could withdraw at any time. Similarly, a pilot of an SBE scenario is essential to identify any errors or problems which may necessitate refining the design of the study and therefore should occur under conditions that resemble the planned SBE scenario as possible. The pilot SBE scenario for our study took place on the 12th of March 2024 with a group of thirteen interns utilising the setting and resources as described above. The prebrief was 10 minutes. The SBE scenario was 20 minutes. A pilot debrief was carried out immediately following the pilot SBE scenario. The duration of the debrief was 20 minutes. Based on pilot SBE scenario and debrief we decided in future scenarios that an emphasis should be placed on involving all participants in both the initial reaction and future planning aspects of the debrief as this would nurture a supportive environment and potentially help the learners to recognise that their peers have also undergone comparable experiences in similar clinical scenarios. To reduce the number of gerontological faculty required (given competing time and work commitments) the roles of the pharmacist would be and geriatric medicine SpR ESPs would now be simulated via telephone enacted by a member of the research team who has prior experience as an ESP.

A pilot interview allows researchers to test their own skills and achieve clarity within their interview guide as well as helping to ensure similar information was collected from each participant (395). A pilot interview took place on the 4th of April 2024 with the learner who participated in the pilot simulation SBE scenario. This took place in-person

and was recorded (audio data only). The transcript was reviewed by researchers AB and EB.

Following the pilot interview questions were revised to encourage participants to discuss their experiences specifically in relation to the simulation scenario they had participated in and their subsequent experiences of similar clinical scenarios. Recordings were continuously reviewed between interviews, and the interview guide was modified to allow for a more in-depth exploration of ideas observed in former interviews. EB and AB reviewed the proposed questions for the semi-structured interviews. Questions were refined to ensure a more focused line of enquiry of what particular elements of the simulation scenario exactly may have influenced the participants subsequent behaviour/approach in a similar scenario, to explore their perceived value and perceptions to having taken part in this particular simulation.

Following these changes, we carried out the SBE scenario nine different times with different learners each time. Each SBE scenario was followed by a debrief immediately. An individual semi-structured interview took place with the learner two to four weeks after each SBE scenario and debrief.

Stage five: Evaluation

This stage in the research project included the immediate post scenario group debrief and a semi-structure interview with each individual learner two to four weeks post the scenario. This is outlined in detail in the main text in chapter four.

Delirium in Parkinson's disease post-op

Scenario Summary (200 words max):

X is a 72-year-old female who was admitted for an elective cholecystectomy. She is day one post op when the nursing staff note she is newly confused. The learner (NCHD) is asked to review the patient. The learner screens the patient for delirium and identifies the potential contributors to delirium and creates a management plan. The nursing staff note that patient has been refusing tablets since the confusion began and ask if any alternative is available, particularly for the Sinemet as they have missed some doses already. The learner may contact the pharmacist/ ARHC ANP or use the BNF for this. The learner is asked at the end of the scenario to give an update to the NOK who are concerned about the patient returning home if her current condition persists and wants to apply for Long-term care.

Target learner(s):

Non-consultant hospital doctors ranging from interns to registrars within a hospital-based specialty.

Prebrief:

- Fictional contract
- Vegas rules
- Basic Assumptions (The Basic Assumption: We believe everyone here is INTELLIGENT, CAPABLE, CARES about doing their BEST and wants to IMPROVE.)
- Consideration is required for psychological safety and what measures or discussion has occurred to ensure this for the learner(s)
- Orientation to environment and resources available
- Timeline for the scenario and debrief

Learning outcomes:

By the end of this simulation scenario, learners will be able to.

- 1.) Recognition and assessment of a post-operative patient with delirium.

Competency from: Group concept mapping study; importance rating 4.57/5
Blooms taxonomy: Level 2: Understanding
IMC '8 Domain of Professional Practice' domain: Quality and Safety/Clinical skills

- 2.) Demonstrate effective communication of diagnosis and management plan with staff, patient and next of kin/carers.

Competency from: scoping review and group concept mapping study; importance rating 4.71/5

Blooms level: Level 3: Application

IMC '8 Domain of Professional Practice' domain: Communication/Collaboration and Teamwork

- 3.) Formulate and implement evidence-based interventions for delirium management, drawing upon understanding of pharmacological and non-pharmacological approaches tailored to patient needs.

Competency from: group concept mapping study; importance rating 4.57/5

Blooms level: Level 6: Create

IMC '8 Domain of Professional Practice' domain: Management/ Communication and interpersonal skills/Collaboration and Teamwork/ Quality and Safety

- 4.) Appropriately review and modify medications (including issues relating to identifying polypharmacy and/ or require deprescribing).

Competency from scoping review and group concept mapping study: 4.65/5

Blooms level: Level 5: Evaluate

IMC '8 Domain of Professional Practice' domain: Quality and Safety/ Management /Scholarship

- 5.) Demonstrate a patient-centred care approach to the care of this patient

Competency from: group concept mapping study; importance rating 4.57/5

Blooms level 2: Understanding

IMC '8 Domain of Professional Practice' domain: Professionalism/Communication and Interpersonal Skills/ Relating to the patient

Desired background knowledge (e.g. guidelines, protocols):

4AT (<https://www.the4at.com/>)

HSE Delirium in a general ward pathway

<http://dementiopathways.ie/permacache/fdd/cf3/d91/f0533608da7160bbe950818bbc5322c6.pdf>

"Nil by mouth" medication dose calculators and guidelines

<https://www.parkinsons.org.uk/professionals/resources/nil-mouth-medication-dose-calculators-and-guidelines>

Emergency management of patients with Parkinson's

Setting/environment:

General ward

Roles required (e.g. NCHD, pharmacist etc.):

Nurse- ESP

Patient-ESP

Pharmacist- ESP (available via phone)

Geriatric medicine SpR (available via phone)

NCHD-learner

Resources required (equipment, props, radiology etc.):

Bed

Phone

Patient notes

Kardex

BNF

4AT screening tool

Delirium pathways print out

Scenario progression/flow:

Stage Name	Timing	Expected action/transition	Cue if required	Actor/patient script	Link to Learning Outcomes
Recognition of delirium	3 mins	-Learner recognises patient may potentially have delirium. -Ask the staff nurse about context of symptoms. -Carrys out 4AT.	If the learner does not suggest delirium, nurse emphasises that 'the patient wasn't like this before'...'confusion is definitely new'. If the learner does not formally assess for delirium the nurse should suggest they do so. If the learner knows to perform the 4AT but doesn't know how, a card will be provided with the 4AT (back of lanyard/guideline available).	Patient must provide answers on which to score the 4AT positively Nurse provides collateral that indicates a change in behaviour and cognition from yesterday and fluctuations throughout the day.	(i) (ii)

			If the learner does not ask the nurse for collateral the nurse should say “he wasn’t like this last night” and provide a brief medical history.		
Assessment		The learner uses the ‘PINCH ME’ mnemonic (available in the guideline) to assess for contributing causes. The learner will be provided with the results of relevant investigations that they ask for e.g. Abdominal x-ray (constipation), Blood tests (AKI), Post-op notes (successful surgery, no issues), Kardex with analgesia charted but no PRNs prescribed, Sinemet held. Learner examines patient- no issues with wound.	If the learner does not seek to assess for causes, the nurse asks if the learner can think of why the patient may have delirium and if required prompts them to utilise the guidelines.	Nurse provides results to appropriate investigations for the scenario incl. Kardex, bloods abdominal x-ray. Asks learner what the specific causes of delirium are.	(i) (ii)
Management part 1: Conservative management		The learner should provide a plan to manage delirium as appropriate including non-pharmacological measures and addressing likely contributing	The nurse asks the learner what the management plan is.	If not addressed nurse asks for detailed management plan. If learner is unsure, nurse directs them to delirium guidelines. Asks what learner would like to do about constipation,	(iii) (iv) (v)

		causes to delirium e.g. charts prn analgesia, Movicol, advice re fluid intake. May ask nurse to commence DOSS.		dehydration, which medications to restart/chart.	
Management, part 2:		Medication management: Learner acknowledges patient requires PD meds. Contacts pharmacy/PD nurse to determine how to do this/looks up guidelines. Charts alternative to sinemet PO.	Nurse states, 'patient refusing tablets, is there any other way we could give her the Parkinson's medications?'...'Pharmacy may know.../know any guidelines'	Patient refusing medications. Nurse asks is there any other options for giving his medications especially the PD medications as he has missed some doses already e.g. madopar dispersible or rotigotine patch. Prompts learner to contact pharmacy who can give advice. Nurse asks about antiemetic post op.	(iv) (ii)
Communication with NOK		Learner provides update to patient's NOK, answering questions including: -Concerns re bringing patient home given 'current state'. -Explains inappropriate to consider LTC at present. Learner should provide information regarding diagnosis of	Nurse tells learner that NOK would like an update	Nurse informs learner that NOK would like an update. NOK asks what is wrong with patient...states if remains like this cannot take patient home and wants to apply for long-term care.	(v)

		delirium, likely causes and course and option of involving geriatric specialist services if unresolving.			
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Debriefing (What needs to be discussed post scenario):

1.) PEARL debriefing tool

2.) Include questions pertaining to stages 2 to 6 of transformative learning theory:

- Encourage critical reflection involving self-assessment of assumptions.
- Facilitate Open discussion amongst learners and observers to enable recognition that others have negotiated a similar clinical scenario in the future.
- Explore options for new roles, relationships and actions when faced with a similar clinical scenario in the future.
- Discuss how learners and observers would approach a similar situation in the future.

Evaluation:

Debrief as above and semi- structured interviews will take place 2-3 weeks post simulation scenario with learners.

Questions will be guided by transformative learning theory with a focus on stages 7-10.

Patient script:

As per scenario progression table.

Candidate Information Sheet (Handed to candidates prior to entering scenario):

NCHD learner

You are one of the NCHDs on your team. You are called by the nursing staff to review a one of your patients who is one day post op and appears confused. Please assess and form a management plan. A pharmacist and frailty/PD ANP are available to contact by phone.

Embedded Simulation participant Information Sheet:

Nurse

You are a staff nurse on the ward. You ask the NCHD to review a patient who is D1 post-op who appears confused in the last hour. This is new. You are aware of the patients medical and social history. You can provide results of investigations that the NCHD requests including images, bloods etc. If the NCHD requires assistance with recognising, identifying the causes of and/ or managing delirium, you can direct them to the HSE delirium

guidelines. You wish to know how the NCHD will address each of the possible causes of delirium. You note that the patient is refusing tablets and ask the NCHD if there is any alternative to the medications especially the Sinemet as the patient has already missed 2 doses. The patients' blood pressure is not high at the moment, so you are not concerned about the anti-hypertensives. You can remind the NCHD that a pharmacist and geriatric medicine ANP are available for advice regarding this.

You inform the NCHD that the family/NOK of the patient would like an update.

Pharmacist

You are contacted by one of the NCHDs who is concerned that the patient is refusing to take tablets and is wondering if there is an alternative available. They are looking for advice on alternative options and how to convert them.

Family member/NOK

You are the son/daughter of the patient. You enter the scenario following completion of delirium management plan and after PD medications have been sorted. You are very concerned at seeing your mother like this and state you can't take her home like this and want to apply for LTC. You have been finding it difficult at home since your mother moved in as you have a fulltime job yourself and three children. You feel guilty that you can't spend more time with your mother and drive her places etc. NCHD must explain diagnosis and likely course of delirium. You also ask about any support services.

Simulated participant:

Patient

You are a 72-y o female. You are acutely confused but generally cooperative (except with taking medications). Your answers to the 4AT include thinking you are at home, believing it is 2012 and believing you are 60 years old. You can start but not complete the months of the year backwards. You moved in with your son/daughter one year ago following the death of your spouse. You are an ex-smoker and do not drink alcohol. You previously lived in U.K (and think you are there currently) and moved back to Ireland one year ago. You are a retired teacher. You are Independent with pADLs. Your son/daughter manages the cooking, shopping, and bills however you usually make your own breakfast and lunch and walk to the post office to collect your pension on Fridays. You mobilise independently although it was recommended you walk with a stick. You had one fall in the garden 6 months ago. You tripped over a plant a pot You do not have home help. You no longer drive as you don't like driving at night and find the roads too busy these days. You use a mobile phone for calls and previously for texts. You occasionally forget tasks, people's names but keep a diary to remind you of appointments, people etc.

Past medical history:

Hypertension

T2DM

Mild Cognitive Impairment
Parkinsons disease

Medications:

Sinemet CR 50/200mg TDS
Sinemet Plus 25/100MG OD
Bisoprolol 5mg OD
Furosemide 20mg OD
Atorvastatin 10mg,
Serc prn.

Since admission:

Oxycontin 5mg BD

Appendix O Guide for debrief questions

Phase 1: disorientating dilemma

- 1.) What is your initial reaction? Anyone else?**
- 2.) Talk us through what happened...is that what normally occurs?**
- 3.) What was challenging about this scenario?**

Phase 2: self-examination

- 4.) How did that make you feel?**

Phase 3: critical assessment of assumptions

- 5.) Have you previously encountered this type of scenario before? How was this different?**

Phase 4: Recognition that one's discontent and process of transformation are shared

- 6.) Has anyone else had a similar experience in this type of scenario?**

Phase 5: Exploration of options for new roles, relationships, and actions

- 7.) What are other ways you could have approached this scenario? Anyone other healthcare professionals you would like to involve?**

Phase 6: planning a course of action

- 8.) Do you think you would approach this differently if faced with a similar scenario in the future? How? What would you do differently?**

Close

Guide for debrief questions guided by phases of Mezirow's transformative learning theory and PEARLS debriefing tool

Appendix P Guide for semi-structured interview questions

Phase 1: disorientating dilemma Tell me about the simulation scenario? Phase 1
Phase 2 and 3: self-examination and critical assessment of assumptions Did the scenario challenge you at the time? (How so?)
Phase 4: Recognition that one's discontent and process of transformation are shared Did you talk with others about the event afterwards? (what did you/they say?)
Phase 8: Provisionally trying out new roles Have encountered a similar scenario since in your clinical work?
Phase 7: Acquisition of knowledge and skills Did you recall anything from the sim scenario that you brought to this clinical scenario? Did you use any resources?
Phase 9: building competence and self-confidence in new roles and relationships Were there any challenges and how did you deal with them? Was there anyone else involved? (what did they do?)
Phase 10: 'A reintegration into one's life on the basis of conditions dictated by one's new perspective Do you think your overall approach to this type of scenario has changed? (Why/why not?)
Other: Did it feel real? (Why?) 10.) Anything else you would like to add at this point? Close

Guide to semi-structured interviews aligned to phases of Mezirow's transformative learning theory