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Title	Evaluation of the pilot implementation of the Framework for Safe Nurse Staffing and Skill-Mix in Emergency Care Settings - Report 2
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Publication date	2021-05-01
Original Citation	Drennan, J., Savage, E., Hegarty, J., Murphy, A., Brady, N., Murphy, A., McCarthy, V., Loughnane, C., Kelly, G., Dahly, D., Griffiths, P., Ball, J., Crouch, R., Duffield, C. and Scott, A. (2021) 'Evaluation of the pilot implementation of the Framework for Safe Nurse Staffing and Skill-Mix in Emergency Care Settings - Report 2'. Cork: University College Cork, pp. 1-119.
Type of publication	Report
Link to publisher's version	https://www.lenus.ie/bitstream/handle/10147/629498/135001_538eaf16-e721-458f-8cb2-46b5c5afea7c.pdf?sequence=1
Rights	© 2021, the Authors.
Download date	2026-11-15 17:35:18
Item downloaded from	https://hdl.handle.net/10468/11820

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Evaluation of the Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix in Emergency Care Settings

Report 2

University of Southampton

UTS

NUI Galway
OÉ Gaillimh

HRB Health Research Board

An Roinn Sláinte
Department of Health

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Acknowledgements

The authors of this report would like to thank the Department of Health and the Health Research Board for funding the research. We would also like to thank the directors and assistant directors of nursing and members of the Local Pilot Implementation Teams in each of the pilot sites for their help and support with the study. In particular, we would like to thank the clinical nurse managers and the nursing staff and healthcare assistants in each of the emergency department and injury unit settings who helped with data collection; their support was conducive to completing the evaluation of the pilot. We would also like to acknowledge the help provided by the data officers in each of the research sites; their expertise was invaluable in collecting and analysing secondary data used in this study. We would like to thank the members of the Pilot Planning and Implementation Group and the Taskforce Steering Group for their advice and oversight during the process of the research. In particular, we would like to acknowledge the support provided by Ms. Rachel Kenna, Chief Nurse and Mr. Ray Healy, Nursing Project Officer, Department of Health and Dr Geraldine Shaw, Nursing and Midwifery Services Director and Ms Liz Roche, Area Director, Nursing & Midwifery Planning & Development, Dublin/Mid-Leinster of the Office of the Nursing and Midwifery Services Director. The research team would also like to thank Ms. Caroline O'Shea at University College Cork for the administrative support provided throughout the study.

Section 1

1.1 Executive Summary

1.1.1 Background

Arising from efforts to introduce a systematic approach to the determination of safe and appropriate nurse staffing levels in the Irish healthcare system, where historical need and legacy issues were often key determinants in staffing decisions, the Department of Health published a policy document titled: *A Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Ireland* (Department of Health 2018) (henceforth referred to as the *Framework*). Based on the research undertaken by a research team from University College Cork, the University of Southampton, University of Technology Sydney, and National University of Ireland Galway (Drennan *at al.* 2018), this report outlined a number of recommendations to ensure staffing levels in medical and surgical wards in acute hospitals were safe and effective in the delivery of care.

In a continuation of this evidence-based approach, the Department of Health made the decision to extend the model to develop a framework for emergency care settings; this resulted in the publication of a draft document titled: *A Pilot to Implement the Framework for Safe Nurse Staffing and Skill Mix in Emergency Care Settings* (Department of Health, 2018). This document outlined a number of recommendations to ensure the safe staffing of emergency care settings. Central among these recommendations was the introduction of a systematic approach to the determination of staffing levels, the adjustment of skill mix to ensure that care was delivered by 85% RN and 15% HCA, and to ensure that the CNM 2 role was 100% supervisory.

The research in this report provides data on the implementation of the recommendations of the *Draft Framework* in three emergency departments (EDs) and one injury unit (IU). Exploring the extent to which changes in staffing within the selected departments have had an impact on patients' experience within the emergency care setting, as well as on the experience of the nursing and healthcare assistant workforce and on organisational factors, this report outlines the methods and results of the programme of research examining the impact of introducing a pilot safe staffing framework to emergency care settings.

1.1.2 Aims and Objectives

The overall aim of this research was to measure the effect of the implementation of the safe nurse staffing draft policy *Framework* in emergency care settings, including measuring the impact of its recommendations on patient outcomes, staff outcomes, and organisational factors. The study also aimed to examine longitudinal data as a means of informing the implementation and evaluation of the *Framework* as well as building capacity with senior staff to monitor staff levels in these settings.

Six key objectives guided this research programme:

- Objective 1: To measure the impact of implementing safe nurse staffing and skill mix measures as outlined in the *Draft Framework* on patient outcomes measures, staff outcomes and organisational factors.

- Objective 2: To examine the extent to which patient outcome measures changed over time as a consequence of the pilot introduction of the *Framework* in emergency care settings.

- Objective 3: To examine the impact of pilot introduction of the *Draft Framework* on adverse patient outcomes and safety CLUEs (Care Left Undone Events).

- Objective 4: To determine the impact of the pilot introduction of the *Draft Framework* on staff outcomes (e.g., job satisfaction, burnout, intention to stay).

- Objective 5: To determine the impact of the pilot introduction of the *Draft Framework* on organisational/ward environment factors

- Objective 6: To determine the cost implications arising from the pilot introduction of the *Draft Framework* and the resources required to deliver national roll-out and to maintain the *Framework*.

1.1.3 Methods

The research took place across three emergency departments and one injury unit, with the hospitals chosen by the Department of Health according to their location and specialist function. The sample included secondary data from all patients who attended the three EDs and IU across the study period (excluding patients who attended clinics associated with the EDs), as well as nurses and HCAs involved in direct patient care within the selected departments. The research was undertaken in conjunction with changes to nurse staffing that were made following the implementation of a systematic approach to determine staffing levels based on patient acuity and dependency, the implementation of the recommended skill-mix (85% RN to 15% HCA) and ensuring the role of the CNM 2 (ED/unit leader) is 100% supervisory. The Nursing Hours per Patient Presentation (NHpPP) model was the selected systematic approach for determining staffing levels in emergency departments. This model calculates the number of Whole-Time Equivalent (WTE) nursing staff (RN and HCA) required to care for patients using triage category as a dependency and acuity measure.

A number of approaches were employed in this research programme, including the collection of cross-sectional and administrative data. Administrative data was collected for patients who attended the three EDs and the IU between January 2018 and March 2020, with the 31st March 2020 selected as a cut-off point for administrative data collection due to the Covid-19 pandemic and the subsequent impact on the healthcare

system. The majority of secondary data was provided by the administrative systems of the respective departments. The administrative data was used to measure the impact of staffing adjustments arising from the recommendations of the *Draft Framework* on patient outcomes (leaving without being seen, time to triage, triage to be seen, ED registration to be seen, ED care time, and patient experience time). Patient experience time refers to the total time spent by patients within the emergency department, inclusive of time spent awaiting admission. The cross-sectional element of the study measured data on nursing work, job satisfaction and intention to leave as well as care left undone events, burnout and the prevalence of violence and aggression. The survey component of the research was administered to staff at baseline (Time 1) and following the adjustments to their staffing based on the recommendations of the *Draft Framework* (Time 2). Staffing adjustments were implemented on varying timescales within each of the emergency departments throughout 2019, however Time 2 survey data was collected in the emergency departments from February 2020 onwards as the adjustments had been implemented in each site at this time. Secondary data on patient experience in the emergency departments was also extracted from the HIQA annual patient experience survey for 2018 and 2019; data for 2020 was unavailable due to the Covid-19 pandemic.

Overall, the administrative and cross-sectional data measured the impact of the *Draft Framework* across a total of four domains: nurse staffing, nursing workload, the working environment, and patient outcomes. The instruments used in the collection of this data were based on those previously used in the European-wide *RN4CAST* research study (Sermeus *et al.* 2011) and those identified in a systematic review of the association between nurse staffing and outcomes in emergency departments (Recio-Saucedo et al. 2015).

1.1.4 Key Results – Emergency Departments

The results are reported according to the timeframes in which the data was collected. The administrative data is reported on an annual basis, while the cross-sectional data is reported at two time points: Time 1 (baseline), and Time 2 (following the adjustments to staffing).

Nursing Hours per Patient Presentation, Agency Usage, and Economic Analysis

- Using data for the year 2018 as a baseline, the Nursing Hours per Patient Presentation (NHpPP) model determined that all three EDs required variations in staffing to ensure the delivery of safe and effective patient care based on the patient's triage category. The calculations were based on adult EDs only.

- The model calculated that Hospital 4 required an additional 6.5 WTEs (comprising of 2.11 RNs and 4.39 HCAs to achieve the recommended skill mix of 85:15); Hospital 5 required an additional 8.5 WTEs (7.1 RNs and 1.4 HCAs), and an additional 28.5 WTEs (18.7 RNs and 9.8 HCAs) were required in Hospital 6.

- It is of note that the recruitment of the required staff took place over an extended period, with the new staff recruited undergoing a required period of induction and adaptation to the departments. Agency staff were required to provide care in the ED and, in particular, for boarded patients during this period. Furthermore, the majority of staffing changes were made towards the end of 2019, with the Covid-19 pandemic potentially inhibiting the impact of such changes from March 2020 onwards. Such factors highlight the need for the collection of further data over a longer period of time to explore the impact of staff stabilisation on agency use and economic outcomes. However, the research shows signs of the positive effects of the staffing changes on agency use, with both Hospital 4 and Hospital 5 showing notable decreases in agency use by March 2020 as staffing stabilised.

- Positive signs were also evident in Hospital 6, which recorded a decrease of 4.35 WTE or 735.64 hours in RN agency use from 2019 to 2020, coinciding with a decrease in vacant posts. The converse was seen in HCA agency use in Hospital 6, with an increase in agency use in 2020 coinciding with an increase in HCA vacancies. The data showed that overall agency use in Hospital 6 began to decrease in late 2019, with the downward trend continuing into 2020.

- The need for further data collection was also evident in the economic analysis of the staffing adjustments. It is envisaged that agency rates and the associated costs will decrease as the workforce stabilises, with further longitudinal research required to measure these trends.

- It is important to note that the majority of agency costs are accrued in the allocation of staff to care for patients who have been admitted but are waiting in the ED for a bed on a ward, with these patients typically cared for by agency staff.

Nursing Work

- Staff across the three Emergency Departments, including clinical nurse managers (CNMs), staff nurses (RNs) and healthcare assistants (HCAs), were asked to complete the staff survey at baseline in 2018 (Time 1) and again at Time 2 following adjustments to their staffing (from February 2020).

- The number of patients per nursing staff (including HCAs, CNMs, and nurses based in Triage) per shift decreased from an average of 14.87 patients at Time 1 to 11.27 patients at Time 2, with each hospital recording a lower average caseload at Time 2 (following adjustments to staffing).

- Looking at RN responses only, RNs on day shift were responsible for an average patient caseload of 12.36 patients per shift at Time 1, decreasing to 11.18 patients per shift at Time 2. RNs on night shift saw their average patient

caseload per shift decrease from 15.47 patients at Time 1 to 7.74 patients at Time 2.

- Overall, staff perceptions of the nursing work environment improved from Time 1 to Time 2, with higher average scores recorded in all five subscales of the Nursing Work Index following the staffing adjustments.

- The lowest scores were consistently reported for the subscale Staffing and Resource Adequacy in all three hospitals and at both time points. However, in both Hospitals 4 and 6, the greatest increase in average score from Time 1 to Time 2 was reported in this subscale, increasing by 30.6% and 37.0% respectively. Hospital 5 also recording a modest increase in this subscale.

- The proportion of staff indicating that they would need additional time to provide necessary care to patients decreased slightly from 94.8% of staff at Time 1 to 90.8% of staff at Time 2. In Hospital 6, which experienced the greatest staffing adjustment, the proportion of staff indicating that they required no additional time to deliver necessary care increased from 2.4% at Time 1 to 14.3% at Time 2.

- Staff perceptions that the quality of care delivered within their ED was poor or fair fell from 48.1% at Time 1 to 33.6% at Time 2. Correspondingly, the proportion of staff perceiving the quality of care delivered to be good or excellent increased from 51.9% at Time 1 to 66.4% at Time 2, with the overall proportion who reported excellent quality of care more than doubling from 8.1% in Time 1 to 16.4% in Time 2.

- Perceptions that their ED was very good or excellent in the provision of patient safety increased from 12.5% of staff at Time 1 to 29.4% of staff at Time 2. The proportion of staff in each hospital who rated their ED as excellent for patient safety increased by at least five percentage points at Time 2.

- While half of respondents at Time 1 indicated that the quality of patient care provided in the last 6 months had deteriorated, a substantial shift was noted at Time 2 with 40.2% of staff reporting that the quality of care had improved in the last 6 months (compared with 4.5% at Time 1). Following the staffing adjustments, at Time 2 each hospital recorded large increases in the proportion of respondents stating the quality of care had improved.

- The research also examined care left undone events (CLUEs); necessary care activities not completed on their most recent shift due to a lack of time: 78.8% of nurses reported at least one CLUE in Time 1, decreasing to 72.5% of respondents in Time 2. An average of 3.32 necessary activities were left undone due to time constraints per shift at Time 1, with this figure decreasing to 2.76 activities on average at Time 2.

- The proportion of staff reporting at least one delayed care activity due to insufficient time falling from 94.2% at Time 1 to 89.2% at Time 2. Improvement was seen in the average number of care tasks delayed per shift, with an

average of 9.95 tasks at Time 1 decreasing to 7.32 tasks on average at Time 2.

- The proportion of staff who reported neither missing nor delaying a meal break rose from 14.6% at Time 1 to 24.4% of staff at Time 2. In Hospital 6, the percentage of staff who reported neither a missed nor a delayed break increased from a baseline of 5.0% to 32.6% following the introduction of the recommendations.

- An improvement was noted in job satisfaction following the staffing adjustments, with 80.0% of staff reporting that they were satisfied or very satisfied with their job at Time 2, increasing from 54.4% at Time 1. Similarly, over three quarters of staff indicated that they would definitely or probably recommend their department to a colleague at Time 2, showing an increase from just over half of respondents at Time 1.

- An increase was also noted from baseline to Time 2 in the proportion of staff who would definitely or probably recommend their department to family or friends should they require hospital care. Overall intention to leave was largely stable from Time 1 to Time 2 across the three EDs, with differences demonstrated at hospital level.

- Staff burnout was also measured. Overall, scores on depersonalisation and personal accomplishment remained relatively constant at both time points, with scores on emotional exhaustion decreasing at Time 2 from baseline. Staff in the three EDs generally scored highly on personal accomplishment across both time points.

- The prevalence of violence and aggression was consistently high at both time points in all EDs, though a slight improvement was noted in overall scores at Time 2 in all three subscales.

Patient Outcomes

- On average, across the three EDs, patients in 2018 and 2019 waited 0.42 hours from check-in at reception to being triaged. This decreased to 0.39 hours on average in 2020. Over the course of the study period, Hospital 6 recorded the greatest change in average Time to Triage, moving from 0.55 hours in 2018 to 0.43 hours in 2020, representing a 21.8% decrease from 2018 to 2020 (i.e., following the staffing changes).

- Similar to the outcomes for Time to Triage, Time from Triage to Be Seen also improved across the study period. Patients had to wait on average 2.18 hours from being triaged to be seen by a decision maker in 2018, with this decreasing to an average of 2.09 hours in 2019 and to 1.90 hours in 2020 (following the changes to staffing). Each of the hospital sites showed a decrease in average Triage to Be Seen times from 2018 to 2020.

- Average wait times from ED registration to being seen by a decision maker decreased in all three EDs from 2018 to 2020, with Hospitals 5 and 6 recording

consecutive decreases in average times across the study period. Following the staffing adjustment, Hospital 6 reduced their average ED registration to be seen times by over 20% from baseline levels, moving from an average time of 3.81 hours in 2018 to 2.98 hours in 2020.

- Across the three EDs, the average time a patient had to wait from ED registration to time of discharge/decision to admit (ED care time) decreased from a baseline of 6.14 hours to 5.72 hours in 2020. Despite their respective average ED care times increasing from 2018 to 2019, Hospitals 4 and 6 recorded their lowest average ED care times in 2020 following the staffing changes. Hospital 5 showed a downward trend in average ED care time across the study period. Among patients ≥75 years, the same trend was evident, with all three EDs recording their lowest average ED care times in 2020.

- Calculated as the time from registration to discharge/admission, inclusive of boarding time following a decision to admit, approximately 51% of patients recorded a Patient Experience Time (PET) of 6 hours or less in 2018, with this proportion rising to 54% in 2020.

- When looking at the proportion of patients who recorded a PET of 9 hours or less, each hospital recorded their highest proportion in 2020, with the overall proportion increasing from approximately 68% in 2018 to just under 72% in 2020. Across the three EDs, approximately 93% of patients each year recorded a PET of 24 hours or less. PET is an outcome that is not directly related to staffing levels in ED but a function, to an extent, of bed availability.

- The overall proportion of patients who left before being seen or before the completion of treatment decreased each year, following from 10.5% in 2018 to 9.7% in 2019, and to 8.3% in 2020. All three hospitals recorded their lowest proportion of patients LWBS in 2020. Among those aged ≥75 years, Hospitals 4 and 5 recorded less than 1.5% of such patients LWBS each year, while the proportion of patients LWBS in Hospital 6 decreased each year, dropping to a low of 2.8% in 2020.

- In the Patient Experience survey, all EDs scored below the National average for waiting times for admission. However, this is a process which cannot be controlled for directly in the ED and is associated with the availability of beds. There was variation between the EDs on communication and privacy and patients ratings on respect during their time in ED.

1.1.5 Key Results – Injury Unit

As with the ED data, the results for Hospital 7, the only IU in the study, are reported according to the timeframes in which the data was collected. The administrative data is reported on an annual basis, while the cross-sectional data is reported at two time points, in October 2018 (Time 1) and again in late August/early September 2020 (Time 2) (following the introduction of extra HCAs).

Staffing adjustments

- The NHpPP model was not suitable for use in the IU. However, it was evident that nursing staff were engaged in non-nursing activities such as cleaning, stock ordering and waste management, adversely impacting their available direct patient contact time. Two HCAs were allocated to the IU in recognition of this, allowing for the prioritisation of patient care; the IU did not use agency staff.

Nursing Work

- The average number of patients per nurse per shift increased from 9.11 patients at Time 1 to 12.25 patients on average at Time 2. Increases were also noted at Time 2 for both maximum and minimum patient caseload per nurse per shift figures. However, these figures may reflect the increased workload in the IU arising from the reconfiguration of the healthcare services in the catchment area in response to Covid-19 and should, at this stage, be interpreted with caution.

- Looking at perceptions of the working environment, substantial improvements were recorded in staff perceptions of Staffing and Resource Adequacy as well as Nursing Foundations for Quality of Care following the staffing adjustments, while scores on Nurse Participation in Hospital Affairs, Collegial Nurse-Doctor Relations, and Nurse Manager Ability, Leadership, and Support of Nurses remained relatively stable across the time points.

- The proportion of staff indicating that they required additional time to provide patient care fell from 85.7% at Time 1 to 76.2% of staff at Time 2.

- Improvements were evident in quality of care in the IU following the staffing adjustment with the percentage of staff rating the quality of care provided on their last shift as excellent rising from 20.0% at baseline to 33.3% at Time 2. Similar improvements were seen in the proportion of staff rating the IU as very good or excellent in the provision of patient safety, rising from two-thirds at Time 1 to over three-thirds at Time 2. Staff indicating that the quality of care provided within the IU had improved within the last 6 months rose from 6.7% at Time 1 to 33.3% at Time 2.

- Job satisfaction within the IU was consistently high at both time points, as was the proportion of staff who would recommend the IU to others. Levels of intention to leave job due to job dissatisfaction were low at both Time 1 and Time 2.

- A decrease was seen in the proportion of nurses reporting at least one CLUE in their last shift, falling to 15.8% at Time 2 from 36.4% at Time 1. The average number of CLUEs per shift fell from 1.36 tasks at Time 1 to 0.21 tasks at Time 2. A similar improvement following the staff adjustment was evident in care delayed events, and in the proportion of staff reporting missing or delaying breaks.

- Staff recorded low scores on depersonalisation and emotional exhaustion at Time 1, with these decreasing at Time 2. High overall scores in personal accomplishment were recorded at both time points.

- Scores on measures of physical violence and aggression appeared to worsen at Time 2, particularly in relation to physical assault where 52.4% of staff reported experiencing such aggression within the last three months, an increase from 35.7% of staff at Time 1. However, this data should be interpreted with caution due to the timing of the Time 2 data collection with the increased workload experienced in the IU due to Covid-19.

1.1.6 Conclusion

This is the first study in Ireland to examine nurse staffing and related outcomes in the emergency care setting; this report has identified some promising outcomes for further analysis in examining the impact of the safe staffing framework in emergency care settings on patient outcomes, staff outcomes, and organisational factors, in addition to the challenges associated with the implementation of the *Draft Framework*. These challenges include the stabilisation of the workforce and the need for further longitudinal data collection and analysis to examine the long-term impact of the implementation of the safe staffing initiative.

Despite the staffing adjustments arising from the NHpPP calculations being made during the latter part of data collection, some positive trends were emerging in the data, exemplified by the decline in agency use towards the end of the study period. Similarly, positive outcomes were evident when analysing the key patient outcomes of time to triage and patients' leaving without being seen. The data demonstrated that the hospital which required the greatest adjustment in staffing levels recorded the greatest reduction in patients' average time to triage and patients LWBS (a key indicator of safe staffing in emergency care) at Time 2, as opposed to hospitals which required a more modest staffing change. This study has highlighted that administrative data is a useful resource in the determination of staffing requirements, as well as in the examination of the impact of staffing changes within the ED, particularly over a longitudinal period.

Overall, this study shows that the hospitals which had modest changes to staffing levels generally remained stable or showed slight improvements in outcomes, despite increasing patient presentations. However, the data clearly demonstrates that the hospital with the greatest staffing adjustment recorded the best outcomes, with trends indicating a stabilisation of workforce, reduced agency use, and improved outcomes for both patients and staff. The results of this study offer support for the implementation of the *Draft Framework* within the emergency care setting. Future programmes of research can build on the insights and learning of this study in assessing emergency department outcomes over time in relation to staffing levels and skill mix.

Section 2

2.1 Introduction

The Department of Health previously published a policy document titled: *A Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Ireland* (Department of Health 2018) (henceforth referred to as the *Framework*). In this report a number of recommendations were made to ensure that the staffing of medical and surgical wards in hospitals was safe and effective; that is to ensure the right number of nurses are in the right place at the right time and with the right skills to deliver care. The objectives of the Framework were to:

- Develop a staffing (RN and HCA) and skill mix ranges framework related to general and specialist medical and surgical care settings.
- Set out clearly the assumptions upon which the staffing and skill mix ranges are determined.
- Make recommendations around implementation and monitoring of the framework.

The *Framework* was developed following consultation with key stakeholders in the healthcare system and national and international experts. The consultation resulted in a number of recommendations, including: the undertaking of quality research on the association between nurse staffing and patient outcomes; that patient safety tipping points are monitored; the CNM II role is fully supervisory and; 'that a systematic...evidence-based approach to determine nurse staffing and skill mix requirements is applied' (DoH 2016: 9). The recommendations in the *Framework* document were based on research undertaken by a research team from University College Cork, the University of Southampton, University of Technology Sydney and National University of Ireland Galway (Drennan *at al.* 2018). Based on this approach, a decision was made by the Department of Health to extend the model to develop a pilot framework for emergency care settings.

This *Framework* was followed by the publication of a draft document titled: A *Pilot to Implement the Framework for Safe Nurse Staffing and Skill Mix in the Emergency Care Settings* (Department of Health 2018). This document outlined a number of draft recommendations to ensure the safe staffing of emergency care settings, including:

1. That an evidence-based tool be used to consistently and systematically measure patient dependency and acuity across each of the emergency/acute floor clinical settings.

2. That patient related information is captured regularly to inform decisions on the determination of nurse staffing requirements; this data includes but is not limited to the following: patient volume and attendance, patient profile, admission rates, patient transfer and escort and, average length of patient stay. In addition, it is further recommended that this information is used to interpret patterns of predictable demand over the spectrum of the day/week/month/year and to allocate the nurse staffing resource according to these patterns.

3. That information on the nursing team profile across the emergency care setting is captured, considering a number of variables including: education level; skill set; and competence and grade mix (that is: mix of Registered Nurse, Clinical Nurse Manager, Clinical Nurse Specialist and Advanced Nurse Practitioner and Healthcare Assistant).

4. That specialist clinical skills/competencies should be determined based on patient and department profile (for example, specific clinical skill requirements for specialist input into children's services including mixed adult and children's EDs).

5. That, for the purposes of this pilot, an RN/HCA skill-mix of 85%/15% for EDs is put in place (once a safe nurse staffing level exists).

6. That planned and unplanned absence is factored into the calculation of the nurse staffing establishment across emergency care settings.

7. That organisations invest in unit leader capacity by ensuring that 100% of the role of the CNM2 unit leader is safeguarded to fulfil her/his supervisory and leadership role within the ED. The document further recommended that the CNM2 role, as shift leader in the Emergency Department, operates over a 24-hour, seven day a week period for those EDs that operate on this basis.

8. That organisations invest in the role of the CNM1; this is recognition not only of her/his supportive role to the CNM2, but equally for the importance of this role as a necessary provision for CNM2 succession planning across the organisation and the development of leadership capabilities.

9. That organisations put in place mechanisms to measure patient outcomes systematically and consistently to indicate the capability of the nurse staffing skill mix and level to meet patient need.

10. That the patient experience be measured in the emergency care setting and can be undertaken within the wider context of the hospital/organisation patient experience surveys.

11. That measurement of the staff experience is recommended in emergency care settings to capture information on the work environment as a key component to nurse staffing.

12. That care left undone events (Safety CLUEs) are measured in in ED settings.

The research in this report provides baseline data on the recommendations outlined above in three emergency departments (EDs) and one injury unit (IU). The extent to which changes in staffing impacted on the experience of patients in EDs, such as the length of time waiting for care, patient experience time and leaving without being seen, are outlined in this report. In addition, the experience of the nursing and healthcare assistant workforce are also outlined in the report; these measures include job

satisfaction, perceptions of quality of care delivered, missed care, the clinical environment, burnout and staff experiences of violence and aggression. Based on our results, this document will outline a number of recommendations to the Department of Health on how to ensure that emergency departments in Ireland are safely staffed and have the required skill-mix.

2.1.1 Background

Recent enquiries have identified failings in care that have resulted in adverse patient outcomes in several countries; for example, in Ireland investigations into the safety and governance of two major hospitals (Health Information and Quality Authority (HIQA) 2012, 2013); in the UK, The Mid Staffordshire NHS Foundation Trust Inquiry (The Mid Staffordshire NHS Foundation Trust Inquiry, chaired by Robert Francis QC, 2010); and an enquiry into a preventable death at the Royal Darwin Hospital in Australia (Coroner's Court 2008). In several of these reports, the role of safe staffing was highlighted as a factor in ensuring good patient outcomes. Safe nurse staffing requires that there are sufficient nurses available to meet patient needs, that nurses have the required skills and are organised to enable them to deliver the highest care possible. Research over the last 20 years has demonstrated the impact that nurse staffing can have on patient outcomes, with several studies reporting that lower levels of nurse staffing are associated with adverse outcomes (Aiken *et al.* 2002; Kane *et al*., 2007; Needleman 2011; Griffiths *et al.* 2014). In relation to nurse staffing and patient outcomes, it was identified that higher rates of staffing are associated with lower rates of failure to rescue, falls, length of stay and readmission rates. It has also been identified that lower levels of staffing are associated with higher rates of drug administration errors and episodes of care left undone. In particular, there is a growing body of evidence that reports on the association between lower nurse to patient ratios and increased patient mortality (Cho *et al.* 2003; Rafferty *et al.* 2007; Needleman *et al.* 2011; Aiken *et al.* 2014; Griffiths *et al.* 2016a; Ball *et al.* 2017).

2.1.1.1 Context of Safe Nurse Staffing in Ireland

In Ireland, the ability to recruit and retain nurses within the healthcare sector remains challenging. This has led to unions highlighting that the nursing shortfall be dealt with as a matter of urgency and demands from the public to deal with increased crowding in Emergency Departments (EDs). The reasons cited for these shortfalls are many but include high levels of job dissatisfaction and intention to leave amongst nurses (Scott et al. 2014; Drennan et al. 2018); a finding similar to those in other countries (Aiken et al. 2012).

2.1.1.2 Nurse Staffing and Outcomes

A number of systematic reviews on the association between safe staffing and patient outcomes have identified a number of associations between nurse staffing, skill-mix and patient outcomes (Kane et al. 2007; Butler et al. 2011; Griffiths et al. 2015, Simon et al. 2015). In reviews undertaken for the National Institute of Health and Care Excellence in the UK NICE (Griffiths et al. 2015; Simon et al. 2015, Drennan et al. 2016), it was identified that higher rates of staffing are associated with lower rates of mortality, failure to rescue, falls, length of stay and readmission rates and that lower

levels of staffing are associated with higher rates of drug administration errors and episodes of care left undone or missed nursing care. In particular, there is a growing body of evidence that reports on the association between higher nurse to patient ratios and increased patient mortality (Rafferty et al. 2007; Needleman et al. 2011; Aiken et al. 2014; Cho et al. 2015).

2.1.1.3 Emergency Departments

In Ireland, as in other developed countries, there is increasing demand for ED care. The 2019 HSE Performance Report outlines that there were 1,506,343 emergency presentations from January 2019 to December 2019, an increase of 2.6% from the previous year (HSE, 2019). This figure is reflective of the increased ED presentations at a national level and the exponential rise in service need. In addition to this, there was a 2.1% increase in the year-to-date December 2019 in ED attendances versus the target for that period (1,475,136 attendances) (HSE, 2019).

The HSE outlines guidance in relation to ED PETs for vulnerable groups. ED PET less than 24 hours (all patients) was 95.8% and less than 9 hours was 76.1% in December 2019. ED PET less than 24 hours for patients aged 75+ was 88.8% in December 2019. This report outlines that all patients ≥75 years should have a PET ≤24 hours (HSE, 2019).

The *Health in Ireland: Key Trends 2019* (Department of Health 2019) report demonstrates that 1,323,466 patients presented to EDs within Ireland in the year ending 2018; a 5.6% increase since 2009. People in the 65 and older age group represent an increasing proportion of Emergency Department discharges each year, rising from 36.5% of discharges in 2012 to 41.3% in 2018 (DoH, 2019). Seasonal factors were evident in ED PET with the winter months of January-February and December showing large variation from other months when looking at time spent within the Emergency Department by 95% of people as measured by the 95th percentile (DoH, 2019). In the *Health in Ireland: Key Trends 2018* report (Department of Health, 2018), weekdays were indicative of higher attendances with between 9am and 5pm on weekdays showing the highest attendance rates, and Monday mornings between 11am and 1pm seeing the highest attendance volumes across the week.

The first systematic review on safe staffing in emergency departments (Recio-Saucedo et al. 2015) concluded that there is inconsistent evidence from small-scale observational studies that associates ED nurse staffing levels with patient outcomes. Although the evidence does not provide strong support for the validity of any single variable as an indicator of safe staffing in the ED, it appears to indicate that levels of nurse staffing in the ED are associated with patients leaving without being seen, emergency department care time and patient satisfaction. Lower staffing is associated with worse outcomes. The review concluded that there are a number of factors that were not studied that may influence nurse staff requirements in the ED including unit layout, patient acuity, overcrowding and time of day and day of week on which patients attend the ED.

2.1.1.4 Injury Units

An Injury Unit (IU) is a division of the Irish Emergency Care Network framework which provides "limited hours of access for patients with non-life and non-limb threatening injuries" such as suspected broken bones, sprains, and minor burns (National Emergency Medicine Programme, 2019, p. 4). There are currently IUs in eleven locations around Ireland (Health Service Executive, 2020b). IUs generally operate with age restrictions, with some units treating patients aged 5 years and older, while others only treat patients 16 years and older (Health Service Executive, 2020b). Each IU is linked to an Emergency Department in an acute hospital, with patients in need of admission who attend an IU referred directly to the linked hospital (Health Service Executive, 2020a). IUs operate under the jurisdiction of a Network Coordinator for Emergency Medicine based at the lead Emergency Department for the network, with staff recruitment, rostering, and professional development managed at the network level (National Emergency Medicine Programme, 2019).

Standardised guidance on the minimum staffing requirements for IUs are outlined within the 'Guidance document on staffing for Injury Units (IUs)' (National Emergency Medicine Programme, 2019). The staffing calculation model operates on the assumption of an IU open for 12 hours each day, seven days a week (10 hours open to the public, with the remaining 2 hours of clinical activity staffed to allow for the completion of care). The document outlines that an IU requires that a member of administrative staff be on duty during hours of opening, while a Staff nurse and a Senior Clinical Decision Maker, defined as a Registered Advanced Nurse Practitioner or a Middle Grade Doctor, must be on duty at all hours of clinical activity. A Clinical Nurse Manager 2 role is required to provide management support while a Consultant in Emergency Medicine is also required to be on duty for the equivalent of eight hours per week. The minimum WTE requirements and calculations for each staffing grade irrespective of attendance volume are outlined within the document, with additional guidance on staffing levels based on annual attendances also provided (National Emergency Medicine Programme, 2019). This guidance is posited as a means of cultivating a multidisciplinary team within the IU with a staffing level and skill-mix commensurate with the optimisation of patient safety and quality of care. The research built on the recommendations outlined in this document by identifying the skill-mix required in the IU.

2.1.2 Aims and Objectives

Overall Aim

The overall aim of this research was to measure the implementation of the safe nurse staffing draft policy *Framework* in emergency departments. This included: measuring the impact of implementing the recommendations in the *Framework* on patient outcomes, staff outcomes, and organisational factors. The study also aimed to examine longitudinal data which will be used to inform the implementation and evaluation of the *Framework* as well as building capacity with senior staff.

Objectives

- Objective 1: Measure the impact of implementing safe nurse staffing and skill mix measures as outlined in the *Draft Framework* on patient outcomes measures, staff outcomes and organisational factors.

- Objective 2: Examine the extent to which patient outcome measures changed over time as a consequence of the pilot introduction of the *Framework* in emergency care settings.

- Objective 3: Examine the impact of pilot introduction of the *Framework* on adverse patient outcomes and safety CLUEs (Care Left Undone Events).

- Objective 4: Determine the impact of the pilot introduction of the *Framework* on staff outcomes (e.g., job satisfaction, burnout, intention to stay).

- Objective 5: Determine the impact of the pilot introduction of the *Framework* on organisational/ward environment factors (e.g., ward climate, impact of Clinical Nurse Manager II supervisory leadership).

- Objective 6: Determine the cost implications arising from the pilot introduction of the *Framework* and the resources required to deliver national roll-out and to maintain the *Framework*.

Section 3
Methods

3.1 Research Design

This study used both longitudinal and cross-sectional designs in developing a research programme for the taskforce on staffing and skill-mix for nursing in emergency care settings. The research was undertaken in conjunction with changes to nurse staffing made by the Department of Health and are based on recommendations in the Draft *Framework*; that is the introduction of a systematic approach to determine staffing levels based on patient acuity and dependency, the alteration in skill-mix (85% RN to 15% HCA) and, ensuring the role of the CNM 2 (ED/unit leader) is 100% supervisory. This approach included the measurement of the total nursing hours available pre and post the intervention; this was further divided into RN hours and HCA hours (skill-mix) and the measurement of supervisory and clinical hours provided by the CNM 2 grade. Actual and required staffing was estimated through the Nursing Hours per Patient Presentation Approach (NHpPP). Based on staffing measures pre the intervention (actual staff levels), nurse staffing levels and skill-mix were adjusted (required staff

levels) in the pilot emergency departments based on patient needs as determined by triage scores and length of time in the department (see Report 1 on the process involved in the identification of the NHpPP model to determine staffing levels).

3.2 Data Collection

A number of administrative and primary data collection variables were used in this study. Data was collected in the following four domains: nurse staffing, workload and working environment and, patient outcomes. These instruments were based on those previously used in the European-wide *RN4CAST* research study (Sermeus *et al.* 2011) and those identified in a systematic review of safe nurse staffing in emergency departments (Recio-Saucedo et al. 2015).

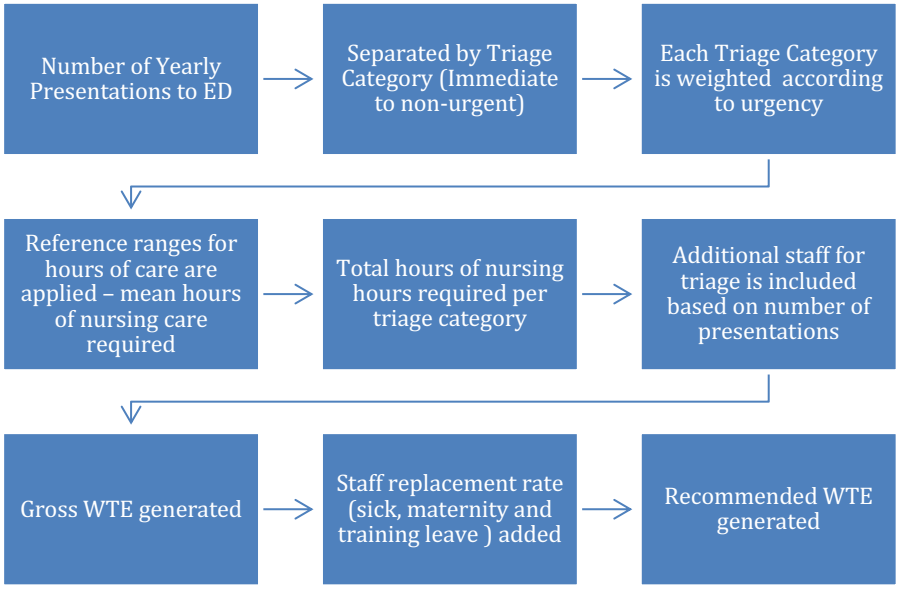
3.2.1 Predictor/Explanatory Variables

3.2.1.1 Nursing Hours per Patient Presentation

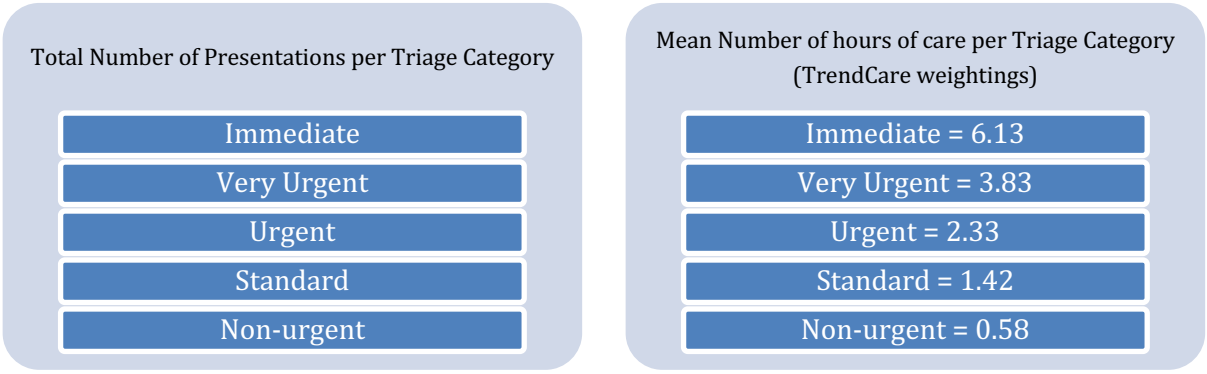
The selected calculation for determining staffing levels in ED is Nursing Hours per Patient Presentation (NHpPP). This formula determines the number of Whole-Time Equivalent (WTE) nursing staff required to care for patients using triage category as a dependency and acuity measure. The WTE is then divided by a ratio of 85:15 for determining the number of RNs (85%) and HCAs (15%) required in each ED. The calculations are inclusive of ED and triage activity and include CNM1, RNs and HCAs. The formula does not include CNM3, CNM2, or ADONs as these are largely leadership roles. Additionally, this calculation is not used to determine the staffing level required to care for patients were a decision to admit has been made but remain in the department for a bed to become available in the hospital; the calculation for these patients comes from the WRC 2016 agreement[1].

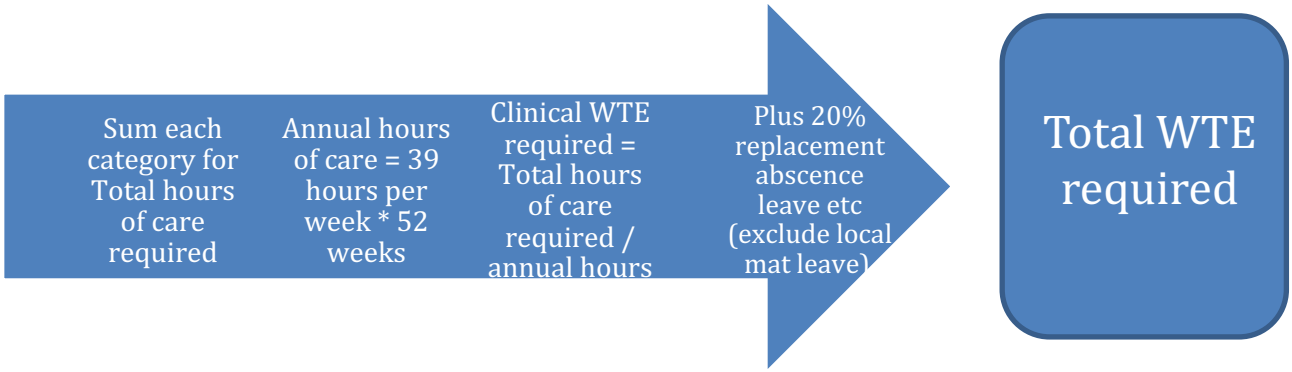
[1] https://www.hse.ie/eng/staff/resources/hr-circulars/hrcircular0072016.html

The approach to calculating NHpPP is outlined below:



The data required to calculate NHpPP is as follows:





3.2.1.2 Demographic and Ward/Unit/Department Profile

Demographic profile of the staff was collected and included: age, gender, level of education (the proportion of staff with a degree), working hours, last shift worked and grade. In addition, the number of nurses and patients present on the ward/unit and the number of patients cared for during the last shift. Self-reports of all nurses also allowed for a calculation of nurse-patient ratios.

3.2.2 Outcome Measures

3.2.2.1 Patient Outcome Measures

To examine the extent to which patient outcome measures changed over time as a consequence of the pilot introduction of the *Framework*, a retrospective analysis of data related to all patients who were admitted to the emergency departments/injury unit over the period of the research was undertaken. This included a retrospective analysis of patient outcomes associated with nurse staffing collected through administrative data from a cohort of patients admitted to the EDs/IU over the period of approximately two years (2018, 2019 and up to March 2020). This data included:

- *Leaving without being seen (LWBS):* Data was obtained from ED databases that provided the monthly patient census and the number of patients who LWBS. The percentage of patients who LWBS was calculated as the number of patients who left before being seen by a healthcare professional divided by the total number of patients registered.
- *Time to Triage (TTT):* TTT was calculated as the time from registration in the ED to being triaged.
- *Triage to be Seen*: This was operationalised as the time from triage to time of being seen by a decision maker.
- *ED Registration to be Seen*: This was calculated as the time from registration in the ED to time of being seen by decision maker.
- *ED Care time*: This was defined as the time from ED registration to the time of decision to admit or ED discharge.
- *Patient Experience Time (PET):* PET was defined as the time from ED registration to the time of departure from the ED following discharge/admission, inclusive of boarding time following the decision to admit.

3.2.2.2 Patient Safety Care Left Undone Events

The *Framework* developed for medical and surgical settings (DoH 2018) highlights the importance of monitoring care left undone events (Safety CLUES) as a means of monitoring the extent to which staffing is safe and recommended that six safety CLUEs are monitored. However, to date, there are no published studies of missed care in

EDs. Therefore, based on previous reports, sixteen items related to missed and delayed care in the ED were measured at both Time 1 and Time 2 following the staffing adjustments. The items measured included: adequate patient surveillance, adequate/regular monitoring of deteriorating patients, vital sign observations, supporting patients with physical needs, recording clinical practice/updating care documentation, adequate monitoring of nutritional/hydration status, providing comfort to patients, educating patients, pain assessment, pain management, planning care, preparing patients for discharge, skin care, undertaking procedures and, oral hygiene. Missed or delayed care, if related to adverse outcomes and to staffing levels, may have the potential to provide an immediate indication of whether a unit is safely staffed. Following on from our pilot study, this component measured the prevalence of Safety CLUEs both pre and post the introduction of the recommendations in the draft ED *Framework*. Safety CLUEs were measured by asking nurses: 'On your most recent shift, which of the following activities were necessary but left undone because you lacked the time to complete them?'. The outcome from this measure will be used to explore the association between nurse staffing and the prevalence of missed care. Two measures of 'missed care' were derived. Firstly, reported prevalence of any care being left undone, based on one or more of the activities having been reported. Secondly, a score indicating the volume of care left undone; this was calculated by summing the number of activities ticked per person. The same items and approach were used to measure care delayed events.

3.2.2.3 Staff Satisfaction, Intention to Stay and Burnout

Job Satisfaction and Intention to Stay - Job satisfaction levels of RN and HCA staff were measured using a using a number of items including satisfaction with current job, satisfaction with being a nurse and intention to leave. Staff were also asked the extent to which they would recommend the department in which they were working to family and friends.

Burnout - The human services version of the Maslach Burnout Inventory (HS-MBI) (Maslach & Jackson 1996) was distributed to all nursing and HCA staff in the three EDs and one IU. The HS-MBI was used to measure three areas associated with burnout: emotional exhaustion, depersonalisation, and personal accomplishment.

3.2.2.4 Prevalence of Violence and Aggression

Staff experiences of violence and aggression were measured by a number of items adapted from the Conflict Tactics Scale (CTS) (Strauss et al. 1979; Strauss et al. 1996). The scale is most commonly used in family violence research and has three domains: physical, psychological/verbal mistreatment and conflict. Staff were asked to rate on a 4-point scale the extent to which they were mistreated and/or abused either verbally or physically by patients in their care as well as their experience of conflict. The 10-items taken from the CTS, adapted for use within the ED context, asked staff to rate the frequency with which they have been confronted with aggressive and/or violent behaviour during the last 3 months in the course of their professional work, ranging from never to greater than 10 times. Psychological/verbal aggression

was measured by five items, physical aggression by four items and conflict with patients by one item.

3.2.2.5 Organisational/ward environment factors

The working environment of staff was measured using the *Practice Environment Scale of the Nursing Work Index – (PES – NWI-R)* and staff perceptions of the quality of care delivered to patients in the departments. The PES is a measure of the work environment (Lake *et al.* 2007) and emerged from research on Magnet Hospitals. The instrument consists of five subscales: nurse autonomy, control over practice, nurse-doctor relations, nursing leadership and resource adequacy (Aiken & Patrician, 2000).

Quality of Care - Nursing staff were asked to give their unit an overall grade on patient safety by rating the quality of nursing care on their last shift, and changes in the quality of nursing care over the month as well as the time available to deliver quality care.

3.2.2.6 Reliability and Validity

The scales used in this study have previously been tested for both reliability and validity in a number of settings. The PES-NWI has demonstrated good reliability in previous research (Lake & Friese, 2006; Roche & Duffield, 2010) with reports of good predictive validity (Bruyneel *et al.* 2009). The single item job satisfaction question has been identified as having acceptable levels of reliability (Wanous *et al.* 1997); in addition, the validity of HS-MBI has previously been ascertained through principal components analysis, confirmatory factor analysis and convergent and discriminant validity with reliability scores for the three subscales reported to be greater than the recommended level of .70 (Maslach *et al*. 1996).

3.3 Settings

Following an open tendering process, the sites to pilot the implementation of the recommendations in the *Framework* were identified by the Department of Health. Hospitals. The sites were chosen according to meeting the scored criteria which includes, but not limited to: their location and specialist functions, annual presentation and population demographics. For the purpose of this report and confidentiality, the three EDs and one IU are referred to with a code. Eligibility criteria included ED settings providing 24-hour, seven-day care for adults and/or child populations. The IU provided care from 8am to 8pm, seven days a week.

3.4 Sample

All RNs and HCAs involved in direct patient care on the selected departments were included in the research. Surveys were administered over the period of a week with follow-up of staff who were on leave. Staff were surveyed at two time points: prior to and following the introduction of the recommendations in the pilot Framework.

Secondary data was collected from patients who attended the EDs from January 2018 to March 2020.

3.5 Administrative Data

We collected administrative data for all patients who attended the three EDs and the IU on a daily basis from January 2018 to March 2020; this was to ensure that seasonal variation was accounted for. The majority of the secondary data was collected by administrative systems in place in each of the respective units; these systems included: *iPMS, iSOFT* and *PatientCentre*.

3.6 Procedure

Research staff were placed in each of the hospitals to facilitate data collection with the support of hospital staff. Orientation and information sessions were held in each of the departments and consent was obtained from staff to undertake the research. All RNs and HCAs employed in the department included in the study were invited to participate. Dillman's (2000) tailored design approach and best practice in questionnaire design, distribution was used to ensure response rates were maximised. These included multiple contacts, personalised correspondence and targeted reminders. Staff questionnaires were coded as, due to the study design, a longitudinal design, it was necessary to collect data from the same members of staff at different time points. Once data collection and data entry was completed, staff data was irrevocably anonymized.

3.7 Analysis

All data analysis was conducted under the quality control system of the Statistics and Data Analysis Unit of the Health Research Board Clinical Research Facility at University College Cork using the R Project for Statistical Computing (R Core Team 2017).

Following the creation of the study dataset, we prepared a descriptive code book. Categorical variables will be described using percentages and counts in each category, while continuous variables will be described by the appropriate measures of central tendency and variability.

3.8 Ethics

Ethics applications to undertake the research were submitted to the research ethics committees of the four research sites. All respondents surveyed were informed about the measurement procedures involved in this study. Respondents were also informed about the nature of the research and that they were entitled not to participate in the study if they so choose. All data was coded, and no individuals or individual hospitals are identifiable in this or any subsequent reporting of results. All questionnaires remain

in a locked cupboard when not in use by the research team and all computer datasets will be password protected (right to privacy). Data will only be used for the purposes disclosed. Data collection complies with Irish data protection and GDPR regulations (www.dataprotection.ie).

3.9 Conclusion

For many years in Ireland decisions on nurse staffing in healthcare settings were based on historical staff complements or professional judgement; no widespread systematic approach was put in place. However, as a consequence of a number of factors the Department of Health (2018) published a *Pilot Framework for Safe Nurse Staffing and Skill Mix in Emergency Care Settings* with a number of recommendations that included the use of a systematic approach to the determination of nurse staffing based on patient acuity and dependency, a pre-determined skill-mix and, and the workload of the ward leader. The introduction of these recommendations on a phased basis in pilot sites provides a unique opportunity for the introduction of a policy initiative on nurse staffing to be aligned with a programme of research.

Section 4
Results from the Emergency Departments

4.1 Introduction

This section outlines the results to date from the research for the pilot emergency departments included in the programme of research into safe nurse staffing and skill-mix. The results are outlined in a number of sections and present a comprehensive outline of the variables associated with nurse staffing; both secondary and cross-sectional data were collected. Secondary data, collected from the ED administrative systems, was used to collate data on a number of patient outcomes related to staffing in the Emergency Department (collected from iPMS, iSOFT, and Patient Centre) and was also used to calculate staffing based on the Nursing Hours per Patient Presentation (NHpPP) model of staffing. Cross-sectional data was collected from nursing staff (RNs and HCAs) working in the three pilot emergency departments. Nursing staff provided data on nursing work, job satisfaction and intention to leave as well as care left undone events, burnout and their experience of violence and aggression. The survey results presented outline the Time 1 and Time 2 data for the three emergency departments and the injury unit included in the pilot study (the injury unit data is presented in a separate section of the Report). Time 1 data was collected at baseline in 2018 prior to any staffing adjustments, while Time 2 data was collected from February 2020 following the adjustments to staffing.

4.2 Staffing Levels and Associated cost

The selected calculation for determining staffing levels in ED is Nursing Hours per Patient presentation (NHpPP). This formula determines the number of Whole-Time Equivalent (WTE) nursing staff required to care for patients using triage category as a dependency and acuity measure. The WTE is then divided by a ratio of 85:15 for determining the number of RNs (85%) and HCAs (15%) required in each ED. The calculations outlined below are inclusive of ED and triage activity and include CNM1, RNs and HCAs; the calculation does not include CNM3, CNM2, ANP or ADON posts as these are predominantly leadership roles. Additionally, this calculation was not used to determine the staffing level required to care for patients were a decision to admit has been made but are waiting for a bed. The calculation for these patients comes from the WRC 2016 agreement. All patient presentations to clinics associated with the EDs have been excluded in these calculations. See Appendix A for full breakdown of NHpPP calculations per hospital, per year. Comparison between baseline data of 2018 and post implementation data up to March 2020 are outlined in Table 4.2.2 below.

4.2.1 Calculation of Nursing Hours per Patient Presentation (NHpPP)

Data on number of presentations per triage category was collected from EDs in the three hospitals in 2018, 2019 and up to the end of March 2020[2]. The available WTEs include all levels that provide clinical care to patients, such as RNs, HCAs, CNM1s, ANPs and CNSs. This is as local arrangements are in place and to ensure that the staffing calculations are compared with all those providing direct patient care. Changes to staffing were based on data for the year 2018.

Hospital 4 NHpPP

Hospital 4's emergency floor consists of an adult emergency department, a children's emergency section and a clinical decision unit (CDU), all staff were pooled together to staff the ED, CDU and children section. For the purpose of this pilot, the CDU and children's section had to be separated from the adult ED staffing. Calculations for staffing were based on those required in the adult ED with 14 WTE identified to staff the children's ED and 13 WTE for the (CDU). In 2018, based on NHpPP calculations, it was determined that Hospital 4 required 89.70 WTEs to staff the adult ED and had 83.20 WTEs in place prior to the implementation of NHpPP. From the baseline data, adjusting for the adult only ED, Hospital 4 required an additional 6.5 WTEs; this comprised an adjustment of 2.11 RNs and 4.39 HCAs and was based on the 85%/15% skill-mix. Table 4.2.1.1 shows the difference from baseline to 2020 comparing the required and available staffing levels including the uplift.

Hospital 5 NHpPP

Hospital 5 is an adult only ED. Based on NHpPP calculations on patient presentations in 2018, Hospital 5 required a total complement of 47.53 WTEs and had 39.03 WTEs in place prior to the calculation. Therefore, based on this assessment, the department required an additional 7.1 RNs and 1.4 HCAs, a total of 8.5 WTEs to bring the department to the recommended staffing complement.

Hospital 6 NHpPP

Hospital 6 is an adult only ED. Based on hospital presentations in 2018, Hospital 6 required 105.48 WTEs and had 77.00 WTEs in place prior to the calculation. Therefore, to meet this staffing complement, it was identified that an extra 28.5 WTEs were required; this consisted of 18.7 RNs and 9.8 HCAs.

[2] Administrative data collected is widely skewed after March 2020 due to the outbreak of Covid-19 and thus the data do not represent the typical throughput of the EDs and is omitted for this time period. onwards. Additionally, it was not possible to account for staff on sick leave or those staff redeployed during the pandemic after March 2020.

Table 4.2.1.1: Number of WTE RNs and HCAs required based on NHPPP and available for each ED per year

	Hospital 4		Hospital 5		Hospital 6	
	2018	2019**	2018	2019**	2018	2019**
Total						
Required	89.70		47.53		105.48	
Available at baseline	83.20		39.03		77.00	
Uplift Required in Adult ED						
RN	-	2.11	-	7.10	-	18.7
HCA	-	4.39	-	1.40	-	9.8
Total	-	6.50	-	8.50	-	28.5
Available plus uplift	-	89.70	-	47.53	-	105.48

Calculation for adult EDs only. **Changes to staffing were made throughout 2019 and were calculated on 2018 patient presentations.

4.2.2 Agency Use

Rosters collected for each year of the research allowed for the calculation of total hours of care delivered by agency or bank staff per year. Data for 2020 is based on three months only and thus is not comparable to the previous years. In order to compare across the three years, the total hours were converted to WTE for each year. Figures 4.2.2.1-3 display the number of hours of agency use per month across the entire research period. It should be noted that agency staff that are placed in the EDs can be deployed to care for boarded patients (those patients for whom a decision to admit has been made but are awaiting a bed) and/or the main ED. Systems in place within the three hospitals involved in the research were unable to provide figures distinguishing where agency staff were deployed; that is to the ED or to care for boarded patients in the ED[3]. It is also of note that the full impact of the changes to staffing on agency usage would require a longer period of data collection as the majority of changes to staffing were made at the end of 2019 and were impacted upon by the Covid-19 pandemic. It is important to note that recruitment of required staff occurred gradually throughout 2019; during this time, agency staff were required to provide care in the ED and to patients who were admitted but waiting for a bed. New staff recruited required a period of induction and adaptation. Therefore, further data over a longer period of time is required to measure the impact of staff stabilisation on agency staff use.

Hospital 4 Agency

Hospital 4 RN agency staffing remained relatively stable across 2018 and 2019 with RN agency staff accounting for approximately 10 to 11 WTEs in each year or an average of between 1696-1826 hours. There was an increase from 1.59 (average 268.88 hours) HCA agency staff in 2018 to 4.82 WTE (average 814.31 hours) in 2019; these HCAs were predominantly deployed in one-to-one care for patients who were in the ED waiting for a bed and had high dependency levels. As staffing stabilised, there was a notable decrease in agency usage in March 2020.

Hospital 5 Agency

Hospital 5's agency usage remained relatively stable over the period of data collection; this was despite an increase in admissions in patients aged 75 years and older. Hospital 5's agency use of HCAs was low across each year with a range of 20-106.5 hours on average, the equivalent of 0.12-0.63 WTE HCAs. Hospital 5's RN agency remained relatively stable ranging from an average of 4.69 WTEs in 2018 to 5.34 in 2019. As staffing stabilised, there was a notable decrease in agency usage in March 2020.

Hospital 6 Agency

Hospital 6 showed a small increase in RN agency from 10.22 WTE (average 1726.471 hours) in 2018 to 13.28 in 2019 (average 2245.97 hours), however in 2020 there was a decrease of 4.35 WTE or a decrease of 735.64 hours from 2019. This coincides with

[3] Calculation of staffing required for boarded patients is not part of this report but is outlined in the WRC agreement of 2016 – see Appendix B.

the decrease in vacant posts in Hospital 6, (see Table 4.2.3 above). The WTE for HCAs increased from 5.56 WTEs in 2018 to 6.16 in 2019 and subsequently increasing to 8.40 WTEs in 2020. However, the vacancies in HCAs also rose in 2020. As evident in Figure 4.2.3.3, agency use has begun to decrease in late 2019 and continuing to decrease in 2020.

Hospital 6, unlike Hospital 4 and 5, has a number of sources in which their deficit is covered including agency staff, bank staff and overtime working. The figures above are a composite of all these. Table 4.2.2.2 below lays out the breakdown of these hours, the average and the conversion to WTE per year. The deficit for RNs in 2018, 2019 and 2020 was covered predominantly by agency staff (4.83, 3.14 and 2.98 WTEs respectively), followed by bank staff (5.74, 4.00 and 3.58 WTEs respectively). Overtime in 2019 (541.44 hours), was slightly higher than 2018, (363.10) hours, and then decreased in 2020 (345.83 hours). Additionally, overtime hours remained below that of agency and bank hours for each year. Overtime by HCAs comprised a small proportion of the additional hours for each year (0.13-0.14 WTEs). Agency and bank hours are relatively equal for each year and both follow the pattern of a decrease from 2018 to 2019 to further decrease in 2020. Hospital 7 (IU) did not use agency staff; changes to staffing are outlined in section 6.3.1.

Table 4.2.2.1: Agency/Bank/Overtime staff*

	Hospital 4			Hospital 5			Hospital 6		
	2018	2019	2020**	2018	2019	2020**	2018	2019	2020**
Total number of hours									
RN	20353.5	21,502.45	5478	9504	10836	2988	20717.65	27083.67	4564
HCA	3226.5	9,771.75	3433	528	1278	48	11275.93	12490.67	4260
Total	23580	31274.2	8911	10032	12114	3036	31993.58	39574.33	8824
Average hours per month									
RN	1696.13	1791.87	1826	792	903	1245	1726.47	2256.97	1521.33
HCA	268.88	814.31	1144.33	44	106.5	20	939.66	1040.89	1420
Total	1965	2606.18	2970.33	836	1009.5	1265	2666.13	3297.86	2941.33
Conversion to WTE									
RN	10.04	10.60	10.80	4.69	5.34	7.35	10.22	13.35	9.00
HCA	1.59	4.82	6.77	0.26	0.63	0.12	5.56	6.16	8.40
Total	11.63	15.42	17.58	4.95	5.97	7.46	15.78	19.51	17.40

*The majority of agency staff are allocated to care for patients who a decision to admit has been made but are awaiting a bed in ED **January to March 2020

Table 4.2.2.2: Breakdown of Agency, Bank and Overtime hours for Hospital 6

Hospital 6	Agency			Bank			Overtime		
	2018	2019	2020*	2018	2019	2020*	2018	2019	2020*
Total Hours									
CNM							22.50	40.00	2.00
RN	9787.25	6363.67	1511.50	11643.50	8109.92	1813.00	4357.23	6497.25	1037.50
RPN	175.00	12.00	200.00	553.00	84.00				
HCA	7310.02	3689.92	2135.50	8133.42	4097.25	2056.00	264.00	260.00	68.50
Average hours per month									
CNM							1.88	3.33	0.67
RN	815.60	530.31	503.83	970.29	675.83	604.33	363.10	541.44	345.83
RPN	14.58	1.00	66.67	46.08	7.00				
HCA	609.17	307.49	711.83	677.78	341.44	685.33	22.00	21.67	22.83
Conversion to WTE									
CNM							0.01	0.02	
RN	4.83	3.14	2.98	5.74	4.00	3.58	2.15	3.20	2.05
RPN	0.09	0.01		0.27	0.04				
HCA	3.60	1.82	4.21	4.01	2.02	4.06	0.13	0.13	0.14

*Three months of data only: January-March up to March 31st

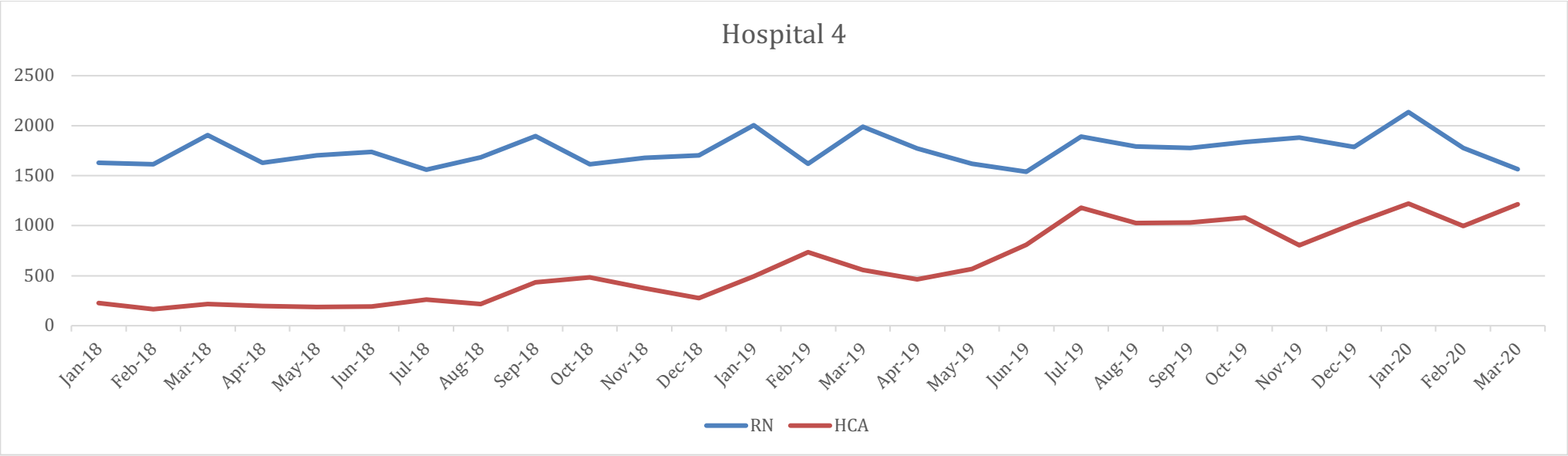


Figure 4.2.2.1: The number of hours of RN and HCA agency use in Hospital 4 from January 2018 to March 2020

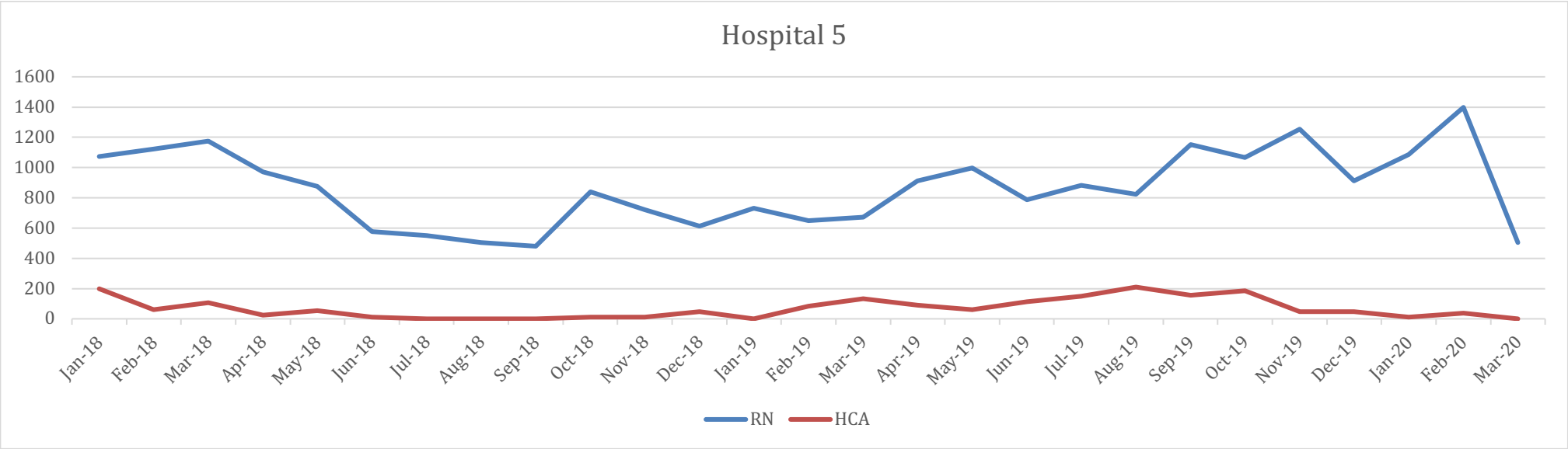


Figure 4.2.2.2: The number of hours of RN and HCA agency use in Hospital 5 from January 2018 to March 2020

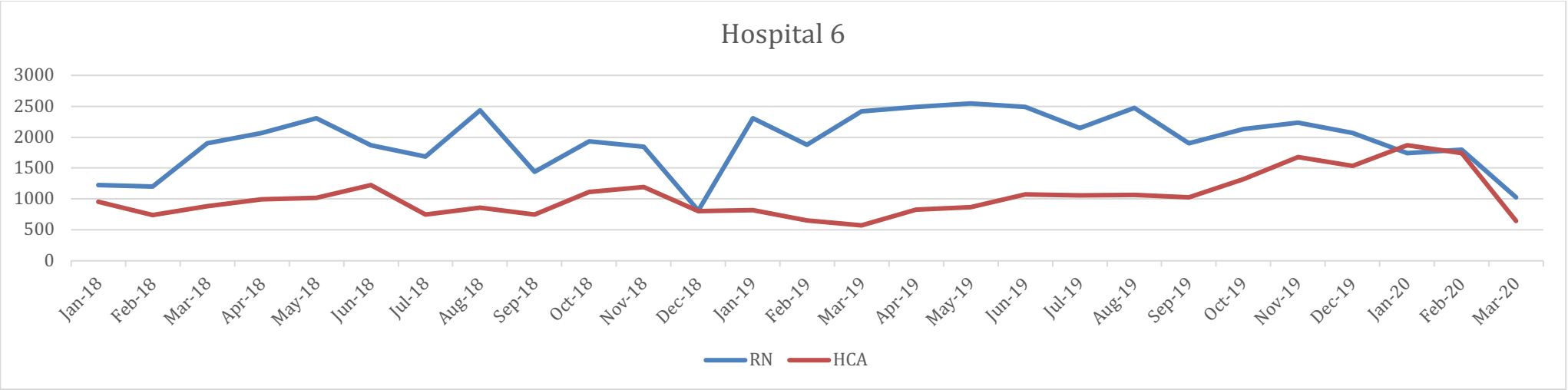


Figure 4.2.2.3: The number of hours of RN and HCA agency use in Hospital 6 from January 2018 to March 2020, these figures are inclusive of agency, overtime and bank usage

4.2.3 Economics

The above data provided on WTEs for RNs and HCAs, along with the agency hours allowed for the estimation of costs incurred through this research project.

4.2.3.1 Costings

The adjustment cost was calculated based on the change in whole-time equivalent posts in RNs and HCAs from 2018 to 2020. These changes were considered a funded uplift in staff. Table 4.2.3.1 shows the basis of the estimation for calculating the cost of the uplift. Data on the exact point each staff member are employed is not currently available thus, using the HSE consolidated salary scale (2020), the mid-point of the scale was selected for nurses, while Band 3 was selected for HCAs for the purpose of estimating the cost of the changes to staffing. It should be noted that these costs are based on the proposed changes to staffing and, at the time of the report, all of the proposed complement may not be in place. In addition, there is need to collect data over a longer period of time to determine the impact of the changes on agency use; this period of data collection was also impacted upon by the advent of the Covid-19 pandemic.

Table 4.2.3.1: Basis of calculations for uplift costs

Basis of Calculation[1]	Basic €	Premia (20%) €	Earnings €	PRSI (10.75%) €	Annual Cost €	Cost per month €
Nurse (Mid-point)	38,546	7,709	46,255	4,972	51,228	4268.97
HCA (Band 3)	30,832	6,166	36,998	3,977	40,976	3414.64

[1]Source: HSE Consolidated salary scale, 2020

Table 4.2.3.2: Projected Costings of Staff Changes to Department of Health

Projected Totals	Recommended WTE	WTE Change	Agency WTE Required	WTE to fund[1]	Cost to Department of Health €
Hospital 4	89.7	6.5	10	0	0
Hospital 5	47.53	8.5	5.4	3.1	155,980.79
Hospital 6	105.48	28.5	10	18.5	925,821.45
Hospital 7 (HCA)	-	2.0	0	2.0	87,138.81
Total					**1,168,941.05**

[1]This is based on agency conversion to WTE posts

4.2.3.2 Agency Cost

The cost of agency staff was calculated based on the total hours of agency employed, (see section 4.2.3 above) and multiplied by the average hourly cost of employing an agency RN or HCA as appropriate. Average agency costs were not available for the individual hospitals. Therefore, the average hourly cost was calculated based on the National agency agreement, using the average of the different shift. The 7th point was used for this average for RNs and the 5th point for HCAs, see Appendix B for calculation. Cost of Bank staff was not available, thus bank hourly costs were

calculated using agency costs minus the administration fee, as such this may be an overestimation. Agency and Bank cost has been added together where applicable and overtime costs were not available for inclusion. It is important to note that the majority of agency staff allocated employed in ED are allocated to patients who have been admitted but are waiting on a bed (boarded patients). Hospitals, at this stage, do not distinguish agency costs for these cohorts and are identified as a cost to ED.

Hospital 4's cost of agency staffing increased over the duration of the research from €91,571 per month in 2018, to €116,673 in 2019. Hospital 5 also increased their agency spend from €39,693 in 2018 to €47,374 in 2019; this consisted of an increase in agency spend for both RNs and HCAs. Hospital 6 had an increase in agency spend between 2018 and 2019, increasing from €99,009.04 in 2018 to €118,894.12 (see Table 4.2.3.3). It is envisaged that agency rates and subsequent cost will likely decrease as the workforce stabilises; data over a longer period of time is required to measure these trends.

Table 4.2.3.3: Agency costings for each emergency department from 2018 to 2020*

	Hospital 4			Hospital 5			Hospital 6		
Total Cost	2018	2019	2020**	2018	2019	2020**	2018	2019	2020**
RN	977,578.61	1,032,762.67	263,108.34	456,477.12	520,453.08	143,513.64	778,015.69	970,748.10	167,378.09
HCA	121,284.14	367,320.08	129,046.47	19,847.52	48,040.02	1,804.32	410,092.77	455,981.29	155,666.97
Total	1,098,862.74	1,400,082.76	392,154.81	476,324.64	568,493.10	145,317.96	1,188,108.46	1,426,729.39	323,045.05
Cost per month									
RN	81,464.88	86,063.56	87,702.78	38,039.76	43,371.09	59,797.35	64,834.64	80,895.68	55,792.70
HCA	10,107.01	30,610.01	43,015.49	1,653.96	4,003.34	751.80	34,174.40	37,998.44	51,888.99
Total	91,571.90	116,673.56	130,718.27	39,693.72	47,374.43	60,549.15	99,009.04	118,894.12	107,681.68

*The majority of agency staff are allocated to care for patients who a decision to admit has been made but are awaiting a bed in ED **January to March 2020

4.2.3.3 Summary of Costs

The overall cost was also calculated based on the cost of the changes to staffing in place to date and the agency cost. As staff have been employed on a phased basis, the associated costs are calculated from January 2020.

Agency costs include those staff allocated both to the ED and to care for patients who a decision to admit has been made but are waiting in ED. Further data is required over a longer period of time to time identify the impact that the planned changes to staff are having on agency costs. Recent trends are showing that this is beginning to decrease.

4.2.4 Conclusion

In summary, the required NHpPP decreased for both Hospital 4 and 5 across the duration of the research, however Hospital 6 had an increase in NHpPP. These changes show that the required NHpPP requires periodic monitoring. The research shows that the identified uplift required at baseline will ensure that the available staffing level matches the requirement. An increase in agency use and subsequently, agency cost was seen in both hospitals 4 and 5, while Hospital 6 showed a decrease in agency use and cost. Both hospitals 4 and 5 had greater spends in 2020 compared to 2018/2019, due to the increase in agency cost, combined with the uplift cost for Hospital 5. Hospital 6 also had a greater overall spend in 2020, however promising patterns of agency cost savings were apparent for Hospital 6. It is important to note that the majority of agency costs are accrued in the allocation of staff to care for patients who have been admitted but are waiting in the ED for a bed on a ward. The majority of these patients are cared for by agency staff.

4.3 Emergency Departments' Administrative Data

This section outlines the results from administrative data collected from the three pilot emergency departments. The results are outlined in a number of sections and provide an overview of the activity within each of the hospitals. Data was collected from each hospital's administrative system and is reflective of the period between 1st January 2018 and 31st March 2020 inclusive. The data presented in this section is organised by calendar year, dividing the data into three distinct time periods, with the administrative data for the year 2020 representative of the period 1st January 2020 to 31st March 2020 inclusive. The 31st March 2020 was selected as a cut-off period for the year 2020 due to the significant changes to the healthcare and emergency department landscape in light of the Covid-19 pandemic and the ensuing lockdown. The administrative systems utilised by the hospitals' information and communications technology departments (ICTs) included iSOFT, iPMS and Patient Centre.

This longitudinal approach to administrative data was enacted to present a comprehensive overview trajectory and to consider seasonal variation within the EDs. Whilst the data is taken from each hospital's administrative systems and was compiled with hospital ICT staff collaboration, the purpose for this report is to present the utilisation of administration data as a means of examining outcomes associated with nurse staffing. This data provides an overview of the hospital sites, both in terms of comparisons with each other, as well as a potential avenue for future analysis. Further analysis will be undertaken matching nurse staffing on a daily basis with the outcomes outlined below, including: Patient Experience Time (PET), time to triage and time from triage to being seen by a decision maker.

The administrative systems within the three hospital sites provided data in the following domains:

- Patient Demographics
- Patient Attendances including new attendances and returns
- Number of patients Leaving Without Being Seen (LWBS)
- Numbers of Patients Admitted
- Trolley time
- Wait Times including:
    - PET
    - Time to Triage
    - Time from triage to time to be seen by a decision maker.
    - ED Registration to time to be seen by a decision maker.
    - Treatment time

4.3.1 Patient Demographics

Overall, from January 1st, 2018 up to and including 31st March 2020, 323,151 patients attended the three EDs in the study. Across the three hospitals, 144,284 attendances were recorded in 2018, 147,082 attendances were recorded in 2019, and 31,785 attendances were recorded up to March 2020. Male patients comprised 51.7% of total

attendances and female patients comprised 48.3% of attendances. The mean age of patients attending the three EDs was 43.97 years. Patient ages ranged from less than 1 month to 106.18 years with only one site providing full specific emergency services for paediatrics (outside of trauma and burns), while another site utilised a paediatric assessment unit. Table 4.3.1.1 outlines patient demographics for each ED site. As Hospital 6 presented data for both the ED unit and a rapid assessment clinic, this data was separated out with only the ED data presented here.

4.3.1.1 Patient Profile

A combined number of 323,151 patient attendances were seen across the three hospital sites over the study period. Attendances were a combination of both new presentations and returns with the majority reflective of new attendances (84%). Table 4.3.1.1 outlines the breakdown of attendances in terms of new presentations and returns. Scheduled returns were defined as attendances which were coded by the hospitals as returns or following a previous ED attendance and which occurred within six weeks of the patient's last discharge from the ED. Other returns were defined as attendances which were not scheduled, and which occurred within 28 days of the patient's last discharge from the ED. Patients returning within 28 days who were recorded by the hospitals as a return patient or presenting following a previous ED attendance, but who had left without being seen or before treatment completion on their previous visit, were deemed to be other returns. Patients who were noted as Total returns were all reattendances within 28 days of the patient's last discharge from the ED.

Hospitals 4 and 5 had relatively similar mean ages of patients; approximately 41-42 years with the mean age remaining relatively equal across each year. Hospital 6 had a slightly older mean age of approximately 47-48 years, again remaining stable across the study period. The gender split was relatively equal in each hospital, with slightly more males in Hospital 4 (51.2-51.6%) and Hospital 6 (53.2-55.3%) and slightly more females in Hospital 5 (50.3-51.1%). These gender ratios remained stable across the data collection period.

For each year in each hospital, the majority of patients were in Manchester Triage category "Urgent" (41.5-58.0%) with the category "Immediate" representing the smallest proportion of patients (0.5-0.9%), while both Hospital 4 and 5 saw a small increase in immediate patients in 2020. However, the data collected for 2020 does not represent an entire year and may reflect the winter season or the outbreak of Covid-19, thus it cannot be concluded that this pattern will remain across the entire year.

A subset of attendance, patients equal to or over 75 years of age, was also analysed. Patients ≥75 years of age accounted for 13.9% of the records within the study period. Hospital 5 had the highest percentage of patients ≥75 years being treated (14.3%, n=9,715). In Hospitals 4 and 6 respectively, 13.9% (n=18,562) and 13.5% (n=16,515) of their cohort were ≥75 years of age (Table 4.3.1.1). The highest percentage of patients ≥75 years of age in an individual year was recorded by Hospital 5 in 2018 (14.9%, n=4,469), while the lowest percentage in an individual year was recorded by Hospital 6 in 2020 (12.8%, n=1,584).

Data on patients who were admitted on their last attendance and who returned within 28 days (excluding scheduled returns) was examined. In 2018, 3% of total attendances (n=4,281) met these criteria across the three hospitals. This proportion was unchanging in 2019 (3.0%, n=4,381), and increased slightly in 2020 (3.3%, n=1,035). In Hospital 4, 2.6% of attendances returned within 28 days of admission in both 2018 (n=1,533) and 2019 (n=1,573), with the proportion increasing slightly in 2020 to 2.8% of total attendances (n=355). In 2018, 2.8% (n=839) of attendances at Hospital 5 were other returns following an admission. This percentage increased in 2019 (3.1%, n=975), and 2020 (3.9%, n=252). Other returns within 28 days of admission accounted for 3.5% of attendances in Hospital 6 in 2018 (n=1,909) and 2020 (n=428), and 3.3% (n=1,833) of 2019 attendances.

4.3.1.2 Number of Patients Admitted

The hospital with the highest proportion of admitted patents was Hospital 4 (n=48,116, 36.1% of all attendances), followed by Hospital 5 (n=22,990, 33.9% of all attendances), and Hospital 6 (n=33,064, 27.1%). Table 4.3.1.1 outlines the breakdown of the attendances for each hospital per year. Hospital 5 saw the greatest change in the percentage of patients who were admitted, increasing from 30.5% in 2018 to 39.4% in 2020. The proportion of patients who were admitted in Hospitals 4 and 6 was relatively consistent across the study period. Admitted patients made up over 32.2% (n=104,170) of all patients who attended the ED, across the three sites. Of those aged 75 years and over, over 60% were admitted across the three hospitals each year.

The rate of admissions per day from the three hospital sites was extensive. Hospital 4 decreased from, on average, 60.1 admissions per day in 2018 to 58.5 admissions per day in 2019 and 53.1 admissions per day in 2020. This downward trend was also seen in Hospital 6, where they recorded, on average, 41.1 admissions per day in 2018, 40.2 admissions per day in 2019, and 37.6 admissions per day in 2020. Hospital 5 varied from an average of 25 admissions per day in 2018 to 30.9 admissions per day in 2019, decreasing to 28.3 admissions per day in 2020.

Table 4.3.1.1: Demographic profile of patients attending each of the pilot emergency department sites

	Hospital 4			Hospital 5			Hospital 6		
	2018 n = 59,579	2019 n = 60,923	2020* n = 12,875	2018 n = 30,018	2019 n = 31,251	2020* n = 6,539	2018 n = 54,687	2019 n = 54,908	2020* n = 12,371
New Attendances, n (%)	53,077 (89.1)	53,920 (88.5)	11,487 (89.2)	24,485 (81.6)	25,072 (80.2)	5,258 (80.4)	44,123 (80.7)	44,284 (80.7)	9,812 (79.3)
Scheduled returns, n (%)	2,242 (3.8)	2,319 (3.8)	424(3.3)	2,862 (9.5)	3,433 (11.0)	691 (10.6)	7 (<0.1)	11 (<0.1)	6 (<0.1)
Other returns ≤7 days, n (%)	1,955 (3.3)	2,151 (3.5)	392 (3.0)	1,073 (3.6)	1,024 (3.3)	199 (3.0)	6,827 (12.5)	6,695 (12.2)	1,651 (13.3)
Other returns ≤28 days, n (%)	4,260 (7.2)	4,684 (7.7)	959 (7.4)	2,671 (8.9)	2,746 (8.8)	590 (9.0)	10,557 (19.3)	10,613 (19.3)	2,553 (20.6)
Total returns ≤7 days, n (%)	3,643 (6.1)	3,896 (6.4)	722 (5.6)	3,369 (11.2)	3,674 (11.8)	741 (11.3)	6,834 (12.5)	6,705 (12.2)	1,656 (13.4)
Total returns ≤28 days, n (%)	6,466 (10.9)	6,961 (11.4)	1,381 (10.7)	5,475 (18.2)	6,100 (19.5)	1,263 (19.3)	10,564 (19.3)	10,623 (19.3)	2,559 (20.7)
Age in Years, mean (SD)	41.42 (26.82)	41.58 (27.18)	42.18 (26.83)	42.01 (26.64)	41.15 (26.52)	42.40 (26.69)	47.72 (20.36)	48.14 (20.21)	47.64 (19.93)
Gender, n (%)									
Males	30,736 (51.6)	31,391 (51.5)	6,596 (51.2)	14,672 (48.9)	15,279 (48.9)	3,252 (49.7)	29,122 (53.3)	29,203 (53.2)	6,835 (55.3)
Females	28,843 (48.4)	29,532 (48.5)	6,279 (48.8)	15,346 (51.1)	15,972 (51.1)	3,287 (50.3)	25,564 (46.7)	25,703 (46.8)	5,535 (44.7)
Unknown	-	-	-	-	-	-	1 (<0.1)	2 (<.01)	1 (<.01)
Triage Category, n (%)									
Immediate	319 (0.5)	333 (0.5)	80 (0.6)	202 (0.7)	226 (0.7)	57 (0.9)	299 (0.5)	315 (0.6)	60 (0.5)
Very Urgent	17,603 (29.5)	18,198 (29.9)	3,802 (29.5)	7,386 (24.6)	7,131 (22.8)	1,564 (23.9)	14,747 (27.0)	14,881 (27.1)	3,509 (28.4)
Urgent	32,374 (54.3)	32,699 (53.7)	6,541 (50.8)	12,451 (41.5)	13,133 (42.0)	2,832 (43.3)	31,728 (58.0)	31,332 (57.1)	6,678 (54.0)
Standard	7,955 (13.4)	8,072 (13.2)	1,723 (13.4)	8,685 (28.9)	9,278 (29.7)	1,788 (27.3)	4,787 (8.8)	4,899 (8.9)	1,380 (11.2)
Non-Urgent	568 (1.0)	719 (1.2)	170 (1.3)	1,117 (3.7)	1,280 (4.1)	270 (4.1)	288 (0.5)	335 (0.6)	126 (1.0)
Admitted patients, n (%)	21,924 (36.8)	21,361 (35.1)	4,831 (37.5)	9,143 (30.5)	11,272 (36.1)	2,575 (39.4)	14,985 (27.4)	14,657 (26.7)	3,422 (27.7)
Attendances ≥75 years, n (%)	8,019 (13.5)	8,698 (14.3)	1,845 (14.3)	4,469 (14.9)	4,291 (13.7)	955 (14.6)	7,469 (13.7)	7,462 (13.6)	1,584 (12.8)
Admissions ≥75 years, n (%)	5,155 (64.3)	5,299 (60.9)	1,159 (62.8)	2,677 (59.9)	2,861 (66.7)	649 (68.0)	4237 (56.7)	4,157 (55.7)	900 (56.8)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020.

4.3.2 Emergency Department Patient Outcomes

The administrative data was explored in terms of potential emergency department outcomes that could be used to demonstrate a relationship with nurse staffing. Outcomes were categorised as wait times, patient experience times (PET), time to triage (TTT), and time from triage to time to being seen by a decision maker. The research team aimed to extrapolate the above data from the administrative systems in order to determine if these offered insight into workforce staffing.

This section describes each of the above outcomes giving an overview of the data obtained from the administrative systems. Table 4.3.2.1 depicts the outcomes reviewed.

The administrative data provided key information in relation to patient wait times. The data presented patient arrival times to the department, departure times from the department, triage time, patient experience times (PET), treatment times, time waiting to be triaged, time waiting from being triaged to being seen by either a decision maker, and the time the decision to admit was made.

Some apparent outliers were identified in the data. These consisted of values exceeding 120 hours or negative values for the variables ‘time to triage’, ‘triage to be seen’, and ‘ED registration to be seen’. Values exceeding 672 hours or negative values for the variables ‘patient experience time’ and ‘ED Care time’ were also deemed to be outliers. Such values were considered to be errors in the administrative data and were excluded from the analysis.

4.3.2.1 Time to Triage

On average, patients in 2018 and 2019 waited 0.42 hours from check in at reception to being triaged; that is time to triage (TTT), across the three hospitals. This decreased to 0.39 hours TTT on average in 2020. The longest average TTT within a calendar year was seen in Hospital 6 at 0.55 hours in 2018 (Table 4.3.2.1). Hospital 4 had the shortest TTT average within a calendar year at 0.33 hours in 2018.

Hospital 6 showed the greatest change in average TTT over the course of the study period, dropping from 0.55 hours on average in 2018 to 0.43 hours on average in 2020 (that is, following the uplift in staff). This amounted to a 21.8% decrease in average TTT from 2018 to 2020. In Hospital 4, average TTT increased slightly from 0.33 hours in 2018 to 0.37 hours in 2019 and 2020; these remained relatively unchanged over the period of the research. Hospital 5 demonstrated a relatively low increase in average TTT from 0.36 hours in 2018 to 0.39 hours in 2019, before decreasing to 0.36 hours in 2020.

4.3.2.2 Triage to Be Seen

In 2018, patients had to wait on average 2.18 hours from being triaged to be seen by a decision maker. This decreased to an average of 2.09 hours in 2019 and to 1.9 hours in 2020. Each of the hospital sites showed a decrease in average Triage to Be Seen times per calendar year from 2018 to 2020. In Hospital 6, patients on average had to

wait 0.72 hours less to be seen following triage in 2020 than in 2018, a decrease of 21.7%. Hospital 4 moved from a 1.06 hour wait on average in 2018 to an average wait of 1.07 hours in 2019, and decreased to a wait, on average, of just under a one hour in 2020. Hospital 5 demonstrated a 44.4% decrease in average Triage to Be Seen times from 2018 to 2020, dropping from a wait of 1.42 hours on average in 2018 to an average wait of 0.79 hours in 2020.

4.3.2.3 ED Registration to Be Seen

Calculating the time from registering at the ED to be seen by a decision maker, Hospital 4 was relatively consistent in this regard across the study period, recording average Registration to Be Seen times of 1.34 hours in 2018, 1.38 hours in 2019, and 1.30 hours in 2020. Both Hospitals 5 and 6 saw consecutive decreases in average Registration to Be Seen times across the study period. Hospital 5 demonstrated an average Registration to Be Seen time of 1.72 hours in 2018, decreasing to 1.34 hours in 2019 and to 1.11 hours on average in 2020. In Hospital 6, patients had to wait an average of 3.81 hours from ED registration to being seen in 2018, 3.51 hours on average in 2019, and just under three hours on average in 2020. This represented a 21.8% decrease in Registration to Be Seen times from 2018 to 2020 in Hospital 6.

4.3.2.4 Patient Experience Time (PET)

Patient Experience Time was defined as the time the patient spent within the Emergency Department (i.e., the time from registration in the ED until time of discharge/admission). PET is inclusive of boarding time following a decision to admit. Due to a lack of availability of trolley time data in Hospital 5 in 2019 and 2020, PET figures for this site should be interpreted with caution.

Hospital 6 demonstrated the highest average PETs across the three years, recording an average PET of 10.13 hours in 2018, 10.97 hours in 2019, and 10.24 hours in 2020. In 2018, Hospital 5 demonstrated an average PET time of 8.23 hours. This decreased to an average PET of 5.03 hours in 2019 and an average PET of 4.89 hours in 2020; however, this should be treated with caution due to the lack of available trolley data in this ED. Patients in Hospital 4 experienced an average of 8.18 hours within the ED in 2018, rising to 9.31 hours on average in 2019 and 9.28 hours in 2020 (Table 4.3.2.1).

Across the EDs, roughly 51% of patients had a PET time of six hours or less in 2018 and 2019, rising to over 54% in 2020. Hospital 5 had the best rate for reaching this target, progressing from 63.2% in 2018 to 69.1% and 70.2% in 2019 and 2020 respectively. Hospital 6 had the lowest rates for the <6 hours target although there was a slight increase from baseline of 41.9% to 45.9% in 2020. Hospital 4 also increased slightly from a baseline of 53.4% to 54.7% in 2020.

Approximately 68% of patients in 2018 and 2019 had PETs of nine hours or less, with just under 72% having a PET of nine hours or less in 2020. Hospital 6 remained stable from 2018-2019 for this 9-hour target (~58-59%) however an increase to 63.0% was seen in 2020. In 2019, Hospital 4 had the lowest rate for the 9-hour target (68.6%), with 2018 slightly higher at 70.6% and the highest rate in 2020 at 72.6%. Hospital 5

rose year on year for the 9-hour target, from a low of 77.6% in 2018 to a high of 87.5% in 2020.

PETs of 24 hours or less were recorded in approximately 93% of cases across the years, with Hospital 5 having upwards of 99% of patient PET within 24 hours for 2019 and 2020. Hospital 4 decreased slightly across the three years from a baseline of 95.9% to 92.2% to a low of 91.0% in 2020. Hospital 6 also decreased from 2018 (91.2%) to 2019 (89.3%) however, 2020 saw 90.3% of patient PET within 24 hours.

These percentages dropped notably when looking at patient aged 75 years and over (Table 4.3.2.2). Approximately, one-third of patients aged 75 years and over had PETs of six hours or less in 2018, rising to 36.4% in 2020. When looking at PETs of nine hours or less, across the three EDs, 48.5% of patients aged 75 years and over met this criterion in 2018, with this percentage increasing to 50% in 2019 and 54.6% in 2020. In 2018, 15.3% of patients aged 75 years and over had a PET time of over 24 hours, increasing to 18.4% in 2019 and 19.4% in 2020. Hospital 5 had the best rates for PET for those aged 75 years and over.

Admitted patients incurred longer overall PETs when compared with non-admitted patients. In general, PETs were over twice as long for admitted patients in comparison to non-admitted patients (Table 4.3.2.1). Across the study period, on average, admitted patients' PET was approximately seven hours longer than patients who were not admitted and over 50% greater than that of overall average PETs. This difference between PETs for admitted patients in comparison with non-admitted patients was also evident among patients 75 years of age and over (Table 4.3.2.2).

4.3.2.5 ED Care Time

This was calculated as the time from registration in the ED up to the time of a decision to admit/discharge, i.e. exclusive of the time that patients were boarding[4] in the emergency department. In 2018, the average ED care time across the three hospitals was 6.14 hours. This figure decreased in 2019 to 6.09 hours on average, and again in 2020 to 5.72 hours on average.

The average ED care time for all patients in both Hospital 4 and Hospital 6 increased from 2018 to 2019, rising from, 5.65 hours to 5.90 hours and 6.85 hours to 6.91 hours respectively (Table 4.3.2.1). In 2020, both hospitals had a decrease to below their 2018 averages (Hospital 4: 5.50, Hospital 6: 6.38). Hospital 5 demonstrated a downward trend in average ED care times across the study period, from 5.79 hours on average in 2018 to 5.00 hours in 2019 and to 4.89 hours in 2020.

The same pattern emerged across the three sites when looking at ED care times of patients aged 75 years and over. Hospital 4 saw the average ED care time increase from 6.92 hours in 2018 to 7.02 hours in 2019, before decreasing to 6.91 hours in 2020. Similarly, the average ED care time in Hospital 6 in 2018 was 6.91 hours, rising to 6.98 hours in 2019, and decreasing to 6.80 hours in 2020. Hospital 5 again saw a downward trend in ED care times, with patients 75 years of age and older averaging

[4] Boarding is the time from decision to admit to when the patient left the ED for a bed on the ward.

treatment times of 6.81 hours in 2018, 6.24 hours in 2019, and just over 6 hours in 2020.

4.3.2.6 Trolley Time

This was defined as the time from when a decision to admit was made until time of admission/departure from the ED. This data is presented here to be illustrative of the activity in an ED but is not directly related to staffing levels; trolley time is indicative of beds available in the hospital to which patients can be admitted.

In 2018, across the three hospitals, patients waited on trolleys an average of 10.66 hours with Hospital 5 demonstrating the highest average time in that year at 16.46 hours. Based on the available data, Hospital 5 demonstrated an average trolley time of 1.41 hours in 2019 and an average time of 1.07 hours in 2020. As only 575 records of trolley time data were available across 2019 and 2020 combined in Hospital 5 compared to 4464 records in 2018, these figures presented here in relation to trolley time and ED PET times for should be interpreted with caution for these years (Table 4.3.2.1). Trolley times in Hospital 4 showed an increase year on year, from 10.56 hours on average in 2018, to 14.51 hours in 2019, and to 16.80 hours on average in 2020. Hospital 6 demonstrated an average trolley time of 9.39 hours in 2018, rising to 13.45 hours on average in 2019 and 12.74 hours in 2020.

In Hospital 4, trolley wait times increased year on year for those aged 75 years and over: 11.60 hours in 2018, 16.61 in 2019 and 19.64 in 2020. Hospital 6 also depicted this increasing pattern rising from a baseline of 11.80 hours to 15.93 in 2019 and remaining stable at 15.67 hours in 2020. Hospital 5 decreased from an average of 15.20 hours of waiting on a trolley for those 75 years and over, to under 2 hours in both 2019 and 2020. However, as stated above these figures may not be reliable.

4.3.2.7 Leaving Without Being Seen

Each of the sites classified Leaving Without Being Seen (LWBS) slightly differently. For Hospital 4, LWBS included patients that had self-discharged, absconded, or left before treatment commencement or completion. For Hospital 5, LWBS was defined as patients who self-discharged or left before being seen by a doctor. Hospital 6, LWBS referred to self-discharging patients or patients who left before treatment commencement or completion. These definitions were collated under the heading LWBS (Table 4.3.2.1). In 2018, 10.5% (n=15,194) of patients were noted as LWBS across the three hospitals. This total proportion decreased to 9.7% (14,333) in 2019, and to 8.3% (n=2,643) in 2020.

There was notable variation between the hospitals in LWBS figures. Both Hospital 4 and 5 recorded their highest percentage of patients LWBS in a calendar year in 2018, at 4.3% and 3.4% respectively, while both recorded their lowest percentage of patients LWBS in a calendar year in 2020, with 2.4% of their respective patients LWBS for both hospitals. Hospital 6 demonstrated their lowest percentage of patients LWBS in 2020, at 17.6%, while their highest percentage of patients LWBS was seen in 2018, at 21.2%. While the proportion of LWBS is high for Hospital 6, it should be noted that this

is consistent with their patient profile along with the high level of return patients indicated in the patient profile above.

For those aged 75 years and over, Hospital 4 and 5 had LWBS rates of below 1.5% for each year, with Hospital 4 dropping to a low of 0.8% in 2020. This proportion was slightly higher for Hospital 6 however, remained much lower that the entire patient population. Additionally, LWBS in the 75 years and over cohort decreased year on year from a baseline of 4.2% to 3.9% in 2019 and 2.8% in 2020.

Table 4.3.2.1: Emergency Department Patient Outcomes

	Hospital 4			Hospital 5			Hospital 6		
	2018 n = 59,579	2019 n = 60,923	2020* n = 12,875	2018 n = 30,018	2019 n = 31,251	2020* n = 6,539	2018 n = 54,687	2019 n = 54,908	2020* n = 12,371
Time to Triage (hrs), mean (SD)	0.33 (0.34)	0.37 (0.36)	0.37 (0.37)	0.36 (0.28)	0.39 (0.28)	0.36 (0.28)	0.55 (0.55)	0.51 (0.54)	0.43 (0.46)
Triage to Time Seen (hrs), mean (SD)	1.06 (2.31)	1.07 (2.28)	0.99 (2.02)	1.42 (2.15)	1.00 (1.12)	0.79 (0.86)	3.32 (3.86)	3.08 (3.87)	2.60 (3.45)
Registration to Time Seen (hrs), mean (SD)	1.34 (2.32)	1.38 (2.30)	1.30 (2.04)	1.72 (2.17)	1.34 (1.17)	1.11 (0.91)	3.81 (3.98)	3.51 (3.98)	2.98 (3.55)
PET all patients (hrs), mean (SD)	8.18 (7.78)	9.31 (9.84)	9.28 (11.29)	8.23 (12.63)	5.03 (4.45)	4.89 (4.91)	10.13 (9.85)	10.97 (11.55)	10.24 (11.73)
Admitted patients, mean (SD)	13.11 (10.24)	15.94 (13.43)	15.94 (15.74)	10.68 (14.47)	5.77 (4.07)	5.69 (4.98)	16.15 (13.02)	18.80 (16.04)	17.42 (16.76)
Non-admitted patients, mean (SD)	5.32 (3.53)	5.73 (3.90)	5.28 (3.55)	7.15 (11.57)	4.61 (4.60)	4.38 (4.78)	7.85 (7.12)	8.11 (7.60)	7.50 (7.45)
PET <6 hours, n (%)	31,818 (53.4)	30,400 (49.9)	7,037 (54.7)	18,984 (63.2)	21,610 (69.1)	4,592 (70.2)	22,938 (41.9)	22,861 (41.6)	5,677 (45.9)
PET <9 hours, n (%)	42,089 (70.6)	41,819 (68.6)	9,341 (72.6)	23,296 (77.6)	26,923 (86.2)	5,721 (87.5)	32,125 (58.7)	31.763 (57.8)	7,797 (63.0)
PET <24 hours, n (%)	57,142 (95.9)	56,197 (92.2)	11,714 (91.0)	27,853 (92.8)	31,067 (99.4)	6,504 (99.5)	49,848 (91.2)	49,036 (89.3)	11,172 (90.3)
ED care time all patients (hrs), mean (SD)	5.65 (3.72)	5.90 (4.00)	5.50 (3.61)	5.79 (6.51)	5.00 (4.43)	4.89 (4.9)	6.85 (5.63)	6.91 (5.55)	6.38 (5.39)
Admitted patients, mean (SD)	6.23 (3.97)	6.22 (4.17)	5.86 (3.67)	5.95 (4.13)	5.71 (4.03)	5.68 (4.98)	6.88 (5.45)	6.99 (5.58)	6.44 (5.24)
Trolley Time (hrs), mean (SD)	10.56 (9.18)	14.51 (12.24)	16.80 (15.25)	16.46 (21.57)	1.41 (1.79)	1.07 (1.10)	9.39 (10.33)	13.45 (13.26)	12.74 (13.99)
LWBS, n (%)	2,556 (4.3)	2,261 (3.7)	308 (2.4)	1,023 (3.4)	868 (2.8)	159 (2.4)	11,615 (21.2)	11,204 (20.4)	2,176 (17.6)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020.

Table 4.3.2.2: Emergency Department Patient Outcomes for patients aged 75 years and over

	Hospital 4			Hospital 5			Hospital 6		
	2018 n = 8,019	2019 n = 8,698	2020* n = 1,845	2018 n = 4,469	2019 n = 4,291	2020* n = 955	2018 n = 7,469	2019 n = 7,462	2020* n = 1,584
Time to Triage (hrs), mean (SD)	0.38 (0.36)	0.44 (0.45)	0.44 (0.44)	0.36 (0.29)	0.39 (0.27)	0.34 (0.25)	0.48 (0.49)	0.45 (0.49)	0.39 (0.39)
Triage to Time Seen (hrs), mean (SD)	1.28 (2.69)	1.26 (2.60)	1.25 (2.55)	2.13 (3.96)	1.34 (1.38)	0.82 (1.28)	2.42 (2.99)	1.91 (2.54)	1.48 (1.98)
Registration to Time Seen (hrs), mean (SD)	1.57 (2.67)	1.63 (2.61)	1.60 (2.57)	2.42 (3.95)	1.71 (1.47)	1.19 (1.30)	2.87 (3.08)	2.32 (2.64)	1.84 (2.07)
PET (hrs), mean (SD)	13.29 (10.42)	15.85 (13.46)	16.96 (16.37)	11.49 (15.01)	6.29 (4.11)	6.06 (4.20)	14.37 (12.69)	16.08 (14.97)	15.89 (16.12)
Admitted patients, mean (SD)	17.07 (10.94)	21.49 (14.25)	22.81 (17.93)	13.14 (14.97)	6.82 (4.03)	6.63 (4.23)	18.85 (13.40)	21.90 (16.25)	21.93 (18.07)
Non-admitted patients, mean (SD)	6.48 (4.06)	7.04 (4.43)	7.05 (4.68)	9.03 (14.74)	5.25 (4.07)	4.87 (3.87)	8.49 (8.70)	8.76 (8.83)	7.94 (7.83)
PET <6 hours, n (%)	2,332 (29.1)	2,390 (27.5)	576 (31.2)	1,902 (42.6)	2,123 (49.5)	498 (52.1)	2,343 (31.4)	2,293 (30.7)	523 (33.0)
PET <9 hours, n (%)	3,555 (44.3)	3,688 (42.4)	880 (47.7)	2,836 (63.5)	3.294 (76.8)	759 (79.5)	3,298 (44.2)	3,247 (43.5)	755 (47.7)
PET <24 hours, n (%)	7,048 (87.9)	6,797 (78.1)	1,368 (74.1)	3,943 (88.2)	4,285 (99.9)	953 (99.8)	5,913 (79.2)	5,606 (75.1)	1,212 (76.5)
ED care time all patients (hrs), mean (SD)**	6.92 (4.12)	7.02 (4.19)	6.91 (4.21)	6.81 (5.24)	6.24 (4.08)	6.04 (4.18)	6.91 (5.65)	6.98 (4.90)	6.80 (4.82)
Admitted patients, mean (SD)	7.17 (4.13)	7.00 (4.03)	6.83 (3.92)	7.21 (4.03)	6.74 (3.99)	6.59 (4.21)	7.19 (5.02)	7.40 (4.98)	7.39 (5.12)
Trolley Time (hrs), mean (SD)	11.60 (9.83)	16.61 (12.78)	19.64 (16.32)	15.20 (20.45)	1.46 (1.99)	1.66 (1.44)	11.80 (11.19)	15.93 (14.09)	15.67 (15.58)
LWBS, n (%)	110 (1.4)	111 (1.3)	15 (0.8)	55 (1.2)	46 (1.1)	12 (1.3)	316 (4.2)	294 (3.9)	45 (2.8)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020. **ED care time for non-admitted patients is the equivalent of PET for non-admitted patients

4.3.3 Conclusion

In summary, the majority of patients who attended the departments at the hospital sites were male (51.7%, n=167,086) and over 40 years, although patient demographics varied within each hospital. New presentations made up over 84% of all attendances across the three sites. Patients who were 75 years of age and older accounted for nearly 14% (n=44,792) of all attendances across the study period. Over 30% of all patients who presented at the three sites were admitted, and this percentage rises to over 60% of patients who are 75 years and older.

Time to triage in general increased slightly in Hospital 4 while Hospital 5 remained stable. Hospital 6 showed a decrease in average time to triage across the study period. Wait times to being seen remained relatively stable in Hospital 4 with both Hospitals 5 and 6 recording a downward trend in these times. PET increased across the study period in Hospital 4, dramatically decreased in Hospital 5 (this result needs to be treated with caution) and was beginning to stabilise in Hospital 6 in 2020 after an upward trajectory in 2019. Positive trends were evident for LWBS with all three hospitals showing decreasing percentages of patients leaving without being seen over the three years.

In conclusion, the administrative data provided a comprehensive overview of the emergency departments within the three hospital sites. The administrative data collected by the hospitals is a useful resource in measuring outcomes, particularly over a longitudinal period of time. However, there is significant variation between the three emergency departments in terms of geographical location, size, purpose, capacity, patients and staff, hence overall definitive generalisation cannot be assumed. Hospital administrative systems varied slightly in terms of the type of data collected by each site. For this reason, certain key criteria have been focused on for this report with other categories being combined to allow for comparisons. Additionally, while the data presented here is representative of a period in excess of two years, the staffing changes occurred towards the latter end of the study period. Therefore, the data should be interpreted with caution at this stage. Further examination of the data over an extended period of time would provide a greater depth and breadth of understanding of the data and the impact of staffing changes. Nonetheless, the results presented here offer some initial promising positive trends, providing key insights into emergency departments within the Irish context. The data also presents a viable means of assessing emergency department outcomes in relation to staffing over time, within a future context.

4.4 Cross-sectional Staff Survey

Staff across the three Emergency Departments, including clinical nurse managers (CNMs), staff nurses (RNs) and healthcare assistants (HCAs), were asked to complete the staff survey at baseline (Time 1) and again at Time 2 following changes to their staffing. The survey measures a number of items including demographics, education, the number of patients being cared for by staff, the working environment, quality of

care, care left undone or delayed, job satisfaction and intention to stay/leave, burnout and the prevalence of violence and aggression.

4.4.1 Demographics and Education

It should be noted that the overall response rate at Time 2 was higher than Time 1, 59.2% versus 43.2% respectively. Hospital 5 had a high response rate at both time points (>71%), while Hospital 4 had the lowest response rates at both time points (T1=53.1%; T2=51.1%). Hospital 6's response rate decreased from 69.7% to 60.9% at Time 2, however this may be attributed to the increased staff numbers following the staffing adjustments.

The demographic profile of the respondents is outlined in Table 3.4.1.1. At Time 1, the majority of respondents were RNs (67.2%) with CNMs comprising 21.9% of the staffing cohort. At Time 2, the largest cohort of respondents were RN grade (63.2%), 26.5% were CNM grade and HCA's accounted for 10.3% of responses. In Time 1, a large proportion of staff held full-time contracts and had been working in their current unit for approximately 6 years which remained relatively stable at Time 2. Respondents were in large part female (Time 1: 80.9%, Time 2: 77.4%) and with an average of almost 12 years' experience as a Registered Nurse (RN) or Healthcare Assistant (HCA) for both time points. The majority had completed degree level education, 87.0% in Time 1 and 88.3% in Time 2. Of those surveyed, 44.4% had received a specialist qualification in emergency nursing in Time 1, increasing to 46.1% in Time 2.

Staff also provided details of the country of nursing pre-registration training, as shown in Table 4.4.1.1. In Time 1, 33.6% received their nursing accreditation overseas, mainly in the UK (36.2%) or India (25.5%). In Time 2, 35.6% of nurses reported that they received their pre-registration training overseas, with the Philippines (33.3%) indicated as the most common country for pre-registration accreditation, followed by the UK (22.9%). At both Time 1 and Time 2, over half of respondents worked 12-hour day shifts, 50.5% and 61.1% respectively (Table 4.4.1.2).

Table: 4.4.1.1: Profile of respondents

	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 51)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 137)	Time 2 (n = 135)
Response rate, %	53.1	51.1	73.3	73.1	69.7	60.9	43.2	59.2
Job Title, n (%)								
CNM	7 (13.7)	7 (15.2)	13 (30.2)	14 (36.8)	10 (23.3)	15 (28.8)	30 (21.9)	36 (26.5)
RN	38 (74.5)	30 (65.2)	24 (55.8)	22 (57.9)	30 (69.8)	34 (65.4)	92 (67.2)	86 (63.2)
HCA	6 (11.8)	9 (19.6)	6 (14.0)	2 (5.3)	3 (7.0)	3 (5.8)	15 (10.9)	14 (10.3)
Nursing Qualifications (RNs), n (%)								
Registered nurse – cert.	2 (4.4)	0 (0.0)	4 (10.8)	4 (11.1)	1 (2.5)	2 (4.4)	7 (5.7)	6 (5.0)
Registered nurse – diploma	5 (11.1)	1 (2.6)	3 (8.1)	6 (16.7)	1 (2.5)	1 (2.2)	9 (7.4)	8 (6.6)
Registered nurse – degree	19 (42.2)	20 (51.3)	11 (29.7)	11 (30.6)	19 (47.5)	20 (44.4)	49 (40.2)	51 (42.1)
Post-graduate certificate	4 (8.9)	2 (5.1)	3 (8.1)	4 (11.1)	1 (2.5)	3 (6.7)	8 (6.6)	9 (7.4)
Post-graduate diploma	11 (24.4)	11 (28.2)	15 (40.5)	9 (25.0)	14 (35.0)	17 (37.8)	40 (32.8)	38 (31.4)
Masters in Nursing	4 (8.9)	5 (12.8)	1 (2.7)	2 (5.6)	4 (10.0)	2 (4.4)	9 (7.4)	9 (7.4)
Educational Qualification, n (%)								
No Formal Education	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.0)	1 (2.6)	4 (8.9)	1 (0.8)	5 (4.0)
Junior Cert./Intermediate Cert.	2 (4.3)	0 (0.0)	0 (0.0)	0 (0.0)	3 (7.7)	0 (0.0)	5 (4.0)	0 (0.0)
Leaving Cert (or equivalent)	24 (51.1)	24 (52.2)	18 (42.9)	14 (42.4)	19 (48.7)	21 (46.7)	61 (48.8)	59 (47.6)
Vocational/Technical	3 (6.4)	5 (10.9)	6 (14.3)	4 (12.1)	5 (12.8)	2 (4.4)	14 (11.2)	11 (8.9)
Qualification								
Certificate (Third-level)	3 (6.4)	4 (8.7)	3 (7.1)	3 (9.1)	2 (5.1)	3 (6.7)	8 (6.4)	10 (8.1)
Diploma (Third-level)	2 (4.3)	2 (4.3)	4 (9.5)	5 (15.2)	2 (5.1)	7 (15.6)	8 (6.4)	14 (11.3)
Bachelor's Degree	12 (25.5)	8 (17.4)	8 (19.0)	6 (18.2)	7 (17.9)	7 (15.6)	27 (21.6)	21 (16.9)
Master's Degree	1 (2.1)	3 (6.5)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.2)	1 (0.8)	4 (3.2)
Doctoral Degree (e.g. PhD)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Specialist qualification in emergency nursing, n (%)								
Yes	19 (41.3)	16 (40.0)	17 (44.7)	15 (40.5)	19 (47.5)	28 (54.9)	55 (44.4)	59 (46.1)
No	25 (54.4)	23 (57.5)	19 (50.0)	21 (56.3)	21 (52.5)	19 (37.3)	65 (52.4)	63 (49.2)
FETAC level 5 (HCA only)	4 (80.0)	6 (75.0)	5 (100.0)	2 (100.0)	3 (100.0)	3 (100.0)	12 (92.3)	11 (84.6)

	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 51)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 137)	Time 2 (n = 135)
Working Contract, n (%)								
Full-time	42 (84.0)	40 (87.0)	34 (79.0)	30 (78.9)	37 (86.0)	41 (83.7)	113 (83.1)	111 (83.5)
Part-time	8 (16.0)	6 (13.0)	3 (6.9)	6 (15.8)	4 (9.3)	7 (14.3)	15 (11.0)	19 (14.3)
Agency	0 (0.0)	0 (0.0)	5 (11.6)	0 (0.0)	0 (0.0)	0 (0.0)	5 (3.7)	0 (0.0)
Other	0 (0.0)	0 (0.0)	1 (2.3)	2 (5.3)	2 (4.6)	1 (2.0)	3 (2.2)	3 (2.3)
Gender, n (%)								
Female	41 (82.0)	35 (76.1)	35 (81.4)	29 (76.3)	34 (79.1)	39 (79.6)	110 (80.9)	103 (77.4)
Male	9 (18.0)	11 (23.9)	8 (18.6)	9 (23.7)	9 (20.9)	10 (20.4)	26 (19.1)	30 (22.6)
Years as a nurse/HCA mean (SD)								
As Nurse/HCA	12.40 (10.39)	10.82 (8.46)	14.27 (8.58)	14. 04 (8.55)	9.06 (7.28)	10.40 (7.18)	11.93 (9.10)	11.59 (8.14)
Current Hospital	6.96 (8.14)	6.78 (7.20)	6.95 (6.71)	8.22 (7.82)	5.33 (6.45)	6.32 (7.15)	6.46 (7.17)	7.01 (7.34)
Current Unit	6.65 (8.03)	6.24 (6.87)	5.47 (5.56)	6.88 (6.61)	4.20 (6.21)	5.21 (6.62)	5.51 (6.78)	6.03 (6.68)
Agency	1.21 (1.50)	1.60 (1.48)	3.30 (2.00)	3.00 (0.00)	1.56 (1.26)	1.69 (1.40)	2.19 (1.90)	1.79 (1.34)
Received Pre-Reg training in Ireland, n (%)								
Yes	36 (70.6)	35 (74.5)	25 (58.1)	18 (47.4)	27 (62.8)	30 (60.0)	88 (64.2)	83 (61.5)
No	12 (23.5)	11 (23.4)	18 (41.9)	18 (47.4)	16 (37.2)	19 (38.0)	46 (33.6)	48 (35.6)
Countries								
UK	4 (33.3)	3 (27.3)	9 (50)	6 (33.3)	4 (23.5)	2 (10.5)	17 (36.2)	11 (22.9)
India	2 (16.7)	2 (18.2)	3 (16.7)	2 (11.1)	7 (41.2)	5 (26.3)	12 (25.5)	9 (18.8)
Other EU	4 (33.3)	3 (27.3)	0 (0.0)	0 (0.0)	1 (5.9)	2 (10.5)	5 (10.6)	5 (10.4)
Philippines	2 (16.7)	2 (18.2)	6 (33.3)	7 (38.9)	3 (17.6)	7 (36.8)	11 (23.4)	16 (33.3)
Other Worldwide	0 (0.0)	0 (0.0)	0 (0.0)	2 (11.1)	2 (11.8)	3 (15.8)	2 (4.3)	5 (10.4)

Table: 4.4.1.2: Profile of respondents' shift type

	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 135)	Time 2 (n = 135)
Day Shift (8 hours)	1 (2.0)	2 (4.5)	2 (4.7)	2 (4.0)	3 (7.0)	2 (4.1)	6 (4.4)	6 (4.6)
Day Shift (12 Hours)	25 (51.0)	27 (61.4)	19 (44.2)	19 (50.0)	24 (55.8)	34 (69.4)	68 (50.4)	80 (61.1)
Night shift (12 hours)	23 (46.9)	15 (34.1)	19 (44.2)	15 (39.5)	16 (37.2)	13 (26.5)	58 (43.0)	43 (32.8)
Other	0 (0.0)	0 (0.0)	3 (7.0)	2 (5.3)	0 (0.0)	0 (0.0)	3 (2.2)	2 (1.5)

4.4.2 Nursing Staff-to-Patient Ratios

Respondents were asked to self-report the minimum, maximum and average number of patients they had direct responsibility for on their most recent shift including HCAs and CNMs; Table 4.4.2.1 outlines the nurse-to-patient ratios. At Time 1 and 2, some outliers existed (i.e. values greater than 100) and were removed from the data.

In Time 1, an average of 14.87 patients per nurse per shift was reported, note these figures included those nurses based in Triage, which decreased to 11.27 at Time 2. A maximum patient caseload of 18.31 patients per shift was found across the three hospitals at Time 1, decreasing to 15.24 in Time 2. The minimum number of patients cared for also decreased from Time 1 (9.89) to Time 2 (7.05). Hospital 4 reported a high average patient caseload of 21.17 in Time 1, which decreased to 14.38 in Time 2. Hospital 5 decreased from 8.09 patients on average in Time 1 to 7.44 patients in Time 2. Likewise, Hospital 6 decreased from an average patient caseload of 12.29 patients to 11.05 patients in Time 2.

At Time 1, RNs on day shift (RN responses only) were responsible for an average of 12.36 patients per shift, while RNs on night shift had an average of 15.47 patients per shift. At Time 2, the average patient caseload for the day shift and night shift decreased (day shift=11.18; night shift=7.74). However, when looking at the average patient caseload per hospital, Hospital 4 saw a decrease in patients per nurse for the day shift from 18.14 to 14.94. Hospital 6 also decreased in ratios from 10.42 to 9.39 during the day shift. However, Hospital 5 saw a slight increase in ratios during the day shift, increasing from 7.00 to 8.78.

While interpreting this data, it should be noted that this represents self-reported figures and represents the total number of patients cared for rather than on an hourly basis.

Table: 4.4.2.1: Number of Patients Cared for by Nurses and HCAs

	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 37)	Time 1 (n = 43)	Time 2 (n= 47)	Time 1 (n = 135)	Time 2 (n = 131)
Minimum patients	13.22 (17.10)	8.82 (16.03)	5.49 (7.43)	4.25 (3.06)	9.14 (13.23)	7.47 (12.19)	9.89 (14.15)	7.05 (12.20)
Maximum patients	26.31 (32.26)	20.30 (21.34)	8.92 (7.46)	9.11 (6.93)	15.98 (21.12)	14.98 (19.96)	18.31 (25.15)	15.24 (18.28)
Average patients	21.17 (31.06)	14.38 (19.69)	8.09 (7.74)	7.44 (5.21)	12.29 (15.69)	11.05 (14.06)	14.87 (22.82)	11.27 (14.99)
Ave Patients per RN, day shift	18.14 (17.66)	14.94 (23.80)	7.00 (2.39)	8.78 (6.51)	10.42 (15.49)	9.39 (11.67)	12.36 (14.94)	11.18 (16.24)
Ave Patients per RN, night shift	26.13 (43.58)	12.38 (10.71)	6.29 (3.37)	5.33 (2.19)	8.62 (3.59)	5.50 (3.94)	15.47 (29.99)	7.74 (7.32)

4.4.3 Nursing Work Index

The Nursing Work Index (NWI) (Lake, 2002) was employed to assess characteristics of the nursing work environment. The NWI is composed of 31 items across five subscales: Nurse Participation in Hospital Affairs; Nursing Foundations for Quality of Care; Nurse Manager Ability, Leadership, and Support of Nurses; Staffing and Resource Adequacy and Collegial Nurse-Doctor Relations. Each item was scored on a scale of 1 to 4 where 1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree. A mean for each subscale was calculated to facilitate comparisons across the subscales. Higher scores were indicative of a positive work environment with a mean of 2.5 considered a neutral midpoint on the 4-point scale.

All five domains of the NWI saw improvements in the overall average scores from Time 1 to Time 2. The mean of each subscale can be seen in Table 4.4.3.1 at hospital level and overall, for all three hospitals for Time 1 and Time 2. For Time 1, the highest scores were reported for Nurse Manger, Leadership and Support, while in Time 2 the highest scores were seen for Collegial Nurse-Doctor Relations. The lowest scores were consistently reported for Staffing and Resource Adequacy across all three hospitals and at both time points.

In baseline data, Hospital 4 had the greatest increase in overall scores. While Staffing and Resource Adequacy had a low score of 1.73 in Time 1, this was the greatest increase from Time 1 to Time 2 (2.26). The highest score in Hospital 4 was for Collegial Nurse-Doctor Relations at 3.17 at Time 1 and 3.22 at Time 2; the three remaining subscales were scored between 2.37 and 2.64 at Time 1 and 2.74 and 2.89 at Time 2.

Hospital 5 remained relatively stable from Time 1 (2.36) to Time 2 (2.38) for Nurse Participation in Hospital Affairs. This was also apparent for Staffing and Resource Adequacy (Time 1 = 1.94, Time 2 = 1.98). The remaining three subscales Nursing Foundations for Quality of Care (2.52 to 2.61), Nurse Manager Ability, Leadership and Support (2.41 to 2.57) and Collegial Nurse-Doctor Relations (2.52 to 2.74) all increased slightly from Time 1 to Time 2 respectively.

Hospital 6 also showed an increase in each of the subscales from Time 1 to Time 2. Nurse Participation in Hospital Affairs and Nursing Foundation for Quality of Care remained relatively similar with slight increases of 0.05, 0.03 points respectively. Nurse Manager Ability and Leadership increased from 2.88 in Time 1 to 2.99 in Time 2, while Collegial Nurse-Doctor Relations increased from 3.08 to 3.35, from Time 1 to Time 2 respectively. The subscale Staffing and Resource Adequacy showed the largest increase of 0.61 points from 1.65 in Time 1 to 2.26 in Time 2.

Table: 4.4.3.1: Nursing Work Index

NWI, mean (SD) RN responses only	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 44)	Time 2 (n = 39)	Time 1 (n = 37)	Time 2 (n = 36)	Time 1 (n = 39)	Time 2 (n = 47)	Time 1 (n = 135)	Time 2 (n = 122)
Nurse Participation in Hospital Affairs	2.37 (0.45)	2.74 (0.54)	2.36 (0.46)	2.38 (0.57)	2.74 (0.86)	2.79 (0.57)	2.49 (0.64)	2.65 (0.57)
Nursing Foundations for Quality of Care	2.54 (0.40)	2.81 (0.44)	2.52 (0.44)	2.61 (0.48)	2.69 (0.74)	2.72 (0.49)	2.59 (0.55)	2.72 (0.48)
Nurse Manager Ability, Leadership, and Support of Nurses	2.64 (0.55)	2.89 (0.54)	2.41 (0.47)	2.57 (0.59)	2.88 (0.49)	2.99 (0.53)	2.65 (0.53)	2.83 (0.57)
Staffing and Resource Adequacy	1.73 (0.75)	2.26 (0.54)	1.94 (0.60)	1.98 (0.60)	1.65 (0.66)	2.26 (0.73)	1.77 (0.77)	2.17 (0.65)
Collegial Nurse-Doctor Relations	3.17 (0.46)	3.22 (0.43)	2.52 (0.51)	2.74 (0.52)	3.08 (0.56)	3.35 (0.44)	2.94 (0.58)	3.13 (0.53)

4.4.4 Time Availability and Quality of Care

Single item measures were used to assess staff (RNs and HCAs) perceptions of time available to deliver care, additional time required to deliver care and the quality of care delivered on the last shift worked.

Staff were asked to rate the time available to them to deliver care on their last shift on a 3-point scale ranging from “less time than usual” to “more time than usual.” At Time 1, the majority of staff (44.4%) reported having “less time than usual” available to them to provide care on their last shift while 43.0% of staff reported having the “same amount of time as usual” available to provide care to patients on their last shift. At Time 2, over half of staff (59.7%) reported that they had “about the same time as usual” available to them to provide care, while 29.1% of staff reported having “less time than usual” to provide patient care during their last shift. Table 4.4.4.1 shows results for Time 1 and Time 2. During baseline, 35.3% of staff in Hospital 4 indicated that they had “less time than usual” while 47.1% indicated they had the “same amount of time”, which increased to 60.9% reporting the “same amount of time” as usual and 29.1% reporting “less time than usual” during Time 2. The proportion of staff reporting “less time than usual” in Hospital 5 decreased from 51.2% to 36.8%, with more staff indicating that they had the “same amount of time” in Time 2 (57.9%) compared to Time 1 (39.5%). This pattern was also seen in Hospital 6, with a decrease from 50.0% in Time 1 to 30.0% in Time 2 for “less time than usual”. Subsequently, Time 2 saw an increase from 40.5% to 60.0% of respondents in Hospital 6 indicating that they had the “same amount of time as usual” to deliver care.

Staff were asked to make an approximation regarding how much more time they required in order to provide necessary care to patients as per their nursing care plan on a 6-point scale ranging from “No more time needed” to “Greater than 60 minutes.” At Time 1, 94.8% of staff reported that they required additional time to provide patient care across all Emergency Departments. There was a slight decrease to 90.8% of staff indicated that they required additional time to provide patient care. The majority of staff in Time 1 (44.0%) reported that they required an additional 15 to 30 minutes per shift to provide the quality of care as detailed in their nursing care plans, which remained relatively the same in Time 2 (43.9%). In Hospital 4, 5.9% of respondents indicated that no extra time was needed, which increased to 11.1% in Time 2. In Hospital 5, 7.1% of staff indicated that they required no extra time in Time 1, however this dropped to 0.0% in Time 2. Only 2.4% of staff in Hospital 6 indicated that they required no extra time to deliver care at Time 1, which increased to 14.3% at Time 2.

Staff were asked to rate the quality of care provided on their last shift on a 4-point scale ranging from “poor” to “excellent.” The majority of staff across all Emergency Departments rated the quality of care provided on their last shift as either “good” (Time 1: 43.7%, Time 2: 50.7%) or “fair” (Time 1: 39.3%, Time 2: 32.1%). While the majority of respondents reported ‘fair’ quality of care after ‘good’ quality of care, this decreased by 7.2% between Time points, and those who reported excellent quality of care doubled from 8.1% in Time 1 to 16.4% in Time 2. In Hospital 4, ratings of “good” quality of care increased by 15.2% from Time 1 to Time 2. A similar pattern is evident in respondents reporting “excellent” quality of care, with an increase of 3.2% evident between Time 1 and Time 2. Conversely, Hospital 5 reported decreased in ratings of “good” from Time 1 (48.8%) to Time 2 (39.5%). However, an 8.2% increase in ratings

of “excellent” was seen from Time 1 to Time 2. Hospital 6’s self-reported quality of care increased from Time 1 to Time 2, with the quality of care rated as “good” increasing by 13% and “excellent” increasing by 12.5%.

A single-item measure asked staff to give the Emergency Department in which they work an overall grade for patient safety on a 5-point scale ranging from “failing” to “excellent.” At Time 1, the majority of staff gave their Emergency Department a grade of “acceptable” (37.5%) for patient safety, which remained stable at Time 2 (36.1%). Combined, a total of 12.5% of staff grading their Emergency Department as either “very good” or “excellent” in its provision of patient safety during Time 1; this increased to 29.4% in Time 2. Each hospital showed an increase in “excellent” ratings of patient’s safety by at least 5% from Time 1 to Time 2 (Hospital 4=5%; Hospital 5=5.3%; Hospital 6=5.8%).

Staff were asked to reflect on the quality of patient care provided in the last 6 months in their department and state on a scale whether it had “deteriorated,” “remained the same,” or “improved”. At Time 1, 45.5% of staff stated that the quality of care provided in their Emergency Department “remained the same” which decreased slightly to 40.9% in Time 2. While 50.0% of staff indicated that quality of care provided had “deteriorated” in Time 1, there was a shift in Time 2 to 40.2% (compared to 4.5% in Time 1) of staff stating that the quality of care had “improved” in the last 6 months, and 18.2% stating that care had “deteriorated”. While each hospital showed a substantial increase in “improved” ratings of quality of care over the last 6 months, Hospital 4 had the largest increase from 4.1% in Time 1 to 48.9% in Time 2. This is followed closely by Hospital 6 (Time 1=4.8%; Time 2=42.0%), and finally Hospital 5 (Time 1=4.8%; Time 2=27.0%)

Table: 4.4.4.1: Quality of care

Quality of care, n (%)	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n=47)	Time 1 (n = 43)	Time 2 (n=38)	Time 1 (n = 43)	Time 2 (n=50)	Time 1 (n = 135)	Time 2 (n = 135)
Time available to deliver care								
Less time than usual	18 (35.3)	10 (21.7)	22 (51.2)	14 (36.8)	21 (50.0)	15 (30.0)	60 (44.4)	39 (29.1)
Same amount of time	24 (47.1)	28 (60.9)	17 (39.5)	22 (57.9)	17 (40.5)	30 (60.0)	58 (43.0)	80 (59.7)
More time than usual	9 (17.6)	8 (17.4)	4 (9.3)	2 (5.3)	4 (9.5)	5 (10.0)	17 (12.6)	15 (11.2)
Additional time needed								
No more time needed	3 (5.9)	5 (11.1)	3 (7.1)	0 (0.0)	1 (2.4)	7 (14.3)	7 (5.2)	12 (9.1)
Less than 15 minutes	11 (21.6)	9 (20.0)	4 (9.5)	8 (21.1)	2 (4.9)	4 (8.2)	17 (12.7)	21 (15.9)
15 to 30 minutes	24 (4.1)	22 (48.9)	20 (47.6)	20 (52.6)	15(36.6)	16 (32.7)	59 (44.0)	58 (43.9)
31 to 45 minutes	5 (9.8)	5 (11.1)	5 (11.9)	3 (7.9)	12 (29.3)	10 (20.4)	22 (16.4)	18 (13.6)
46 to 60 minutes	2 (3.9)	1 (2.2)	6 (14.3)	4 (10.5)	5 (12.2)	5 (10.2)	13 (9.7)	10 (7.6)
Greater than 60 minutes	6 (11.8)	3 (6.7)	4 (9.5)	3 (7.9)	6 (14.6)	7 (14.3)	16 (11.9)	13 (9.8)
Quality of care								
Poor	5 (10.0)	0 (0.0)	3 (7.0)	1 (2.6)	4 (9.5)	1 (2.0)	12 (8.9)	2 (1.5)
Fair	14 (28.0)	9 (19.6)	18 (41.9)	18 (47.4)	21 (50.0)	16 (32.0)	53 (39.3)	43 (32.1)
Good	25 (50.0)	30 (65.2)	21 (48.8)	15 (39.5)	13 (31.0)	22 (44.0)	59 (43.7)	67 (50.0)
Excellent	6 (12.0)	7 (15.2)	1 (2.3)	4 (10.5)	4 (9.5)	11 (22.0)	11 (8.1)	22 (16.4)
Grade of patient safety								
Failing	15 (29.4)	1 (2.2)	9 (20.9)	8 (21.1)	11 (26.2)	0 (0.0)	35 (25.7)	9 (6.8)
Poor	11 (21.6)	12(26.1)	10 (23.3)	11 (28.9)	12 (28.6)	14 (28.6)	33 (24.3)	37 (27.8)
Acceptable	18 (35.3)	14 (30.4)	19 (44.2)	13 (34.2)	14 (33.3)	21 (42.9)	51 (37.5)	48 (36.1)
Very good	4 (7.8)	14 (30.4)	5 (11.6)	4 (10.5)	4 (9.5)	10 (20.4)	13 (9.6)	28 (21.1)
Excellent	3 (5.9)	5 (10.9)	0 (0.0)	2 (5.3)	1 (2.4)	4 (8.2)	4 (2.9)	11 (8.3)
Quality of care, last 6 months								
Deteriorated	23 (46.9)	8 (17.8)	22 (52.4)	11 (29.7)	21 (51.2)	6 (12.0)	66 (50.0)	25 (18.9)
Remained the same	24 (49.0)	15 (33.3)	18 (42.9)	16 (43.2)	18 (43.9)	23 (46.0)	60 (45.5)	54 (40.9)
Improved	2 (4.1)	22 (48.9)	2 (4.8)	10 (27.0)	2 (4.9)	21 (42.0)	6 (4.5)	53 (40.2)

4.4.5 Care Left Undone and Delayed

The data reported on care left undone events (CLUEs) and care delayed (CD) are derived from respondents with registered nurse qualification only (including CNMs) as many of these tasks are specific to the RN role. Nurses were asked to identify care activities which had been necessary but left undone and/or delayed on their most recent shift due to lack of time.

The mean number of items of care left undone and the number of shifts where at least one item of care was left undone is reported in Table 4.4.5.1 at a total level and across each separate Emergency Department. Baseline measurements showed 78.8% of nurses reported that at least one item of care was left undone in Time 1 and 72.5% in Time 2 due to a lack of time during their last shift. Overall, baseline measurements revealed that, in Time 1 an average of 3.32 necessary care activities were left undone per shift due to a lack of time to complete these tasks, whereas Time 2 reported, on average, 2.76 activities left undone. The number of items of care left undone in Hospitals 5 (2.75 to 2.78) remained relatively unchanged between Time 1 and 2. Hospital 6 had a slight decrease from 3.05 to 2.80. Hospital 4 had the greatest change in activities left undone between the two time points, showing a decrease from 4.05 in Time 1 to 2.68 in Time 2.

The mean number of necessary care activities which were delayed per shift and the number of shifts where at least one care activity was delayed are displayed in Table 3.4.5.1. In Time 1, 94.2% of nurses reported that the provision of at least one item of necessary care was delayed during their last shift. This decreased to 89.2% of nurses reporting at least one item of care delayed in Time 2. Baseline reports by nurses revealed that in Time 1, on average, a total of 9.95 care tasks per shift were delayed which decreased to 7.32 in Time 2. During Time 1, Hospital 5 reported 10.67 items of Care Delayed which reduced to 9.28 in Time 2. Hospital 6 showed a larger decrease in items delayed, dropping from 9.58 items in Time 1 to 6.94 in Time 2. Hospital 4 had the largest change, showing a decrease from 9.66 activities delayed in Time 1 to 6.24 in Time 2.

A single item also assessed if staff meal breaks had been missed or delayed due to lack of time (Table 4.4.5.2). In Time 1, the majority of staff reported having missed or delayed meal breaks on their most recent shift (40.7% and 36.6% respectively). While the percentage of staff reporting missed meal break decreased in Time 2 (21.8%), the percentage of staff that reported having a delayed meal break increased (47.1%). A small proportion (Time 1 = 8.1%, Time 2 = 6.7%) reported that they had both a missed and a delayed meal break. In Time 1, 14.6% reported neither a missed nor delayed meal break on their last shift, which increased to 24.4% in Time 2. Hospital 4 and 6 showed an increase in staff reporting neither missed nor delayed breaks (H4: 6.7% to 18.4%; H6: 5.0% to 32.6%), with hospital 6 showing the largest change of a 27.6% increase between the two time points. Hospital 5 showed a decrease in staff reporting neither missed or delayed meal breaks from Time 1 (34.2%) to Time 2 (20.2%).

Across all Emergency Departments, the items of care most frequently reported as left undone in Time 1 were educating patients and their families (51.7%), oral hygiene care (51.6%), and engaging in comfort talk with patients and/or their families (42.5%).

Similarly, educating patients and/or their families (45.8%), oral hygiene (42.5%), and comfort talk with patients and/or their families (42.5%) were reported as activities most frequently left undone in Time 2. The items of care reported as least frequently left undone across all three Emergency Departments for Time 1 were the provision of medications on time (4.2%), pain management (3.3%) and the monitoring of deteriorating patients (5.8%). Pain management (0.8%), administration of patient medications on time (1.7%), and observation of vital signs (4.2%) were the least reported as left undone for Time 2. See Tables 4.4.5.3 and 4.4.5.4 for frequencies of Care Left Undone and Care Delayed.

Table: 4.4.5.1: Care left undone and care delayed overall total

Missed Care	Hospital 4		Hospital 5		Hospital 6		Total	
RN responses only	Time 1 (n = 44)	Time 2 (n = 47)	Time 1 (n = 37)	Time 2 (n = 38)	Time 1 (n = 39)	Time 2 (n = 50)	Time 1 (n = 135)	Time 2 (n = 135)
Number of activities undone, mean (SD)	4.05 (3.06)	2.68 (3.28)	2.75 (3.48)	2.78 (2.75)	3.05 (2.48)	2.80 (2.66)	3.32 (3.05)	2.76 (2.87)
Shifts with at least one item undone, n (%)	38 (88.4)	27 (71.1)	22 (61.1)	27 (75.0)	33 (84.6)	33 (71.7)	93 (78.8)	87 (72.5)
Number of activities delayed, mean (SD)	9.66 (4.18)	6.24 (4.25)	10.67 (5.01)	9.28 (4.86)	9.58 (3.76)	6.72 (4.17)	9.95 (4.32)	7.32 (4.54)
Shifts with at least one item delayed, n (%)	42 (95.5)	32 (84.2)	33 (89.2)	34 (94.4)	38 (97.4)	41 (89.1)	113 (94.2)	107 (89.2)

Table 4.4.5.2: Missed and/or Delayed meal breaks

Meal Breaks	Hospital 4		Hospital 5		Hospital 6		Total	
RN responses only	Time 1 (n = 44)	Time 2 (n = 47)	Time 1 (n = 37)	Time 2 (n = 38)	Time 1 (n = 39)	Time 2 (n = 50)	Time 1 (n = 135)	Time 2 (n = 135)
Meal break missed, n (%)	21 (46.7)	11 (28.9)	14 (36.8)	8 (22.9)	15 (37.5)	7 (15.2)	50 (40.7)	26 (21.8)
Meal break delayed, n (%)	11 (24.4)	17 (44.7)	11 (28.9)	18 (51.4)	23 (57.5)	21 (45.7)	45 (36.6)	56 (47.1)
Missed and Delayed, n (%)	10 (22.2)	3 (7.9)	0 (0.0)	2 (5.7)	0 (0.0)	3 (6.5)	10 (8.1)	8 (6.7)
Neither missed or delayed, n (%)	3 (6.7)	7 (18.4)	13 (34.2)	7 (20.2)	2 (5.0)	15 (32.6)	18 (14.6)	29 (24.4)

In Hospital 4, the activities with most frequently left undone was educating patients and/or families, oral hygiene, and adequate monitoring/ recording of nutritional/ hydration status in time 1. This varied only slightly in Time 2 with providing comfort/ talking with patients replacing adequate monitoring/ recording of nutritional/ hydration status as frequently left undone. Across Hospitals 5 and 6, the highest activities left undone were oral hygiene, educating patients and/or families and providing comfort/ talking with patients in Time 1 and Time 2 (see Table 4.4.5.3). There was very little change in frequency of care undone in these activities between the two phases. The largest increase in care left undone was reported in oral hygiene (Time 1 = 35.1%; Time 2 = 44.4%) and adequate patient surveillance (Time 1 = 16.2%; Time 2 = 25.0%) in hospital 5, and planning care (Time 1=20.5%; T2=27.7%) in Hospital 6. There was no substantial increase in care left undone for Hospital 4. In comparison, the activities with largest decrease in frequency left undone was oral hygiene (65.9% to 36.8%) and adequate monitoring/ recording of nutritional/ hydration status for hospital 4 (41.9% to 23.7%), preparing patients and families for discharge (24.3% to 13.9%) in Hospital 5, and providing comfort/ talking with patients in Hospital 6 (43.6% to 34.8%).

Unlike care delayed, there was not a substantial difference between the increase and decrease of care left undone to report a pattern in frequencies between Time 1 and Time 2 (see Table 3.4.5.3). However, it is worth noting the change of CLUEs in vital sign observations (Hospital 5 = 8.1% to 0.0%; Hospital 6 = 2.6% to 0.0), pain management (Hospital 5 = 2.7% to 0.0%; Hospital 6 = 0.0% to 0.0%), and administration of patients' medication (Hospital 5 = 2.7% to 0.0%; Hospital 6 = 2.6% to 0.0%) to a 0.0% frequency in Time 2 in both Hospital 5 and 6 (see Table 4.4.5.3).

Table 4.4.5.4 presents a breakdown of the frequency of care delayed per hospital. The activities with the highest delay rates in hospital for included vital signs observation (79.5%), administration of medication (72.5%), and adequate monitoring/ recording of nutritional/ hydration status (58.3%) in Time 1. Supporting patients with physical needs (65.8%), recording clinical practice/ developing and updating nursing care documentation (50.0%), and adequate patient surveillance (50.0%) had the highest delay rates for Time 2. Recording clinical practice/ developing and updating nursing care documentation (83.8%), monitoring of deteriorating patients (81.1%), and pain management (78.4%) were reported as activities with the highest delay rates in Hospital 5 during Time 1. For Time 2, recording clinical practice/ developing and updating nursing care documentation remained the highest for delay rates (77.8%) along with vital sign observations (77.8%), followed by supporting patients with physical needs (75.0%). Similarly, recording clinical practice/ developing and updating nursing care documentation had the highest delay rates in Hospital 6 for both Time 1 (82.1%) and Time 2 (78.3%), followed by vital signs observation (79.5%) and supporting patients with physical needs (76.9%) for Time 1, and Adequate monitoring/ recording of nutritional/ hydration status (74.2%) and supporting patients with physical needs (73.3%) for Time 2. In general, both hospitals reported an overall decrease in activities delayed between Time 1 and Time 2 (see Table 3.4.5.4). Hospital 6 reported no increase in delay of activities, and Hospital 5 only had a small increase in delay rates for vital sign observations (Time 1 = 75.1%; Time 2 = 77.8%) and discharge (Time 1 = 54.1%; Time 2 = 61.1%).

Table 4.4.5.3: Number and frequency of each item of care left undone in Times 1 and 2

Care Left Undone RN responses only	Hospital 4 Time 1 (n = 44)	Time 2 (n = 47)	Hospital 5 Time 1 (n = 37)	Time 2 (n = 38)	Hospital 6 Time 1 (n = 39)	Time 2 (n = 50)	Total Time 1 (n = 135)	Time 2 (n = 135)
Adequate patient surveillance	12 (27.3)	8 (21.1)	6 (16.2)	9 (25.0)	8 (20.5)	13 (27.7)	26 (21.7)	30 (24.8)
Adequate/ regular monitoring of deteriorating patients	3 (6.8)	3 (7.9)	2 (5.4)	2 (5.6)	2 (5.1)	1 (2.2)	7 (5.8)	6 (5.0)
Vital sign observations	4 (9.1)	5 (13.2)	3 (8.1)	0 (0.0)	1 (2.6)	0 (0.0)	8 (6.7)	5 (4.2)
Administration of patient medications on time	3 (6.8)	2 (5.3)	1 (2.7)	0 (0.0)	1 (2.6)	0 (0.0)	5 (4.2)	2 (1.7)
Supporting patients with physical needs	12 (27.3)	2 (5.3)	4 (10.8)	3 (8.3)	5 (12.8)	7 (15.2)	21 (17.5)	12 (10.0)
Recording clinical practice/ developing and updating nursing care documentation	9 (20.5)	5 (13.2)	3 (8.1)	2 (5.6)	4 (10.3)	2 (4.3)	16 (13.3)	9 (7.4)
Adequate monitoring/ recording of nutritional/ hydration status	18 (41.9)	9 (23.7)	9 (25.0)	10 (27.8)	9 (23.1)	11 (23.9)	36 (30.0)	30 (25.0)
Providing comfort/ talking with patients	18 (40.9)	16 (34.8)	15 (40.5)	19 (52.8)	18 (43.6)	16 (34.8)	51 (42.5)	51 (42.5)
Educating patients and/or families	26 (59.1)	16 (42.1)	17 (45.9)	17 (47.2)	19 (48.7)	22 (47.8)	62 (51.7)	55 (45.8)
Pain assessment	4 (9.1)	1 (2.6)	3 (8.1)	3 (8.3)	3 (7.7)	3 (6.5)	10 (8.3)	7 (5.8)
Pain management	3 (6.8)	1 (2.6)	1 (2.7)	0 (0.0)	0 (0)	0 (0.0)	4 (3.3)	1 (0.8)
Planning care	9 (20.5)	4 (11.1)	6 (16.2)	4 (11.1)	8 (20.5)	13 (27.7)	23 (19.2)	21 (17.4)
Preparing patients and families for discharge	14 (31.8)	7 (18.4)	9 (24.3)	5 (13.9)	12 (30.8)	12 (26.1)	35 (29.2)	24 (20.0)
Skin care and/or assessment of pressure ulcers	5 (11.4)	6 (12.8)	3 (8.1)	5 (13.9)	4 (10.3)	4 (8.7)	12 (10.0)	15 (12.5)
Undertaking procedures/ treatments e.g. wound care	6 (13.6)	3 (7.9)	5 (13.5)	5 (13.9)	4 (10.3)	4 (8.7)	15 (12.5)	12 (10.0)
Oral Hygiene	29 (65.9)	14 (36.8)	13 (35.1)	16 (44.4)	20 (51.3)	21 (45.7)	62 (51.6)	51 (42.5)

Table 4.4.5.4: Number and frequency of each item of care delayed in Times 1 and 2

Care Delayed RN responses only	Hospital 4 Time 1 (n = 44)	Time 2 (n = 47)	Hospital 5 Time 1 (n = 37)	Time 2 (n = 38)	Hospital 6 Time 1 (n = 39)	Time 2 (n = 50)	Total Time 1 (n = 135)	Time 2 (n = 135)
Adequate patient surveillance	28 (63.6)	19 (50.0)	28 (75.7)	22 (61.1)	22 (56.4)	21 (44.7)	78 (65.0)	62 (51.2)
Adequate/ regular monitoring of deteriorating patients	34 (77.3)	15 (39.5)	30 (81.1)	22 (61.1)	25 (64.1)	18 (39.1)	89 (74.2)	55 (45.8)
Vital sign observations	35 (79.5)	16 (42.1)	28 (75.7)	28 (77.8)	31 (79.5)	24 (52.2)	94 (78.3)	68 (56.7)
Administration of patient medications on time	34 (77.3)	17 (44.7)	28 (75.7)	25 (69.4)	25 (64.1)	19 (41.3)	87 (72.5)	61 (50.8)
Supporting patients with physical needs	30 (68.2)	25 (65.8)	28 (75.7)	27 (75.0)	30 (76.9)	28 (60.9)	88 (73.3)	80 (66.7)
Recording clinical practice/ developing and updating nursing care documentation	31 (70.5)	19 (50.0)	31 (83.8)	28 (77.8)	32 (82.1)	34 (72.3)	94 (78.3)	81 (66.9)
Adequate monitoring/ recording of nutritional/ hydration status	21 (47.7)	15 (39.5)	25 (67.6)	16 (44.4)	24 (61.5)	17 (37.0)	70 (58.3)	48 (40.0)
Providing comfort/ talking with patients	21 (47.7)	14 (36.8)	18 (48.6)	11 (30.6)	21 (53.8)	21 (45.7)	60 (50.0)	46 (38.3)
Educating patients and/or families	13 (29.5)	6 (15.8)	12 (32.4)	11 (30.6)	14 (35.9)	9 (19.6)	39 (32.5)	26 (21.7)
Pain assessment	30 (68.2)	14 (36.8)	23 (62.2)	20 (55.6)	24 (61.5)	17 (37.0)	77 (64.2)	51 (42.5)
Pain management	31 (70.5)	12 (31.6)	29 (78.4)	22 (61.1)	26 (66.7)	21 (45.7)	86 (71.7)	55 (45.8)
Planning care	26 (59.1)	12 (31.6)	23 (62.2)	22 (61.1)	19 (48.7)	13 (27.7)	68 (56.7)	47 (38.8)
Preparing patients and families for discharge	21 (47.7)	10 (26.3)	20 (54.1)	22 (61.1)	15 (38.5)	14 (30.4)	56 (46.7)	46 (38.3)
Skin care and/or assessment of pressure ulcers	33 (75.0)	16 (42.1)	27 (73.0)	21 (58.3)	27 (69.2)	21 (45.7)	87 (72.5)	58 (48.3)
Undertaking procedures/ treatments e.g. wound care	28 (63.6)	16 (42.1)	27 (73.0)	23 (63.9)	26 (66.7)	25 (54.3)	81 (67.5)	64 (53.3)
Oral Hygiene	9 (20.5)	11 (28.9)	18 (48.6)	12 (33.3)	10 (25.6)	10 (21.7)	37 (30.8)	33 (27.5)

4.4.6 Job Satisfaction and Intention to Leave

The respondents' level of job satisfaction by hospital, ranging from very dissatisfied to very satisfied is displayed in Table 4.4.6.1.

Overall job satisfaction increased from 54.4% of staff reporting being either satisfied or very satisfied with their current job in Time 1 to 80.0% in Time 2. Hospital 4 reported that 51% of staff in total were satisfied or very satisfied with their job in Time 1 which increased to 76.6% in Time 2; in addition, two-thirds of staff reported that they were satisfied with being a nurse in Time 1, which increased to 90.0% in Time 2. Hospital 5 reported that 59.6% of staff reported being satisfied or very satisfied with their current job in Time 1, which increased to 68.5% in Time 2. Staff who reported being satisfied or very satisfied with being a nurse remained relatively stable in Hospital 5 from Time 1 (74.4%) to Time 2 (75.3%). Hospital 6 had a substantial increase in staff who reported being satisfied or very satisfied from Time 1 (53.5%) to Time 2 (92.0%). In Time 1, 72.1% of staff reported being satisfied or very satisfied with being a nurse, which increased slightly to 78.0% in Time 2.

Time 2 saw an overall rise in staff recommending the department to a colleague from Time 1 (Time 1 = 53.7%; Time 2 = 76.2%). Likewise, the majority (Time 1 = 69.3%; Time 2 = 73.7%) of respondents would "definitely" or "probably" recommend their department to family or friends should they require hospital care, with a slight increase between Time 1 and Time 2, with the highest rates in Hospital 6 (94.0%), followed closely by Hospital 4 (93.1%). Hospital 6 reported a 17.7% increase in respondents who would recommend the department to family or friends from Time 1, and Hospital 4 presented an increase of 14.7% from Time 1 to Time 2. A high proportion of staff in Hospital 4 would recommend the unit to a colleague (Time 1=54.9%; Time 2=78.8%). In Hospital 5 at Time 1, 52.3 % of respondents would "not recommend" their hospital as a good place to work to a colleague, decreasing to 42.1% in Time 2. Under half of respondents from Hospital 6 (41.9%) would "definitely" or "probably not" recommend their workplace to a colleague, which reduced to 14.0% in Time 2.

Overall intention to leave remained relatively stable from Time 1 to Time 2. 53.3% of staff reported they would probably or definitely not leave in Time 1. In Time 2, 55.2% of staff reported they would probably or definitely not leave. Of the staff in Hospital 4, 50.9% stated that they intended to leave their job, with 39.2% of these indicating this was due to job dissatisfaction. There was a slight decrease in intention to leave in Time 2 (45.6%) however, 75% of respondents who had intended to leave indicated it was due to job dissatisfaction. The vast majority intended to stay within the nursing career when pursuing a new job in Time 1 and Time 2. In Time 1, just under half (44.2%) of respondents for Hospital 5 and 6 reported intention to "definitely" or "probably" leave in the future. Time 2 saw a reduction to 36.8% in staff's intention to leave in Hospital 5, while Hospital 6 increased to 50.0% of staff reporting that they "probably" or "definitely" would leave.

Table: 4.4.6.1: Job satisfaction and intention to leave overall total

	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 136)	Time 2 (n = 135)
Satisfaction with current job								
Very dissatisfied	6 (11.8)	1 (2.1)	5 (11.9)	2 (5.3)	5 (11.6)	0 (0.0)	16 (11.8)	3 (2.2)
Dissatisfied	19 (37.3)	10 (21.3)	12 (28.6)	10 (26.3)	15 (34.9)	4 (8.0)	46 (33.8)	24 (17.8)
Satisfied	23 (45.1)	29 (61.7)	23 (54.8)	21 (55.3)	20 (46.5)	38 (76.0)	66 (48.5)	88 (65.2)
Very satisfied	3 (5.9)	7 (14.9)	2 (4.8)	5 (13.2)	3 (7.0)	8 (16.0)	8 (5.9)	20 (14.8)
Satisfaction with being a nurse								
Very dissatisfied	1 (2.0)	0 (0.0)	4 (9.3)	3 (7.9)	2 (4.7)	1 (2.0)	7 (5.1)	4 (3.0)
Dissatisfied	15 (29.4)	5 (10.6)	7 (16.3)	6 (15.8)	3 (23.3)	10 (20.0)	32 (23.4)	21 (15.6)
Satisfied	17 (33.3)	24 (51.1)	21 (48.8)	23 (60.5)	5 (58.1)	30 (60.0)	64 (46.75)	77 (57.0)
Very satisfied	17 (33.3)	18 (38.3)	11 (25.6)	6 (15.8)	6 (14.0)	9 (18.0)	34 (24.8)	33 (24.4)
Recommend unit to colleague								
Definitely no	5 (9.8)	1 (2.1)	6 (7.1)	2 (5.3)	6 (14.0)	0 (0.0)	14 (10.3)	3 (2.2)
Probably no	18 (35.3)	9 (19.1)	19 (45.2)	14 (36.8)	12 (27.9)	7 (14.0)	49 (36.0)	30 (22.2)
Probably yes	23 (45.1)	24 (51.1)	17 (40.5)	19 (50.0)	20 (46.5)	28 (56.0)	60 (44.1)	71 (52.6)
Definitely yes	5 (9.8)	13 (27.7)	3 (7.1)	3 (7.9)	5 (11.6)	15 (30.0)	13 (9.6)	31 (23.0)
Recommend unit to family/friends								
Definitely no	1 (2.0)	1 (2.3)	4 (9.3)	3 (8.1)	1 (2.3)	0 (0.0)	6 (4.4)	4 (3.1)
Probably no	10 (19.6)	2 (4.5)	16 (37.2)	14 (37.8)	10 (23.3)	3 (6.0)	36 (26.3)	19 (14.5)
Probably yes	27 (52.9)	17 (38.6)	21 (48.8)	17 (45.9)	20 (46.5)	18 (36.0)	68 (49.6)	52 (38.7)
Definitely yes	13 (25.5)	24 (54.5)	2 (4.7)	3 (8.1)	12 (27.9)	29 (58.0)	27 (19.7)	56 (42.7)
Feelings about future in hospital								
Definitely will leave	4 (7.8)	7 (15.2)	3 (7.0)	1 (2.6)	2 (4.7)	2 (4.0)	9 (6.6)	10 (7.5)
Probably will leave	22 (43.1)	14 (30.4)	16 (37.2)	13 (34.2)	17 (39.5)	23 (46.0)	55 (40.1)	50 (37.3)
Probably will not leave	20 (39.2)	15 (32.6)	22 (51.2)	22 (57.9)	21 (48.8)	17 (34.0)	63 (46.0)	54 (40.3)
Definitely will not leave	5 (9.8)	10 (21.7)	2 (4.7)	2 (5.3)	3 (7.0)	8 (16.0)	10 (7.3)	20 (14.9)
Leaving due to job dissatisfaction	20 (39.2)	9 (75.0)	22 (51.2)	10 (52.6)	13 (30.2)	11 (84.6)	55 (40.1)	30 (68.2)
Leaving for								
Nursing in another hospital	12 (54.5)	7 (36.8)	11 (52.4)	11 (52.4)	14 (66.7)	13 (56.5)	37 (57.8)	31 (49.2)
Nursing, but not in a hospital	6 (27.3)	5 (26.3)	7 (33.3)	5 (23.8)	6 (28.6)	6 (26.1)	19 (29.7)	16 (25.4)
Non-Nursing	4 (18.2)	7 (36.8)	3 (14.3)	5 (23.8)	1 (4.8)	4 (17.4)	8 (12.5)	16 (25.4)

4.4.7 Burnout

The Maslach Burnout Inventory (MBI) (Maslach et al., 1996) was used to measure burnout in nursing staff. The MBI-Human Services Survey Medical Personnel (MBI-HSS MP) is composed of 22 items across three subscales: emotional exhaustion; depersonalisation; personal accomplishment. The emotional exhaustion subscale addresses feelings of being emotionally overextended by work. depersonalization subscale assesses an impersonal response to recipients of care and personal accomplishment subscale measures feelings of competence and achievement in one's work. Items are measured on a 7-point scale of 0 to 6 (never = 0, to everyday = 6, see Table 4.4.7.1). High scores in emotional exhaustion and depersonalisation and low scores in personal accomplishment indicate burnout. A full break down of hospital scores can be found in Table 4.4.7.2.

Overall, emotional exhaustion showed the greatest improvement from Time 1 to Time 2, decreasing from 3.31 to 2.95. Overall scores on depersonalisation also decreased (i.e. improved) at Time 2, while levels of personal accomplishment remaining relatively stable. At hospital level, Hospital 4 showed slightly high levels of emotional exhaustion in Time 1 (3.40), while depersonalisation had a lower score of 2.12 and personal accomplishment had a high score of 4.35. Scores slightly decreased at Time 2 with emotional exhaustion decreasing to 2.61, and depersonalisation to 1.52, while personal accomplishment remained largely unchanged (4.26). Hospital 5 slightly decreased on emotional exhaustion (3.02 in Time 1 to 2.96 in Time 2) but increased from 1.90 for depersonalisation in Time 1 to 2.27 in Time 2. while Hospital 6 showed largely unchanged scores for emotional exhaustions and a slight decrease of 0.32 for depersonalisation. Both Hospital 5 and 6 had scores of above 4.00 for personal accomplishment across both time points.

Table: 4.4.7.1: Maslach burnout inventory scale

0	1	2	3	4	5	6
Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Everyday

Table: 4.4.7.2: Maslach burnout inventory scores overall

	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 136)	Time 2 (n = 135)
Emotional Exhaustion	3.40 (1.58)	2.61 (1.32)	3.02 (1.21)	2.96 (1.27)	3.48 (1.31)	2.84 (1.18)	3.31 (1.34)	2.79 (1.25)
Depersonalisation	2.12 (1.44)	1.52 (1.18)	1.90 (1.29)	2.27 (1.35)	2.54 (1.37)	2.09 (1.30)	2.19 (1.39)	1.94 (1.30)
Personal Accomplishment	4.35 (1.04)	4.26 (0.89)	4.27 (0.96)	4.02 (1.09)	4.34 (1.04)	4.55 (0.88)	4.32 (1.01)	4.30 (0.97)

4.4.8 Prevalence of Violence and Aggression

The Conflict Tactics Scale is a 10-item scale developed by Straus (1979) and is most commonly used in family violence research. The scale has been adapted to suit the Emergency Department for the purpose of this study. Staff were asked to rate how often events occurred in the last three months, ranging from never to more than 10 times. The survey is divided into three subscales: physical, psychological and conflict. Table 4.4.8.1 displays the overall mistreatment experienced by staff, while Tables 4.4.8.2-4 show the breakdown of each subscale.

Overall, in Time 1, 76.5% of staff reported that they experienced a physical assault, 94.0% psychological/verbal mistreatment and 97.8% conflict with patients (conflict with family was removed for this analysis) over the last three months. Time 2 reported similar results with 74.2% of staff experienced physical assault, 93.3% experienced psychological/verbal mistreatment, and 94.7% experienced conflict with patients. In Time 1, the highest proportion for each mistreatment was experienced in Hospital 6 with a large majority reporting physical assault (83.3%), verbal mistreatments (97.6%) and conflict (100.0%). Hospital 6's prevalence for physical assault (78.0%), verbal mistreatment (90.0%) and conflict (96.0%) remained high at Time 2. Overall, Hospital 5 reported increases in physical assaults (78.6% to 81.1%) and verbal mistreatment (92.9% to 100.0%), with a slight decrease recorded in conflict (97.7% to 97.2%) from Time 1 to Time 2. Hospital 4 rates of physical assault and conflict decreased by 4.4% and 4.6% respectively, though verbal mistreatment remained largely consistent from Time 1 and Time 2.

The physical mistreatment of staff is displayed below in Table 4.4.8.2. Overall, in Time 1 more than half of respondents had a patient throw something at them (61.9%) and had been pushed, grabbed, shoved or pinched by a patient (60.4%) at least once; 53% of all respondents had also been slapped or hit at least once in the last 3 months. Furthermore, 45.5% of all respondents have been kicked or hit with their fist. Respondents for Time 2 reported a lower rate of physical mistreatment of staff, with 56.7% of respondents reported being pushed, grabbed, shoved or pinched by a patient, the same percentage report having something thrown at them, and 54.5% of all respondents have been slapped or hit at least once. Conversely, 49.2% reported being kicked which is an increase of 3.7% from Time 1.

The Psychological Prevalence of Violence and Aggression is reported in Table 4.4.8.3. In Time 1, 87.2% of respondents have been sworn at or insulted at least once in the last 3 months; 91.0% of respondents have been shouted at in anger; 66.4% of staff reported patients threatening to hit or throw something at them in the last 3 months. Respondents who reported being sworn at or insults at least once decreased to 86.6% in Time 2. There was a slight increase in respondents being shouted at in anger (92.5%) and threatened by patients (69.4%).

Table 4.4.8.4 illustrates the level of conflict experienced by respondents. Altogether, 97.8% of respondents experienced patients arguing with them about waiting to be seen in Time 1. There was a slight decrease in respondents experiencing patients arguing with them about waiting times (94.7%) in Time 2. Likewise, the majority (82.7%) of respondents reported patients' complaints about care they had received for

both Time 1 and Time 2 (Time 1=82.8%; Time 2=82.7%). Additionally, 83.6% of respondents in Time 1, and 80.6% of respondents in Time 2 reported experiencing conflict with patient's visitors at least once in the last 3 months.

Table: 4.4.8.1 Overall Mistreatment Experienced by staff

Overall	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 134)	Time 2 (n = 135)
Physical assault	33 (68.8)	29 (64.4)	33 (78.6)	30 (81.1)	35 (83.3)	39 (78.0)	101 (76.5)	98 (74.2)
Verbal mistreatment	45 (91.8)	42 (91.3)	39 (92.9)	38 (100.0)	41 (97.6)	45 (90.0)	125 (94.0)	125 (93.3)
Conflict	47 (95.9)	42 (91.3)	42 (97.7)	35 (97.2)	42 (100.0)	48 (96.0)	131 (97.8)	125 (94.7)

Table 4.4.8.2 Physical Prevalence of Violence and Aggression

Physical	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 134)	Time 2 (n = 135)
Patient thrown something at you								
Never	23 (46.9)	25 (54.3)	17 (39.5)	15 (39.5)	11 (26.2)	19 (38.0)	51 (38.1)	59 (44.0)
Once	11 (22.4)	9 (19.6)	14 (32.6)	8 (21.1)	10 (23.8)	7 (14.0)	35 (26.1)	24 (17.9)
2-10 times	12 (24.5)	9 (19.6)	12 (27.9)	14 (36.8)	18 (42.9)	22 (44.0)	42 (31.3)	45 (33.6)
>10 times	3 (6.1)	3 (6.5)	0 (0.0)	1 (2.6)	3 (7.1)	2 (4.0)	6 (4.5)	6 (4.5)
Patient slapped or hit you								
Never	23 (46.9)	23 (50.0)	19 (44.2)	14 (36.8)	21 (50.0)	24 (48.0)	63 (47.0)	61 (45.5)
Once	4 (8.2)	7 (15.2)	9 (20.9)	10 (26.3)	7 (16.7)	10 (20.0)	20 (14.9)	27 (20.1)
2-10 times	18 (36.7)	12 (26.1)	13 (30.2)	12 (31.6)	12 (28.6)	14 (28.0)	43 (32.1)	38 (28.4)
>10 times	4 (8.2)	4 (8.7)	2 (4.7)	2 (5.3)	2 (4.8)	2 (4.0)	8 (6.0)	8 (6.0)
Patient kicked you or hit you with their fist								
Never	29 (60.4)	26 (57.8)	21 (50.0)	13 (35.1)	22 (52.4)	28 (56.0)	72 (54.5)	67 (50.8)
Once	6 (12.5)	10 (22.2)	10 (23.8)	13 (35.1)	7 (16.7)	8 (16.0)	23 (17.4)	31 (23.5)
2-10 times	10 (20.8)	7 (15.6)	11 (26.2)	9 (24.3)	12 (28.6)	13 (26.0)	33 (25.0)	29 (22.0)
>10 times	3 (6.3)	2 (4.4)	0 (0.0)	2 (5.4)	1 (2.4)	1 (2.0)	4 (3.0)	5 (3.8)
Patient pushed, grabbed, shoved or pinched you								
Never	23 (46.9)	21 (45.7)	15 (34.9)	16 (42.1)	15 (35.7)	21 (42.0)	53 (39.6)	58 (43.3)
Once	8 (16.3)	7 (15.2)	10 (23.3)	7 (18.4)	8 (19.0)	7 (14.0)	26 (19.4)	21 (15.7)
2-10 times	14 (28.6)	13 (28.3)	14 (32.6)	11 (28.9)	16 (38.1)	16 (32.0)	44 (32.8)	40 (29.9)
>10 times	4 (8.2)	5 (10.9)	4 (9.3)	4 (10.5)	3 (7.1)	6 (12.0)	11 (8.2)	15 (11.2)

Table 4.4.8.3 Psychological Prevalence of Violence and Aggression

Psychological/ Verbal	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 134)	Time 2 (n = 135)
Patient insulted or sworn at you								
Never	8 (16.3)	11 (23.9)	5 (11.6)	0 (0.0)	4 (9.5)	7 (14.0)	17 (12.7)	18 (13.4)
Once	7 (14.3)	7 (15.2)	8 (18.6)	6 (15.8)	3 (7.1)	2 (4.0)	18 (13.4)	15 (11.2)
2-10 times	19 (38.8)	17 (37.0)	19 (44.2)	20 (52.6)	6 (14.3)	13 (26.0)	44 (32.8)	50 (37.3)
>10 times	15 (30.6)	11 (23.9)	11 (25.6)	12 (31.6)	29 (69.0)	28 (56.0)	55 (41.0)	51 (38.1)
Patient shouted at you in anger								
Never	6 (12.2)	4 (8.7)	5 (11.9)	0 (0.0)	1 (2.4)	6 (12.0)	12 (9.0)	10 (7.5)
Once	11 (22.4)	7 (15.2)	6 (14.3)	5 (13.2)	5 (11.9)	4 (8.0)	22 (16.5)	16 (11.9)
2-10 times	13 (26.5)	25 (54.3)	19 (45.2)	22 (57.9)	6 (14.3)	11 (22.0)	38 (28.6)	58 (43.3)
>10 times	19 (38.8)	10 (21.7)	12 (28.6)	11 (28.9)	30 (71.4)	29 (58.0)	61 (45.9)	50 (37.3)
Patient threatened to hit or throw something at you								
Never	19 (38.8)	17 (37.0)	16 (37.2)	10 (26.3)	10 (23.8)	14 (28.0)	45 (33.6)	41 (30.6)
Once	9 (18.4)	11 (23.9)	6 (14.0)	12 (31.6)	3 (7.1)	4 (8.0)	18 (13.4)	27 (20.1)
2-10 times	13 (26.5)	9 (19.6)	15 (34.9)	9 (23.7)	11 (26.2)	16 (32.0)	39 (29.1)	34 (25.4)
>10 times	8 (16.3)	9 (19.6)	6 (14.0)	7 (18.4)	18 (42.9)	16 (32.0)	32 (23.9)	32 (23.9)

Table 4.4.8.4 Conflict Reported within Prevalence of Violence and Aggression

Conflict	Hospital 4		Hospital 5		Hospital 6		Total	
	Time 1 (n = 50)	Time 2 (n = 47)	Time 1 (n = 43)	Time 2 (n = 38)	Time 1 (n = 43)	Time 2 (n = 50)	Time 1 (n = 134)	Time 2 (n = 135)
Patient argued with you about waiting to be seen								
Never	2 (4.1)	4 (8.7)	1 (2.3)	1 (2.7)	0 (0.0)	2 (4.0)	3 (2.2)	7 (5.3)
Once	4 (8.2)	4 (8.7)	4 (9.3)	1 (2.7)	0 (0.0)	2 (4.0)	8 (6.0)	7 (5.3)
2-10 times	11 (22.4)	16 (34.8)	11 (25.6)	13 (35.1)	6 (14.3)	13 (26.0)	28 (20.9)	42 (31.6)
>10 times	32 (65.3)	22 (47.8)	27 (62.8)	22 (59.5)	36 (85.7)	33 (66.0)	95 (70.9)	77 (57.9)
Patient complained to you about their care								
Never	8 (16.3)	14 (30.4)	11 (25.6)	3 (8.1)	4 (9.5)	6 (12.0)	23 (17.2)	23 (17.3)
Once	12 (24.5)	6 (13.0)	5 (11.6)	5 (13.5)	2 (4.8)	5 (10.0)	19 (14.1)	16 (12.0)
2-10 times	9 (18.4)	19 (41.3)	13 (30.2)	14 (37.8)	11 (26.2)	18 (36.0)	33 (24.6)	51 (38.3)
>10 times	20 (40.8)	7 (15.2)	14 (32.6)	15 (40.5)	25 (59.5)	21 (42.0)	59 (44.0)	43 (32.2)
Experienced conflict with a patient's visitor								
Never	9 (18.4)	12 (26.1)	10 (23.3)	5 (13.2)	3 (7.1)	9 (18.0)	22 (16.4)	26 (19.4)
Once	4 (8.2)	8 (17.4)	5 (11.6)	4 (10.5)	2 (4.8)	6 (12.0)	11 (8.2)	18 (13.4)
2-10 times	16 (32.7)	18 (39.1)	12 (27.9)	16 (42.1)	14 (33.3)	11 (22.0)	42 (31.3)	45 (33.6)
>10 times	20 (40.8)	8 (17.4)	16 (37.2)	13 (34.2)	23 (54.8)	24 (48.0)	59 (44.0)	45 (33.6)

4.4.9 Conclusion

The profile of the respondents in each hospital was relatively similar. While self-report of nurse to patient ratios were obtained, these are based on how many patients an individual was caring for rather than how many the entire team were caring for. This is due to the issue of the ever-changing patient flow in ED and the difficulty around staff members being aware of this figure. However, the results are indicating some changes in the ratios following the introduction of the recommendations. Hospital 4 reported decreased ratios at Time 2, with Hospital 6 in particular showing a decrease in nurse-to-patient ratio for RNs only on day and night shifts

The results from the NWI are indicating some upwards trends in all four subscales. Both Hospital 4 and 6 showed increases on the subscales with Hospital 5 remaining relatively stable across the two time periods. In particular, Hospital 6 showed a substantial increase on scores of Staffing and Resource Adequacy following the introduction of the recommendations.

At hospital level, it is clear that Time 2 has substantially better ratings on quality of care, patient safety and quality of care over the last 6 months. However, this did not translate into fewer items of care being left undone or delayed with over 85% of shifts in both times having at least one item of care left undone and almost 90% for care delayed. However, the average number of care items left undone fell from Time to Time 2. The number of items delayed remained higher than undone but showed a slight reduction from Time 1 to Time 2. Missed and/or delayed meal breaks were showing improvements from Time 1 to Time 2.

Job dissatisfaction was relatively high in Time 1 although substantial improvements were apparent in job satisfaction in Time 2 and the vast majority of staff were satisfied with the profession in general in both time-points. However, despite these improvements in job satisfaction, a large proportion stating that they intended to leave their job due to job dissatisfaction. Staff reported relatively high levels of emotional exhaustion in Time 1, which are beginning to improve in Time 2. Low levels of depersonalization were seen in Time 2; however these scores increased in Hospital 5 but showed a slight decrease in Hospitals 4 and 6. However, the personal accomplishment scores remained relatively high indicating that staff take pride in their work.

High levels of physical, psychological, and verbal violence and aggression, along with similarly high levels of conflict, were experienced by the staff over the last 3 months in their work in both Time 1 and 2 with little change seen. Staff highlighted a number of issues in their qualitative comments including, the challenges of their environment, staffing and skill-mix, support and teamwork, workload, quality of care and missed care, and the fact that they are burned out and stressed. These issues were prevalent in both Time 1 and 2

Overall, the staff data indicate a number of issues in Time 1, most of which can be related to staffing resources and availability of time, however many of these outcomes improved or were improving during Time 2. However, data was collected during the

Covid-19 pandemic which changed the typical ED environment. As such, these results may not be entirely reflective of staffing in the EDs.

4.5 Cross-sectional patient experience

Data on patient experience in the Emergency Departments were extracted from the HIQA annual patient experience survey[5]. The survey includes categorical questions but have been converted to scores of 0-10 with higher scores indicating a more favourable outcome. Data from 2020 was not collected due to the Covid-19 outbreak.

Two questions in the survey address communication: one on receiving understandable answers and a second on understandable explanations on condition and treatment. For answering questions clearly in the EDs, Hospital 4 and 6 scored above the National average with Hospital 4 increasing slightly from 2018 to 2019, while Hospital 6 remained at the same score. Hospital 5 had a score on answering questions below the National average, which dropped by 0.4 points in 2019. For explanations, Hospital 6 had a high score above the National average in 2018 and remained at that in 2019. Hospital 4 had the same score as the National average on explanations in 2018 and rose to 7.7 point in 2019. In 2018, Hospital 5 was on par with the National average for communication but dropped to 6.9 and below the National average in 2019.

Hospital 6 had scores above the National average on privacy for both 2018 and 2019. Hospital 5 was above average for 2018 but dropped below for 2019 while Hospital 4 was below average for both 2018 and 2019. Hospital 6 had high scores above the National average for patients feeling treated with respect and dignity while Hospitals 4 and 5 were at the National average for 2018 and both slightly below the average for 2019 (Table 4.5.1).

Hospital 5 scored favourably for waiting times for admission in 2018 which dropped by 0.9 points in 2019 and below the National average. Both Hospital 4 and Hospital 6 remained below the National average both years for waiting time to be admitted.

In conclusion, each of the Hospitals received below average ratings for waiting time for admission; however, waiting times for admission is a process which cannot be controlled for in the EDs. Hospital 6 received favourable ratings from patients on all other aspects of the survey. Hospital 4 saw improvement on communication from 2018 to 2019 however, Hospital 4 could target areas of privacy and respect for their patients. All of Hospital 5's scores dropped from 2018 to 2019 to below the National average indicating that staff should address communication, privacy and respect of patients. While data is not available for 2020, when collected and published it will be interesting to examine any changes in these scores following implementation of the Framework.

[5] Source of data: https://public.tableau.com/profile/ncepireland#!/vizhome/StagesofCareFINAL_15743337199370/StagesofCare

Table 4.5.1: Patient experience in the Emergency Departments in 2018 and 2019

	Hospital 4		Hospital 5		Hospital 6		National comparison	
Response rate	2018 n = 846 (51%)	2019 n = 803 (49%)	2018 n = 246 (46%)	2019 n = 184 (42%)	2018 n = 662 (47%)	2019 n = 546 (42%)	2018 n = 13404 (50%)	2019 n = 12343 (46%)
When you had important questions to ask the doctors and nurses in the Emergency Department, did you get answers that you could understand?	8.3	8.4	8.0	7.6	8.4	8.4	8.2	8.2
While you were in the Emergency Department, did a doctor or nurse explain your condition and treatment in a way you could understand?	7.5	7.7	7.5	6.9	7.9	7.9	7.5	7.6
Were you given enough privacy when being examined or treated in the Emergency Department?	7.4	7.6	8.1	7.2	8.4	8.6	7.9	8.0
Overall, did you feel you were treated with respect and dignity while you were in the Emergency Department?	8.8	8.8	8.8	8.7	9.2	9.2	8.8	8.9
Following arrival at the hospital, how long did you wait before being admitted to a ward?	6.3	6.3	7.5	6.6	6.6	6.7	7.0	6.8

4.6 Summary of Results

Staffing and skill-mix adjustments were made in the three EDs and one IU involved in the study based on the Nursing Hours per Patient Presentation model. This approach in that it based the staffing requirement on routinely collected data in each of the settings. The impact of these adjustments, which were made in late 2019, are starting to show a decline in agency use towards the latter part of data collection; however, due to the Covid-19 pandemic, further data on this outcome is required.

Administrative data was used to identify associations between staffing levels at two time points; Time 1 (prior to any staff changes been made) and Time 2 (following adjustments to staffing levels). These included time to triage and patients leaving without being seen.

Time to triage remained stable in two hospitals that required relatively modest changes to staffing whereas the hospital with the greatest level of staffing uplift saw an improvement in time to triage at Time 2; this was as a result of the number of staff being deployed to this section of the ED.

One key indicator of safe staffing in ED is the proportion of patients who leave without been seen. All three EDs saw a decline in the proportion of patients who LWBS following the changes to staffing in the EDs in Time 2; the greatest reduction was in Hospital 6 which saw a reduction from 21.2% in Time 1 to 17.6% in Time 2.

The vast majority of staff outcome measures improved from Time 1 to Time 2. Staff to patient ratios decreased from an average of 14.87 patients per shift in Time 1 to 11.27 patients in Time 2. There was also increases in staff perceptions of the staffing resource, time available to provide direct patient care, and quality of care delivered. The proportion of shifts with care left undone and items of care left undone fell from Time 1 to Time 2 with an associated fall in the number of staff who reported that they missed meal breaks due to workloads. Levels of job satisfaction also increased in Time 2 when compared to time 1 with an increase in staff reporting that they would recommend their unit to a colleague and to a member of their family.

Levels of emotional exhaustion also reduced from Time 1 to Time 2; this was particularly the case in Hospital 6.

In conclusion, the hospital with the greatest changes to staffing levels had the best outcomes. The workforce was stabilising, with reduced use of agency and better patient and staff outcomes. The hospitals with smaller changes showed some improvements or remained stable, despite an increase in patient presentations.

Section 5
Discussion, Conclusions

5.1 Introduction

This section outlines a number of conclusions from the research and highlights a number of recommendations for the programme of research in safe nurse staffing. The data presented identifies that nursing staff are working in EDs which have high levels of demand for ED care, with challenges in patients waiting to be see and waiting for decisions on being admitted or discharged.

5.2 Calculating Staffing

A number of approaches were used to determine safe staffing levels in ED in phase 1 of the research; these included prospective measures (BEST) and the use of triage levels in administrative data as well as nurse: patient ratios. There was great variability in the outcomes from the methods used with the primary complicating factor the length of stay of patients in the ED and the challenge of capturing changing complexity and dependency over a period of time. In addition, the EDs were crowded during the data collection process.

Each of the different staffing methods used indicated that Hospital 6 was understaffed based on patient dependency levels and length of stay, with patients in Hospital 6 having relatively high levels of dependency, greater acuity, longer PET times and a greater number of attendances than those of the other hospitals.

Hospital 7 (IU) did not require additional RNs; however, it did consistently identify that it required HCA support. This is discussed in Section 6 of the report.

The data from the administrative system was found to be more objective than that of the paper-based data collection method (BEST) in identifying staffing levels. Both BEST and NICE approaches rely on a very high capture rate of patients throughout their emergency department stay. There are logistical difficulties in applying these methods in practice and they require a high level of staffing resources during intensive data collection periods.

The other methods rely on administrative data and accuracy of administrative data; however, these are based on patients triage level on admission to the ED; due to the long ALOS, this may skew the data as the patients will become stable and thus no longer require high levels of nursing care. Additionally, two of the EDs in particular had a high number of patients with decision to admit but awaiting a bed; that is, boarded patients. It is recommended that these patients are staffed separately under the WRC 2016 agreement. Thus, they would no longer require care from the core ED staff; however, there is a need to accurately identify the “time a decision to admit” was made from the administrative data. This may lead to an overestimation in some of the systems used, as patients remain in the ED for a period of time beyond their immediate emergency needs. Therefore, based on the results from this study, it is recommended

that the Nursing Hours per Patient Presentation (NHpPP) approach is used to identify staffing levels in EDs in Ireland (see Appendix A for an example of the calculations required).

5.3 Administrative Data

The administrative/secondary data available at each site provided a comprehensive overview of the pilot units. It is apparent that outcomes associated with nurse staffing can be identified utilising the secondary data which provides a useful resource for measuring outcomes, particularly over a longitudinal period of time. Hospital administrative systems varied slightly in terms of the type of data collected by each site. For this reason, certain key criteria have been focused on for this report. In addition to this, the data presented here is representative of data collected from January 2018 to March 2020, including staff rosters, vacancies and agency use. The results presented here offer a key insight into emergency departments within the Irish context and have identified data that can be used to assess emergency department outcomes in relation to staffing over time.

Time to triage remained relatively unchanged in both Hospital 4 and 5, while Hospital 6 showed a decrease across the study period. Wait times to be seen remained relatively stable in Hospital 4 with both Hospitals 5 and 6 indicating a decrease in these times. PET increased across the study period in Hospital 4, dramatically decreased in Hospital 5, which needs to be treated with caution, and was beginning to stabilise in Hospital 6 in 2020 after an upward trajectory in 2019. However, positive trends were evident for LWBS with all three hospitals showing decreasing percentages of patients leaving without being seen over the three years.

In conclusion, the administrative data provided a comprehensive overview of the emergency departments within the three hospital sites. The administrative data collected by the hospitals is a useful resource in measuring outcomes, particularly over a longitudinal period of time. However, there is considerable variation between the three emergency departments in terms of geographical location, size, purpose, capacity, patients and staff, hence overall definitive generalisation cannot be assumed. Hospital administrative systems varied slightly in terms of the type of data collected by each site. For this reason, certain key criteria have been focused on for this report with other categories being combined to allow for comparisons. Additionally, while the data presented here is representative of a period in excess of two years, the staffing changes occurred towards the latter end of the study period. Therefore, the data should be interpreted with caution at this stage. Further examination of the data over an extended period of time would provide a greater depth and breadth of understanding of the data and the impact of staffing changes. Nonetheless, the results presented here offer some initial promising positive trends, providing key insights into emergency departments within the Irish context. The data also presents a viable means of assessing emergency department outcomes in relation to staffing over time, within a future context.

5.4 Staff Survey Results

Data was collected from staff (RNs and HCAs) at two time points: baseline and following adjustments to staffing. The survey completed by staff measured a number of areas including demographics, education level, the number of patients being cared for by staff, the working environment, quality of care, care left undone or delayed, job satisfaction and intention to stay/leave, burnout and the prevalence of violence and aggression.

The demographic profile of participants was similar at the two time points with the vast majority of nursing staff indicating that they had been educated to degree level; were female; engaged in full time contracts and had over 6 years' experience. There was an increase in the number of staff who stated that they had received a specialist qualification in emergency nursing. Additionally, 12-hour shifts were the most predominant working pattern of staff within the EDs who responded.

Following the implementation of the pilot Framework, it was identified that there was a decrease in the average numbers of patients cared for by staff in Time 2 when compared to Time 1; this decreased from 14.87 to 11.27. In addition, there was a fall in the maximum number of patients cared for over this time period.

Staff perceptions of the working environment was also measured over the two time points. All five domains of the Nursing Work Index saw improvements in the overall average scores from Time 1 to Time 2. This was particularly the case for Hospital 6 which recorded the largest adjustment in staffing; in particular, the subscale Staffing and Resource Adequacy showed the largest increase of 0.61 points from 1.65 in Time 1 to 2.26 in Time 2. It is notable that Hospital 6 demonstrated increases on all scales of the NWI.

The proportion of staff who reported that they had less time to deliver care also fell over the two time periods from approximately 44.4% in Time 1 to 29.1% in Time 2. In addition, overall there was an increase in the perception of the quality of care delivered to patients in ED following the implementation of the pilot *Framework*; respondents rating the grade of patient safety as either good or excellent increased from, 12.5% in Time 1 to 29.4% in Time 2. This was also identified in staff perceptions of the quality of care delivered over the last 6 months; 40.2% of staff stated the quality of care provided in their Emergency Department had "improved" in the last 6 months at Time 2. Both Hospitals 5 and 6 showed substantial increases in "improved" ratings of quality of care over the last 6 months.

There was a small decline in the proportion of shifts where items of care were left undone, with the average of 3.32 items of care left undone in Time 1 decreasing to an average of 2.76 activities left undone in Time 2. The proportion of shifts with care delayed also dropped slightly at Time 2, with the average number of care activities delayed also falling from Time 1 to Time 2. .

There was also a decrease in the proportion of staff who reported that they had missed a meal break over the two time periods; this decreased from 40.7% of staff in Time 1

to 21.8% of staff in Time 2. Hospital 6 reported the largest fall in the proportion of staff that reported meal breaks that were either missed or delayed.

Levels of job satisfaction increased across the two time periods with those respondents stating that they were satisfied increasing from 48.5% in Time 1 to 65.2% in Time 2 and staff indicating that they were very satisfied increasing from 5.9% in Time 1 to 14.8% in Time 2. Larger increases of satisfaction were noted in Hospital 6. There was also an increase in the proportion of respondents who would recommend their department to a colleague; while the proportion of staff indicating that they would definitely recommend the unit to family or friends increased substantially from 19.7% in Time 1 to 42.7% in Time 2.

Levels of emotional exhaustion, as measured by the Maslach Burnout Inventory reduced between the time periods, as did levels of depersonalisation, while personal accomplishment scores remained stable across time points. Hospital 6 reporting a substantial decrease in Emotional Exhaustion from 3.48 to 2.79.

There was little change in the extent to which staff experienced physical assault or psychological and verbal aggression over the two time periods, though overall scores in each subscale decreased slightly at Time 2 from baseline.

5.5 Conclusion

This is the first study in Ireland to examine nurse staffing and related outcomes in EDs. There are challenges in accurately identifying safe staffing levels; however, administrative data can be used in this regard. The administrative data collected identified variables that were used to measure the association between nurse staffing and patient outcomes such as leaving without been seen. The results identified a number of positive outcomes related to the introduction of the pilot Framework; however, there are challenges evident. These include the further stabilisation of the ED workforce overtime and the need to continue collecting data to measure the long-term impact of the introduction of the initiative.

Section 6
Results from the Injury Unit

6.1 Introduction

The Injury Unit (IU) was not a candidate for the NHPPP model as previously stated. However, from investigating the data from baseline it was apparent that the RNs in the IU were carrying out many non-nursing duties, such as cleaning, stocktaking, replenishing stocks, etc. Thus, an uplift of two WTE HCAs was identified to release nursing time from these non-nursing duties to facilitate them to provide direct patient care. These HCAs began in April 2020 and were immediately redeployed due to the Covid-19 pandemic. Once the HCAs were re-assigned back to the IU in August 2020 the research team were able to commence the data analysis for Time 2. However, it is of note that due to the HCAs not being in post for a substantive period of time, results should be interpreted with caution and future longitudinal analysis of the impact of the introduction of the HCAs would provide further in-depth analysis and breadth to the results.

6.2 Administrative Data

This section outlines the administrative data results to date from the injury unit pilot site. The results are outlined in a number of sections and provide an overview of the site. Data were collected from 1st January 2018 to 31st March 2020 inclusive.

The administrative system provided data in the following domains:

- Patient Demographics
- Patient Attendances
- Numbers Leaving Without Being Seen
- Numbers of Patients Admitted
- PET
- Time to Triage

6.2.1 Patient Demographics

Across the study period, 19,706 individual presentations were recorded in Hospital 7, the IU. This consisted of 8,721 presentations in 2018, 9,128 in 2019, and, up to and including 31st March, 1,857 in 2020. New attendances accounted for over 98% of presentations each year. As with the Emergency Departments, returns were broken down in terms of scheduled returns and other returns. A total of nine scheduled returns (patients who were logged as 'For Follow-up Appointment' on their previous visit and who returned within 42 days of their last ED discharge) were recorded across the entire study period. Other returns were again defined as returns which were not scheduled, and which occurred within 28 days of a patient's last discharge from the IU. Additionally, 121 (1.4%) other returns were recorded in 2018, 134 (1.5%) were recorded in 2019, and 35 (1.9%) in 2020. Over the entire study period, there was one instance of a patient, having been admitted on their last presentation, returning non-

scheduled within 28 days of their last ED discharge. Total returns were all re-attendances which occurred within 28 days of a patient's last discharge from the IU, accounting for less than 2% of presentations each year.

Slightly more males attended the IU each individual year (51.2%-52.4%), with 10,287 (52.2%) male patients attending over the study period, while 9,418 (47.8%) patients were female. There was one patient whose gender was unknown. The average age of patients was 37.10 across the study period, with ages ranging from less than one year to 101 years old. Looking at the subset of patients who were aged 75 years and older, the proportion of such patients remained generally consistent each year, accounting for 7.0% (n=609) of all presentations in 2018, 7.1% (n=645) in 2019, and 7.5% (n=139) in 2020.

The vast majority of patients in the IU were triage categories 'Standard' and 'Non-Urgent', which accounted for a combined percentage of 96.7% of presentations in 2018, 97.0% in 2019, and 97.4% in 2020. The proportion of patients who were triage category 'Standard' declined each year, decreasing from 87.7% of presentations in 2018, to 86.4% in 2019, and to 80.6% in 2020. Conversely, the proportion of patients who were triage category 'Non-Urgent' increased each year, rising from 9.1% in 2018, to 10.6% in 2019 and again to 16.7% in 2020. Patient demographics can be seen in Table 6.2.1 below.

Table 6.2.1: Demographic profile of patients attending Hospital 7

	Hospital 7		
	2018 (n = 8,721)	2019 (n = 9,128)	2020* (n = 1,857)
Age in Years, mean (SD)	36.87 (22.74)	36.96 (22.91)	38.87 (22.78)
Gender, n (%)			
Females	4,152 (47.6)	4,360 (47.8)	906 (48.8)
Males	4,569 (52.4)	4,768 (52.2)	950 (51.2)
Unknown	-	-	1 (0.1%)
Triage Category, n (%)			
Immediate	42 (0.5)	22 (0.2)	8 (0.4)
Very Urgent	22 (0.3)	33 (0.4)	6 (0.3)
Urgent	220 (2.5)	222 (2.4)	35 (1.9)
Standard	7,644 (87.7)	7,884 (86.4)	1,497 (80.6)
Non-Urgent	793 (9.1)	967 (10.6)	311 (16.7)
Aged ≥75 years, n (%)	609 (7.0)	645 (7.1)	139 (7.5)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020.

6.2.2 IU Patient Outcomes

Patient outcomes including waiting times, such as Time to Triage and Patient Experience Times (PET), as well as outcomes such as admission and leaving without

being seen are discussed in the section below for all patients and further or those aged over 75 years of age.

6.2.2.1 Waiting Times

Time to triage across each year is relatively short at 0.30 hours in 2018, 0.28 hours in 2019 and 0.31 hours in 2020. The average PET time in 2018 was 2.30 hours, dropping slightly to 2.26 hours in 2019 and further decreasing to 2.23 hours in 2020. A large proportion of patients (94.7%-95.3) across the three years had a PET time within 6 hours, while the majority had a PET time within 9 hours (97.6%-98.6%).

6.2.2.2 Outcomes following attendance

A small proportion of patients were admitted to hospital following their IU attendance, 0.6% in 2018, 0.5% in 2019 but rising to 0.9% in 2020. A slightly larger proportion of patients had to be transferred to another hospital following their IU attendance, 7.3% in 2018, 6.5% in 2019 and 6.8% in 2020.

Leaving without being seen (LWBS) is an all-encompassing term to account for patients who self-discharged against medical advice, left the department before treatment completion or left the department prior to treatment commencement. The percentage of patients LWBS was small across each year of the project, 1.1% in 2018, 0.5% in 2019 and 0.4% in 2020.

Table 6.2.2: Patient outcomes in Hospital 7

	Hospital 7		
	2018	2019	2020*
	(n = 8,721)	(n = 9,128)	(n = 1,857)
Time to Triage (hours)	0.30 (0.28)	0.28 (0.42)	0.31 (1.00)
PET (hours)	2.30 (2.88)	2.26 (2.90)	2.23 (3.19)
PET <6 hours, n (%)	8,314 (95.3)	8,643 (94.7)	1,759 (94.7)
PET <9 hours, n (%)	8,595 (98.6)	8,909 (97.6)	1,828 (98.4)
Admitted to hospital, n (%)	55 (0.6)	49 (0.5)	16 (0.9)
Transferred, n (%)	639 (7.3)	590 (6.5)	127 (6.8)
LWBS, n (%)	93 (1.1)	44 (0.5)	8 (0.4)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020.

6.2.2.3 Waiting Times for patients aged 75 years and over

Time to Triage was for patient over 75 years of age was relatively similar all patients, 0.32 in 2018, 0.29 in 2019 and 0.26 in 2020. PET for patients over 75 years decreased across the three data collection times, from 2.59 hours in 2018, to 2.24 hours in 2019 and further decreased to 1.93 hours in 2020. In 2018, 93.9% of patients over 75 years had a PET within 6 hours, rising to 95.3% in 2019 and further to 98.6% in 2020. In

total, 97.9% of patient had a PET within 9 hours in 2018, compared to 98.3% in 2019 and 100.0% in 2020.

6.2.2.4 Outcomes following attendance for patients aged 75 years and over

A slightly larger proportion of patients aged 75 years plus were admitted or transferred to hospital compared to all patients above. Admissions accounted for 1.1% in 2018, 1.9% in 2019 and 2.9% in 2020. Transfers to other hospitals made up 12.3% in 2018, 10.5% in 2019 and 11.5% in 2020 of attendees aged 75 years and over. Small proportions of patients aged over 75 years LWBS, 0.8% in 2018, 0.5% in 2019 and 0.7% in 2020.

Table 6.2.3: Patient outcomes for those aged 75 years and over Hospital 7

	Hospital 7		
	2018 (n = 609)	2019 (n = 645)	2020* (n = 139)
Time to Triage (hours)	0.32 (0.34)	0.29 (0.23)	0.26 (0.26)
PET (hours)	2.59 (3.21)	2.24 (2.41)	1.93 (1.37)
PET <6 hours, n (%)	572 (93.9)	615 (95.3)	137 (98.6)
PET <9 hours, n (%)	596 (97.9)	634 (98.3)	139 (100.0)
Admitted to hospital, n (%)	7 (1.1%)	12 (1.9%)	4 (2.9)
Transferred, n (%)	75 (12.3)	68 (10.5)	16 (11.5)
LWBS, n (%)	5 (0.8)	3 (0.5)	1 (0.7)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020.

6.2.3 Conclusion

Overall, the IU has good patient outcomes regardless of the overall population or those over the age of 75. The average time to triage is approximately half an hour while the average PET is just under two and a half hours. Over 94% of all patients across each year had treatment completion and discharge, admission or transfer within six hours, while over 97% of patient had this within nine hours. Small number of patients are admitted or transferred to another hospital with the vast majority completing their treatment in the IU and less than 1.0% overall left without being seen.

6.3 Cross-sectional Staff Survey

Cross-sectional data for the IU was collected at two time points, in October 2018 (Time 1) and again in late August early September 2020 (Time 2) (following the introduction of extra HCAs). Note there was a delay in the collection of data for Time 2 due Covid-19 and the redeployment of staff within the healthcare infrastructure. Data was collected under the domains of demographics, nurse-to-patient ratios, the nursing environment, quality of care, care left undone/delayed, job satisfaction, burnout and

the prevalence of violence and aggression. The response rate for both Time 1 and Time 2 were high at 76.7% and 80.8%, respectively.

6.3.1 Demographics and Education

The demographic profile of the respondents is outlined in Table 6.3.1.1. At Time 1, the majority of respondents were RN grade (94.1%), with CNM comprising of 1% of the staff cohort. At Time 2, RNs comprised of 71.4% of respondents, CNMs 19% and HCAs represented 9.5% of respondents. At Time 1, a large proportion of the staff had full time contracts and were employed in their current unit for over 4 years, this remained consistent in Time 2, where over 90% were employed on a full-time basis with an average of over 6 years on their current unit. Respondents were mostly female (Time 1 87.5%: Time 2 85.7%) with an average of over 20 years as a nurse (RN) for both time points. The majority of staff were educated to degree level. Of those surveyed, 23.8% at Time 2 had a specialist's qualification in emergency nursing; this was similar to that represented at Time 1.

Staff were also asked to specify if they had received their pre-registration training in Ireland and if not to specify the country they had received this training in. At Time 1, 52.9% of respondents stated they had received their training overseas with the UK indicated as the country where this was attained. Similarly, at Time 2, of the staff who indicated that they had received their pre-registration training overseas this was again predominantly in the UK (47.6%). Staff were also asked about their shift type (see Table 6.3.1.2). Most respondents indicated at both Time 1 and Time 2 that the shifts most commonly worked were 12-hour day shifts, 73.3% and 66.7% respectively. This is reflective of the IU as the vast majority of care is provided on a day basis from 8am to 8pm.

Table: 6.3.1.1: Profile of respondents

Characteristic	Time 1 (n =17)	Time 2 (n=21)
Response rate, %	76.7	80.8
Job Title, n (%)		
CNM	1 (5.9)	4 (19.0)
RN	16 (94.1)	15 (71.4)
HCA	0 (0.0)	2 (9.5)
Nursing Qualifications, n (%) RN only		
Registered nurse – cert.	3 (20.0)	3 (14.3)
Registered nurse – diploma	1 (6.7)	2 (9.5)
Registered nurse – degree	2 (13.3)	4 (19.0)
Post-graduate certificate	2 (13.3)	2 (9.5)
Post-graduate diploma	7 (46.7)	6 (28.6)
Masters in Nursing	0 (0.0)	2 (9.5)
Educational Qualification, n (%)		
No Formal Education	0 (0.0)	0 (0.0)
Junior Cert./Intermediate Cert.	0 (0.0)	0 (0.0)
Leaving Cert (or equivalent)	9 (56.3)	10 (47.6)
Vocational/Technical	2 (12.5)	2 (9.5)
Qualification		
Certificate (Third-level)	1 (6.3)	2 (9.5)
Diploma (Third-level)	4 (25)	5 (23.8)
Bachelor's Degree	0 (0.0)	2 (9.5)
Master's Degree	0 (0.0)	0 (0.0)
Doctoral Degree (e.g. PhD)	0 (0.0)	0 (0.0)

	Time 1 (n =17)	Time 2 (n=21)
Specialist qualification in emergency nursing, n (%)		
Yes	4 (23.5)	5 (23.8)
No	12 (70.6)	14 (66.7)
FETAC level 5 (HCA only)	-	1 (4.7%)
Working Contract, n (%)		
Full-time	13 (81.2)	19 (90.5)
Part-time	3 (18.7)	2 (9.5)
Agency	0 (0.0)	0 (0.0)
Other	0 (0.0)	0 (0.0)
Gender, n (%)		
Female	14 (87.5)	18 (85.7)
Male	2 (12.5)	3 (14.3)
Years as a nurse/HCA mean (SD)		
As Nurse/HCA	20.49 (8.92)	22.85 (12.58)
Current Hospital	6.89 (6.99)	11.28 (10.40)
Current Unit	3.84 (4.28)	6.18 (9.46)
Agency	0 (0.0)	2 (0.00)
Received Pre-Reg training in Ireland, n (%)		
Yes	8 (47.1)	11 (52.4)
No	9 (52.9)	10 (47.6)
Countries		
UK	9 (52.9)	10 (47.6)
India	0 (0)	0 (0.0)
Other EU	0 (0)	0 (0.0)
Philippines	0 (0)	0 (0.0)
Other Worldwide	0 (0)	0 (0.0)
Other (Missing/Not Stated)	0 (0)	0(0.0)

Table: 6.3.1.2: Profile of respondents' shift type Hospital 7

	Time 1 (n = 15)	Time 2 (n=21)
Day Shift (8 hours)	2 (13.3)	3 (14.3)
Day Shift (12 Hours)	11 (73.3)	14 (66.7)
Evening shift (After 8pm)	0 (0.0)	2(9.5)
Other	2 (13.3)	2(9.5)

6.3.2 Nursing Staff-to-Patient Ratios

Respondents were asked to self-report the minimum, maximum and average number of patients they had direct responsibility for on their most recent shift. While the IU operates on an 8am to 8pm 7 days a week basis in some instances staff may have to stay later or work in other areas and hence ratios for night shifts also represented in the data. Table 6.3.2.1 outlines the nurse-to-patient ratios.

In Time 1, an average of 9.11 patients per nurse per shift was reported, this increased to an average of 12.25 at Time 2. A maximum patient caseload of 12.83 patients per shift was found within the IU at Time 1, again this increased to 15.19 in Time 2. The minimum number of patients cared for by respondents within the IU also increased from Time 1 (6.00) to Time 2 (10.68). Note these figures may be reflective of the IU increasing in workload due Covid-19 and hence should be interpreted with caution.

Also examined within this questionnaire, was the differential staff-to-patient ratios between day and night staff. As previously stated, while the IU does not operate overnight these may be patients who were awaiting transfer to other wards/units/departments or whose treatment lapsed into night-time shifts within the IU. At Time 1, RNs on day shift were responsible for an average of 10.57 patients per shift, while RNs on night shift had an average of 1.00 patient per shift. At Time 2, the average patient caseload for the day shift increased to 13.86 on day shift.

While interpreting this data, it should be noted that this represents self-reported figures and represents the total number of patients cared for rather than on an hourly basis.

Table: 6.3.2.1: Number of Patients Cared for by Nurses Over a Shift Hospital 7

Ratios, mean (SD)	Time 1 (n = 13)	Time 2 (n=7)
Minimum patients	6.00 (3.30)	10.68 (10.17)
Maximum patients	12.83 (9.79)	15.19 (11.59)
Average patients	9.11 (7.29)	12.25 (7.95)
Ave Patients per RN per shift Day Shift	10.57 (7.52)	13.86 (9.05)
Ave Patients per RN per shift Night Shift	1.00 (0.00)	0.00 (0.00)

6.3.3 Nursing Work Index

The Nursing Work Index (NWI) (Lake, 2002) was employed to assess characteristics of the nursing work environment. The 31 items are covered across five subscales: Nurse Participation in Hospital Affairs; Nursing Foundations for Quality of Care; Nurse Manager Ability, Leadership, and Support of Nurses; Staffing and Resource Adequacy and Collegial Nurse-Doctor Relations. Each item was scored on a scale of 1 to 4 where 1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree. A mean for each subscale was calculated to facilitate comparisons across the

subscales. Higher scores are indicative of a positive work environment with a mean of 2.5 considered a neutral midpoint on the 4-point scale.

The mean of each subscale can be seen in Table 6.3.3.1. For Time 1, the highest scores were reported for Collegial Nurse-Doctor Relations, while in Time 2 the highest scores were seen for Nursing Foundations for Quality of Care. The lowest scores reported on the NWI at Time 1 was for Staffing and Resource Adequacy (2.21). This increased by 0.54 to 2.75 at Time 2, with the lowest scores at Time 2 being reported for Nurse Participation in Hospital Affairs (2.61).

Interestingly, at Time 2, the IU saw a decrease in scores for three items on the NWI: Nurse Participation in Hospital Affairs, Nurse Manager Ability, Leadership, and Support of Nurses and Collegial Nurse-Doctor Relations all decreased slightly at Time 2. However, Staffing and Resource Adequacy considerably increased as well as Nursing Foundations for Quality of Care (increased by 0.25) from Time 1 to Time 2. Again, caution should be noted with interpreting these figures given the small reductions in scores from Time 1 to Time 2. It also should be noted that both Time 1 and Time 2 cross sectional data from staff were above the mid-point values for the NWI and were quite positive prior to the introduction of the framework with the exception of Staffing and Resource Adequacy which was 2.21 at Time 1 and saw a substantial improvement.

Table: 6.3.3.1: Nursing Work Index

NWI, mean (SD)	Time 1 n=17	Time 2 n=21
Nurse Participation in Hospital Affairs	2.68 (0.28)	2.61 (0.33)
Nursing Foundations for Quality of Care	2.77 (0.38)	3.04 (0.25)
Nurse Manager Ability, Leadership, and Support of Nurses	2.95 (0.35)	2.87 (0.43)
Staffing and Resource Adequacy	2.21 (0.50)	2.75 (0.56)
Collegial Nurse-Doctor Relations	3.05 (0.39)	3.02 (0.36)

6.3.4 Time Availability and Quality of Care

Single item measures were used to assess staff (RNs and HCAs) perceptions of time available to deliver care, additional time required to deliver care and the quality of care delivered on the last shift worked.

Staff were asked to rate the time available to them to deliver care on their last shift on a 3-point scale ranging from “less time than usual” to “more time than usual”. Table 6.3.4.1 shows results for Time 1 and Time 2. At Time 1, a third of staff (33.3%) reported having “less time than usual” available to them to provide care on their last shift, which decreased to 14.3% of staff in T2. 60.0% of staff reported having the “same amount of time” available to provide care to patients on their last shift in Time 1, which increased 76.2% in Time 2.

Staff were asked to make an approximation regarding how much more time they required in order to provide necessary care to patients as per their nursing care plan on a 6-point scale ranging from “No more time needed” to “Greater than 60 minutes.” At Time 1, 85.7% of staff reported that they required additional time to provide patient care. This decreased to 76.2% of staff indicating that they required additional time to provide patient care. The majority of staff in Time 1 (35.7%) reported that they required an additional 15 to 30 minutes per shift to provide the quality of care as detailed in their nursing care plans, which increased to 42.9% in Time 2.

Staff were asked to rate the quality of care provided on their last shift on a 4-point scale ranging from “poor” to “excellent.” The majority of staff across the IU rated the quality of care provided on their last shift as either “good” (Time 1: 66.7% Time 2: 47.6%) or “excellent” (Time 1: 20.0%, Time 2: 33.3%).

A single-item measure asked staff to give the IU in which they work an overall grade for patient safety on a 5-point scale ranging from “failing” to “excellent.” At Time 1, the majority of staff gave their unit a grade of “acceptable” (50.0%) for patient safety, which decreased to 38.1% in Time 2. The majority of staff reported patient safety as “very good” in Time 2 (42.9%). Combined, a total of 42.9% of staff graded their IU as either “very good” or “excellent” in its provision of patient safety during Time 1; this increased to 61.9% in Time 2.

Staff were asked to reflect on the quality of patient care provided in the last 6 months in their department and state on a scale whether it had “deteriorated,” “remained the same,” or “improved”. At Time 1, 80.0% of staff stated that the quality of care provided in their unit “remained the same” which decreased to 52.4% in Time 2. Staff reporting “deteriorated” quality of care remained consistent between Time 1 and Time 2 (13.3%; 14.3%). While those reporting an “improved” quality of care increased from 6.7% in Time 1 to 33.3% in Time 2.

Table: 6.3.4.1: Quality of care Hospital 7

Quality of care, *n (%)*	Time 1 (n = 17)	Time 2 (n = 21)
Time available to deliver care		
Less time than usual	5 (33.3)	3 (14.3)
Same amount of time	9 (60.0)	16 (76.2)
More time than usual	1 (6.7)	2 (9.5)
Additional time needed		
No more time needed	2 (14.3)	5 (23.8)
Less than 15 minutes	4 (28.6)	5 (23.8)
15 to 30 minutes	5 (35.7)	9 (42.9)
31 to 45 minutes	2 (14.3)	1 (4.8)
46 to 60 minutes	0 (0.0)	1 (4.8)
Greater than 60 minutes	1 (7.1)	0 (0.0)
Quality of care		
Poor	0 (0.0)	0 (0.0)
Fair	2 (13.3)	4 (19.0)
Good	10 (66.7)	10 (47.6)
Excellent	3 (20.0)	7 (33.3)
Grade of patient safety		
Failing	0 (0.0)	0 (0.0)
Poor	1 (7.1)	0 (0.0)
Acceptable	7 (50.0)	8 (38.1)
Very good	2 (14.3)	9 (42.9)
Excellent	4 (28.6)	4 (19.0)
Quality of care, last 6 months		
Deteriorated	2 (13.3)	3 (14.3)
Remained the same	12 (80.0)	11 (52.4)
Improved	1 (6.7)	7 (33.3)

6.3.5 Care Left Undone and Delayed

The descriptive statistics of care left undone events (CLUEs) and care delayed (CD) are derived from respondents with registered nurse qualification only (including CNMs) as many of these tasks are specific to the RN role. Nurses were asked to identify care activities which had been necessary but left undone and/or delayed on their most recent shift due to lack of time.

The mean number of items of care left undone and the number of shifts where at least one item of care was left undone is reported in Table 6.3.5.1. Baseline measurements showed 36.4% of nurses reported that at least one item of care was left undone in Time 1, which decreased to 15.8% in Time 2. Overall, baseline measurements revealed that, in Time 1 an average of 1.36 necessary care activities were left undone per shift due to a lack of time to complete these tasks, whereas Time 2 reported, on average, 0.21 activities left undone.

The mean number of necessary care activities which were delayed per shift and the number of shifts where at least one care activity was delayed are displayed in Table 6.3.5.1. In Time 1, 81.8% of nurses reported that the provision of at least one item of necessary care was delayed during their last shift. This decreased to 63.2% of nurses reporting at least one item of care delayed in Time 2. Baseline reports by nurses revealed that in Time 1, on average, a total of 4.73 care tasks per shift were delayed which decreased to 2.79 in Time 2.

A single item also assessed if staff meal breaks had been missed or delayed due to lack of time (Table 6.3.5.2). In Time 1, the majority of staff reported having missed or delayed meal breaks on their most recent shift (71.4%). The percentage of staff reporting missed, or delayed meal breaks decreased substantially in Time 2 to 40.0%. No one within Time 1 and Time 2 reported missed and delayed meal breaks. In Time 1, 28.6% reported neither a missed nor delayed meal break on their last shift, which increased to 60.0% in Time 2.

Across the IU, the items of care most frequently reported as left undone in Time 1 were providing comfort talk/ talking with patients (36.4%), and oral hygiene care (27.3%). For Time 2 items that were reported as undone decreased from Time 1. Adequate patient surveillance, providing comfort talk/ talking with patients, education patients and/or families, and oral hygiene were reported as the only activities left undone at 5.3%. See Tables 6.3.5.3 and 6.3.5.4 for frequencies of Care Left Undone and Care Delayed events.

Table: 6.3.5.1: Care left undone and care delayed overall total for Hospital 7

Care left undone and delayed	Time 1 (n = 17)	Time2 (n = 21)
Number of activities undone, mean (SD)	1.36 (2.54)	0.21 (0.54)
Shifts with at least one item undone, n (%)	4 (36.4)	3 (15.8)
Number of activities delayed, mean (SD)	4.73 (3.74)	2.79 (3.10)
Shifts with at least one item delayed, n (%)	9 (81.8)	12 (63.2)

Table 6.3.5.2: Missed and/or Delayed meal breaks

Missed and/or Delayed meal breaks	Time 1 (n = 17)	Time 2 (n = 21)
Meal break missed, n (%)	3 (21.4)	1 (5.0)
Meal break delayed, n (%)	7 (50)	7 (35.0)
Missed and Delayed, n (%)	0 (0.0)	0 (0.0)
Neither missed or delayed, n (%)	4 (28.6)	12 (60.0)

Table 6.3.5.3 Care Left Undone Events for Hospital 7

Care left undone RN responses only n (%)	Time 1 (n = 17)	Time 2 (n = 21)
Adequate patient surveillance	1 (9.1)	1 (5.3)
Adequate/ regular monitoring of deteriorating patients	0 (0.0)	0 (0.0)
Vital sign observations	0 (0.0)	0 (0.0)
Administration of patient medications on time	0 (0.0)	0 (0.0)
Supporting patients with physical needs	2 (18.2)	0 (0.0)
Recording clinical practice/ developing and updating nursing care documentation	0 (0.0)	0 (0.0)
Adequate monitoring/ recording of nutritional/ hydration status	2 (18.2)	0 (0.0)
Providing comfort/ talking with patients	4 (36.4)	1 (5.3)
Educating patients and/or families	1 (9.1)	1 (5.3)
Pain assessment	0 (0.0)	0 (0.0)
Pain management	1 (9.1)	0 (0.0)
Planning care	0 (0.0)	0 (0.0)
Preparing patients and families for discharge	0 (0.0)	0 (0.0)
Skin care and/or assessment of pressure ulcers	1 (9.1)	0 (0.0)
Undertaking procedures/ treatments e.g. wound care	0 (0.0)	0 (0.0)
Oral Hygiene	3 (27.3)	1 (5.3)

Table 6.5.5.4 Care Delayed Events for Hospital 7

Care delayed

RN responses only n (%)	Time 1 (n=17)	Time 2 (n=21)
Adequate patient surveillance	7 (63.6)	7 (36.8)
Adequate/ regular monitoring of deteriorating patients	3 (27.3)	2 (10.5)
Vital sign observations	2 (18.2)	4 (21.1)
Administration of patient medications on time	5 (45.5)	4 (21.1)
Supporting patients with physical needs	2 (18.2)	8 (42.1)
Recording clinical practice/ developing and updating nursing care documentation	7 (63.6)	4 (21.1)
Adequate monitoring/ recording of nutritional/ hydration status	1 (9.1)	1 (5.3)
Providing comfort/ talking with patients	3 (27.3)	3 (15.8)
Educating patients and/or families	5 (45.5)	5 (26.3)
Pain assessment	2 (18.2)	0 (0.0)
Pain management	2 (18.2)	1 (5.3)
Planning care	3 (27.3)	0 (0.0)
Preparing patients and families for discharge	2 (18.2)	2 (10.5)
Skin care and/or assessment of pressure ulcers	1 (9.1)	3 (15.8)
Undertaking procedures/ treatments e.g. wound care	7 (63.6)	7 (36.8)
Oral Hygiene	0 (0.0)	2 (10.5)

6.3.6 Job Satisfaction and Intention to Leave

The respondents' level of job satisfaction, ranging from very dissatisfied to very satisfied is displayed in Table 6.3.6.1. The majority of staff in the IU were either satisfied (64.3%; 61.9%) or very satisfied (28.6%; 28.6%) in both Time 1 and Time 2. Only a small portion of the staff were dissatisfied in Time 1 (7.1%), which only increased slightly to 9.7% in Time 2. As previously mentioned, given the specific healthcare climate under which the data was collected caution should be noted with interpreting this.

In Time 1, 100% of staff reported that they would probably or definitely recommend the unit to a colleague as a good place to work. However, this decreased to 95.3% of staff recommending the unit to a colleague at Time 2. However, 100% of staff stated that they would probably or definitely recommend the unit to family/friends in both Time 1 and Time 2.

Of the staff in the IU, 15.4% reported they would probably leave their job, which increased to 23.8% in Time 2. Of those in Time 1 who indicated an intention to leave their job, 15.4% was due to job dissatisfaction in Time 1. This remained largely the same in Time 2 (14.3%). Of the respondents who intended to leave due to job dissatisfaction, half of them were leaving for nursing, but not in a hospital (50.0%), and the other half were leaving for nursing in another hospital (50.0%). In Time 2, the majority of staff who indicated an intention to leave intended to leave for nursing in another hospital (66.7%), followed by a non-nursing career (33.3%).

Table: 6.3.6.1: Job satisfaction and intention to leave overall total for Hospital 7

n (%)	**Time 1** (n = 17)	**Time 2** (n = 21)
Satisfaction with current job		
Very dissatisfied	0 (0.0)	0 (0.0)
Dissatisfied	1 (7.1)	2 (9.5)
Satisfied	9 (64.3)	13 (61.9)
Very satisfied	4 (28.6)	6 (28.6)
Satisfaction with being a nurse		
Very dissatisfied	0 (0.0)	0 (0.0)
Dissatisfied	3 (23.1)	2 (9.5)
Satisfied	5 (38.5)	11 (52.4)
Very satisfied	5 (38.5)	8 (38.1)
Recommend unit to colleague		
Definitely no	0 (0.0)	0 (0.0)
Probably no	0 (0.0)	1 (4.8)
Probably yes	8 (57.1)	9 (42.9)
Definitely yes	6 (42.9)	11 (52.4)
Recommend unit to family/friends		
Definitely no	0 (0.0)	0 (0.0)
Probably no	0 (0.0)	0 (0.0)
Probably yes	5 (35.7)	6 (28.6)
Definitely yes	8 (57.1)	15 (71.4)
Feelings about future in hospital		
Definitely will leave	0 (0.0)	0 (0.0)
Probably will leave	2 (15.4)	5 (23.8)
Probably will not leave	5 (38.5)	10 (47.6)
Definitely will not leave	6 (46.2)	6 (28.6)
Leave due to job dissatisfaction (yes)	2 (15.4)	3 (14.3)
Leaving for		
Nursing in another hospital	1 (50.0)	2 (66.7)
Nursing, but not in a hospital	1 (50.0)	0 (0.0)
Non-Nursing	0 (0.0)	1 (33.3)

6.3.7 Burnout

The Maslach Burnout Inventory (MBI) (Maslach et al., 1996) was used to measure burnout in nursing staff. The MBI-Human Services Survey Medical Personnel (MBI-HSS MP) is composed of 22 items across three subscales: emotional exhaustion; depersonalisation; personal accomplishment. The emotional exhaustion subscale addresses feelings of being emotionally overextended by work. depersonalization subscale assesses an impersonal response to recipients of care and personal accomplishment subscale measures feelings of competence and achievement in one's work. Items are measured on a 7-point scale of 0 to 6 (never = 0, to everyday = 6, see Table 6.3.7.1). High scores in emotional exhaustion and depersonalisation and low scores in personal accomplishment indicate burnout. A full break down of hospital scores can be found in Table 6.3.7.2.

Emotional exhaustion and depersonalisation were quite low in Time 1 (1.75; 0.82 respectively) and continued to decrease in Time 2 (1.42; 0.38). Overall, higher levels personal accomplishment were reported in the IU in Time 1 with a slight decrease in Time 2 (Time 1 = 5.02; Time 2 = 4.76).

Table: 6.3.7.1: Maslach burnout inventory scale

Maslach burnout and inventory scale

0	1	2	3	4	5	6
Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Everyday

Table: 6.3.7.2: Maslach burnout inventory scores overall for Hospital 7

MBI mean, (SD)	Time 1 (n=13)	Time 2 (n=21)
Emotional Exhaustion	1.75 (1.13)	1.42 (1.22)
Depersonalisation	0.82 (0.97)	0.38 (0.40)
Personal Accomplishment	5.02 (1.87)	4.76 (1.07)

6.3.8 Prevalence of Violence and Aggression

The Conflict Scale is a 10-item scale developed by Straus (1979) and is most commonly used in family violence research. The scale has been adapted to suit the Injury Unit for the purpose of this study. Staff were asked to rate how often events occurred in the last three months, ranging from never to more than 10 times. The survey is divided into three subscales: physical, psychological and conflict. Table 6.3.8.4 displays the overall mistreatment experienced by staff, while tables 6.3.8.1-3 show the breakdown of each subscale.

Overall, in Time 1, 35.7% of staff reported that they experienced a physical assault, 78.6% psychological/verbal mistreatment and 85.7% conflict with patients (conflict

with family was removed for this analysis). Time 2 reported that 52.4% of staff experienced physical assault, 75.0% experienced psychological/verbal mistreatment, and 76.2% experienced conflict with patients. While there was a decrease in staff reporting psychological/verbal mistreatment and conflict with patients from Time 1 to Time 2, there was a 16.7% increase in physical assault between the two time periods.

The physical mistreatment of staff is displayed below in Table 6.3.8.1. Overall, in Time 1 23.6% of respondents had a patient throw something at them, and 23.6% had been pushed, grabbed, shoved or pinched by a patient at least once; 23.5% of all respondents had also been slapped or hit at least once in the last 3 months. Furthermore, 23.6% of all respondents have been kicked or hit with their fist. Respondents for Time 2 reported a higher rate of physical mistreatment of staff, with 38.1% of respondents reported being pushed, grabbed, shoved or pinched by a patient, 23.8% report having something thrown at them, and 28.6 of all respondents have been slapped or hit at least once. Respondents who reported being kicked which has the largest increase in reported from Time 1 to Time 2, increasing by 19.2% (T2 = 42.8%)

The Psychological Prevalence of Violence and Aggression is reported in Table 6.3.8.2. In Time 1, 64.7% of respondents have been sworn at or insulted at least once in the last 3 months; 58.8% of respondents have been shouted at in anger; 29.5% of staff reported patients threatening to hit or throw something at them in the last 3 months. Respondents who reported being sworn at or insults at least once decreased to 57.1% in time 2. Likewise, there was a decrease in respondents who were threatened by patients in Time 2 (T2 = 25.0%). However, there was an increase in respondents that have been shouted at in anger to 71.5%.

Table 6.3.8.3 illustrates the level of conflict experienced by respondents. Altogether, 64.7% of respondents experienced patients arguing with them about waiting to be seen in Time 1. There was an increase in respondents experiencing patients arguing with them about waiting times (76.1%) in Time 2. Likewise, over half of respondents reported patients' complaints about care they had received for both time 1 and time 2 (T1=58.8%; T2=57.2%). Additionally, 58.9% of respondents in Time 1 reported experiencing conflict with patient's visitors at least once in the last 3 months, which increased to 66.7% in Time 2.

Table 6.3.8.1 Physical Prevalence of Violence and Aggression Hospital 7

Physical **n (%)**	Time 1 (n=17)	Time 2 (n=21)
Patient thrown something at you		
Never	10 (58.8)	16 (76.2)
Once	2 (11.8)	4 (19.0)
2-10 times	2 (11.8)	1 (4.8)
>10 times	0 (0.0)	0 (0.0)
Patient slapped or hit you		
Never	10 (58.8)	15 (71.4)
Once	1 (5.9)	5 (23.8)
2-10 times	3 (17.6)	1 (4.8)
>10 times	0 (0.0)	0 (0.0)
Patient kicked you or hit you with their fist		
Never	10 (58.8)	12 (57.1)
Once	1 (5.9)	7 (33.3)
2-10 times	2 (11.8)	2 (9.50
>10 times	1 (5.9)	0 (0.0)
Patient pushed, grabbed, shoved or pinched you		
Never	10 (58.8)	13 (61.9)
Once	1 (5.9)	6 (28.6)
2-10 times	1 (5.9)	2 (9.5)
>10 times	2 (11.8)	0 (0.0)

Table 6.3.8.2 Psychological Prevalence of Violence and Aggression Hospital 7

Psychological/Verbal **n (%)**	Time 1 (n=17)	Time 2 (n=21)
Patient insulted or sworn at you		
Never	3 (17.6)	9 (42.9)
Once	5 (29.4)	5 (23.8)
2-10 times	4 (23.5)	7 (33.3)
>10 times	2 (11.8)	0 (0.0)
Patient shouted at you in anger		
Never	4 (23.5)	6 (28.6)
Once	4 (23.5)	6 (28.6)
2-10 times	4 (23.5)	9 (42.9)
>10 times	2 (11.8)	0 (0.0)
Patient threatened to hit or throw something at you		
Never	9 (52.9)	15 (75.0)
Once	2 (11.8)	3 (15.0)
2-10 times	1 (5.9)	2 (10.0)
>10 times	2 (11.8)	0 (0.0)

Table 6.3.8.3 Conflict Reported within Prevalence of Violence and Aggression Hospital 7

Conflict **n (%)**	Time 1 (n=17)	Time 2 (n=21)
Patient argued with you about waiting to be seen		
Never	3 (17.6)	5 (23.8)
Once	3 (17.6)	4 (19.0)
2-10 times	6 (35.3)	10 (47.6)
>10 times	2 (11.8)	2 (9.5)
Patient complained to you about their care		
Never	4 (23.5)	9 (42.9)
Once	3 (17.6)	6 (28.6)
2-10 times	6 (35.3)	5 (23.8)
>10 times	1 (5.9)	1 (4.8)
Experienced conflict with a patient's visitor		
Never	4 (23.5)	7 (33.3)
Once	2 (11.8)	5 (23.8)
2-10 times	6 (35.3)	8 (38.1)
>10 times	2 (11.8)	1 (4.8)

Table: 6.3.8.4 Overall Mistreatment Experienced by staff in Hospital 7

n (%)	Time 1 (n=17)	Time 2 (n=21)
Physical assault	5 (35.7)	11 (52.4)
Verbal mistreatment	11 (78.6)	15 (75.0)
Conflict	12 (85.7)	16 (76.2)

6.4 Summary of Results

Overall, the response rate from the staff survey was above 70% for the IU at Time 1 and Time 2 allowing accurate conclusions to be drawn. The profile of the respondents in the IU were relatively similar at Time 1 and Time 2. While self-report of nurse to patient ratios were obtained, these are based on how many patients an individual was caring for rather than how many the entire team were caring for. This is due to the issue of the ever-changing patient flow experienced in IUs. However, the results indicate some positive changes in the workload and nursing outcomes following the introduction of the recommendations.

The results from the NWI within the IU are indicating improvement in Staffing and Resource Adequacy and Nursing Foundations and Quality of Care with scores on the other three subscales remaining relatively stable across the two time periods. In particular, Hospital 7 showed a substantial increase on scores of Staffing and Resource Adequacy following the introduction of the recommendations.

At Time 2, ratings on quality of care, patient safety and quality of care over the last 6 months also saw noticeable improvements. Items of care being left undone or delayed also decreased from Time 1 to Time with the number of items left undone remaining relatively low, less that 1.36 out of a possible 16 in both Time 1 and Time 2 and shifts with items if care left undone reducing from 4 to 3. The number of items delayed also decreased from Time 1 to Time 2 but shifts with at least one item of care left delayed increased from Time 1 to Time 2. Across the IU, the items of care most frequently reported as left undone in Time 1 were providing comfort talk/ talking with patients (36.4%), and oral hygiene care (27.3%). Adequate patient surveillance, providing comfort talk/ talking with patients, education patients and/or families, and oral hygiene were reported as the only activities left undone at Time 2 (5.3%). Missed and/or delayed meal breaks showed considerable improvements from Time 1 to Time 2.

Job satisfaction was relatively high in Time 1 and this remained evident in the staff survey responses at Time 2, with most staff reporting that they were satisfied with the profession in general in both time-points. Most staff at Time 1 and Time 2 also reported that they would recommend the unit to others. Levels of intention to leave job due to job dissatisfaction were low at both Time 1 and Time 2. Staff reported relatively low levels of emotional exhaustion in Time 1, which remained consistent in Time 2. Low levels of depersonalization were also seen in Time 1 and 2 as well as high personal accomplishment scores which remained relatively stable indicating that staff take pride in their work within the IU.

High levels of physical, psychological, and verbal violence and aggression, along with similarly high levels of conflict, were experienced by the staff over the last 3 months in their work in Time 1 and Time 2. This appears to have worsen since Time 1, specifically in relation to physical assault which increased from 35.7% reporting this in Time 1 to 52.4% of staff at Time 2. Verbal mistreatment remained relatively stable between Time 1 and Time 2, 78.6% and 75% respectively with indications of conflict reducing from 85.7% at Time 1 to 76.2% of staff at Time 2. Note that these results

should be interpreted with caution due to timing of the Time 2 of the study and the recent staff changes as well as workload the IU experienced in response to Covid-19.

The open comments highlighted a number of issues that staff experienced including, the challenges of their environment, staffing and skill-mix, support and teamwork, workload, quality of care and missed care, as well as burnout and stress at Time 1. Time 2 saw a noticeable improvement in relation to staff qualitative self-report comments on staffing and skill-mix, workload and job satisfaction as a result of the introduction of the recommendations with it apparent that the addition of 2 HCAs had greatly enhanced the working environment and allowed nursing staff to focus and prioritise patient care.

Overall, the staff data from the IU did not present as suitable for the NHpPP model that was utilised within the other 3 pilot sites. However, following results of the initial analysis of the staffing data it was apparent that a vast majority of nursing time was being taken up by performing non-nursing duties. Following the implementation of the recommendation that 2 HCAs be assigned to the IU overall outcomes for staff appear to be much improved at Time 2 specifically in relation to staffing resources and availability of time and quality of care. However, data was collected during the Covid-19 pandemic which changed the typical ED/IU environment.

6.5 Discussions and Conclusions

6.5.1 Introduction

This section outlines the key conclusions from the research for the programme of research in safe nurse staffing in IUs. The data presented identifies that nursing staff working in IUs represent specific and unique challenges and areas of focus. IUs offer a diverse clinical environment and appropriately staffing these can have a significant impact on nurse and patient outcomes.

6.5.2 Calculating Staffing in IU's

Within the IU, similar to the ED context several approaches were used to determine safe staffing levels in phase 1; these included prospective measures (BEST and Jones Dependency Tool) and data collected from administrative systems as well as nurse: patient ratios. However, due to the specific type of work environment and clinical setting of the IU, the methods used for the three ED pilot sites was not deemed appropriate for use within this context. Analysis of data from Time 1 revealed that the IU appeared adequately staffed in relation to RN grades however, other data provided by staff referred to the issue of non-nursing duties being time consuming and affecting patient care.

While the NHpPP model was not suitable for use within the IU, Time 1 data analysis revealed that nursing staff were engaging in non-nursing duties such as cleaning,

stock ordering and waste management which increased their workload and reduced the amount of direct patient contact time they had. As a result, 2 HCAs were employed within the IU to alleviate this. Thus, although the IU did not receive an alteration in their nurse staffing it was allocated 2 HCAs to facilitate the provision of appropriate patient care and allowing the prioritisation of nursing duties.

6.5.3 Administrative Data

In order to gain an insight into the operation and clinical profile of the IU such as patient presentations, triage times, wait times etc. administrative data was collected at Time 1 and Time 2. During Time 1 and Time 2 administrative data was analysed from the IU on an ongoing basis. The administrative data collected provided a comprehensive overview of the unit. It is apparent that outcomes associated with nurse staffing can be identified utilising the secondary data which provides a useful resource for measuring outcomes. The use of this type of data going forward is worthy to note particularly given the longitudinal design of the study and the insight that this type of data can provide about the unit in relation to outcomes and staff levels.

The hospital administrative systems varied widely within each pilot site specifically in terms of the type of data collected and stored. For this reason, certain key criteria have been focused on for this report. In addition to this, the data presented here is representative of data collected from January 2018 to March 2020, including staff rosters, vacancies and agency use or overtime within the IU. The results presented here offer a key insight into IUs within the Irish context and have identified data that can be used to assess IU outcomes in relation to staffing over a sustained period of time.

The administrative data for the IU noted that on average the IU saw 19,706 individual presentations. New attendances accounted for over 98% of presentations to the unit year on year. The mean age of patients attending was 37.10 years. For the years 2018, 2019 more male than female patients were seen within the IU, 52.4% and 52.2% respectively, with a more equal gender split evident in January to March 2020. The majority of patients were triaged as “standard”, 80.6% to 87.7%, indicating that they did not require immediate or urgent care. Providing a profile of the unit such as this is useful in comparing with EDs the different services offered.

Time to triage was relatively low within the IU (in comparison to the three pilot ED sites), with most patients being triaged within 30 minutes of their arrival to the unit. The average PET for patients had a PET was under 2.5 hours, with 94% experiencing treatment completion within 6 hours and over 97% completing treatment within 9 hours or less. Less than 1.0% of patients left without being seen with a small proportion of patients being admitted (<1%) or transferred from the IU (<8%) to another hospital.

Within the IU, over 75-year olds accounted for less than 8% of the total presentations across all three data collection times. Interestingly, over 75-year olds PET decreased across the three data collection times, from 2.59 hours in 2018, to 2.24 hours in 2019 and 1.93 hours in 2020. A larger proportion of over 75-year olds were

admitted or transferred to another hospital when compared with the under 75-year old cohort. However, leaving without being seen for over 75-year olds remained low at less than 1.5% across the three time points and was comparable with the general population cohort.

In conclusion, the administrative data provided a useful method of collecting comprehensive longitudinal data over a sustained period of time. In addition, it allowed for a profile of the IU to be attained and supported the nursing outcomes that were expressed by staff within the staff survey responses. As stated earlier, there were differences between hospital administrative systems utilised by the different pilot sites hence, for this report certain key items were focused on. The administrative data outlined in this report was collected over a 2-year time period, further longitudinal collecting and analysis of this type of data would provide further insight into IUs and aid in the understanding of staffing and resource adequacy within this context.

6.5.4 Staff Survey

Data was collected from staff within the IU at two time points: baseline and following adjustments to staffing (introduction of 2 HCAs within the IU). The staff survey measured a number of areas including demographics, education level, the number of patients being cared for by staff, the working environment, quality of care, care left undone or delayed tasks, job satisfaction and intention to stay/leave, burnout and the prevalence of violence and aggression and conflict within the unit. At Time 1 and Time 2 the demographic profile was similar, with the majority of nursing staff identifying as RN grade; educated to degree level qualification; engaged in full time employment and working predominantly 12-hour shifts.

Staff to patient ratios within the IU were also assessed. It was identified that there was an increase in the average numbers of patients cared for by staff in Time 2 when compared to Time 1. On average nurses had 9.11 patients at Time 1, this increased to 12.25 at Time 2. In addition to this, the maximum patient caseload also increased from Time 1 to Time 2, 12.83 and 15.19, respectively. However, given recent events of Covid-19 results should be interpreted with caution.

Staff perception of the IU working environment was also measured over the two time points. The Staffing and Resource Adequacy and Nursing Foundations in Quality of Care saw noticeable improvements in the overall average scores from Time 1 to Time 2. With regard to time available to deliver care, most staff reported that they had the same amount of time to deliver care within Time 1 and Time 2. The majority of staff reported that they required an additional 15 to 30 minutes to deliver care at Time 1 and Time 2. In addition, overall, there was an increase in the perception of the quality of care delivered to patients in the IU following the implementation of the pilot *Framework*; respondents rating the grade of patient safety as either good or excellent increased from 20.0% in Time 1 to 33.3% in Time 2. This was also identified in staff perceptions of the quality of care delivered over the last 6 months; 6.7% of staff stated the quality of care provided in their IU had “improved” during Time 1, while a much larger proportion indicated this in Time 2 (33.3%).

There was a substantial decline in reports of shifts where items of care were left undone decreasing from 36.4% in Time 1 to 15.8% at Time 2. Overall, 1.36 items of care were left undone in Time 1 compared to an average of 0.21 activities left undone in Time 2. The number of shifts with care delayed also decreased from Time 1 (81.1%) to Time 2 (63.2%) with a noticeable reduction in the number of items of care delayed reducing from 4.73 tasks per shift delayed in Time 1 to 2.79 in Time 2.

Staff working within the IU reported relatively high levels of job satisfaction at both time points. The majority of staff in the IU were either satisfied (64.3%;61.9%) or very satisfied (28.6%; 28.6%) in their job at both Time 1 and Time 2. In addition to this, emotional exhaustion and depersonalisation measured by the Maslach Burnout Inventory were quite low in Time 1 (1.75; 1.42 respectively) and continued to decrease in Time 2 (0.82; 0.38). Overall, higher levels Personal Accomplishment were reported in the IU in Time 1 with a slight decrease in Time 2 (Time 1 = 5.02; Time 2 = 4.76).

There was an increase in the extent to which staff reported experiences of physical assault or psychological and verbal aggression and/or conflict over the two time periods. Overall, in Time 1 76.5% of staff reported that they experienced a physical assault, 94.0% psychological/verbal mistreatment and 97.8% conflict with patients (conflict with family was removed for this analysis). This was similar to Time 2 where it was reported that 78.9% of staff experienced physical assault, 94.8% experienced psychological/verbal mistreatment, and 96.0% experienced conflict with patients.

The results of the staff survey provide interesting insights into the working environments of IUs. Although comparison between the EDs and the IU is not recommended it can be determined that IUs generally operate at a different level to EDs and hence has been reported separately to the ED pilot sites.

6.6 Conclusion

In conclusion, the study was one of the first in Ireland to examine safer nursing staffing and skill mix within an IU. There are unique challenges in attempting to determine a model that can be utilised within the context of IUs to determine staffing. This is most notably associated with the high patient turnover and being able to accurately capture nurse-staff ratios. The administrative data collected within this study was hugely beneficial in identifying measures associated with staffing. In addition to this, the staff cross sectional data identified a number of key areas of focus and outlined several positive outcomes as a result of the introduction of the pilot framework. The continued collection and analysis of data from this specific context would further aid in the breadth and depth of understanding safer nurse staffing and skill-mix within IUs.

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Appendix A

NHpPP Calculations – Hospital 4

2018	Attendances	Hours	Total Hours req	Yearly hours	WTE required	Replacement	Maternity leave %	Total replacement factor	Replacement WTE required	Total direct clinical WTE required
Immediate	319.00	6.13	1955.47	2028.00	0.96	0.20	0.00	0.20	0.19	1.16
V. Urgent	17603.00	3.83	67419.49	2028.00	33.24	0.20	0.00	0.20	6.65	39.89
Urgent	32374.00	2.33	75431.42	2028.00	37.19	0.20	0.00	0.20	7.44	44.63
Standard	7955.00	1.42	11296.10	2028.00	5.57	0.20	0.00	0.20	1.11	6.68
Non urgent	568.00	0.58	329.44	2028.00	0.16	0.20	0.00	0.20	0.03	0.19
										92.56

Please note the calculation above does not include nursing staff required in triage or patients awaiting an inpatient bed.							
TRIAGE STAFF CALCULATION							
No of RNs on triage	hours provided	Total Hrs required	Clinical WTE required	Replacement factor (annual, sick and study leaves)	Maternity leave	Replacement WTE required	Total direct clinical WTE required for triage
2.00	24.00	48.00	8.64	1.73	0.00	1.73	10.37

OVERALL STAFFING REQUIRED	
ED Activity	92.56
Triage	10.37
Total	102.93
Skill Mix	
RN's including CNM 1s and RANP's	87.49
HCA's	15.44
CNM 2	0.00
CNM3	0.00
ADON	0.00
Total Nursing staff requirements	102.93

NHpPP Calculations – Hospital 5

2018	Attendances	Hours	Total Hours req	Yearly hours	WTE required	Replacement	Maternity leave %	Total replacement factor	Replacement WTE required	Total direct clinical WTE required
Immediate	202.00	6.13	1238.26	2028.00	0.61	0.20	0.00	0.20	0.12	0.73
V. Urgent	7386.00	3.83	28288.38	2028.00	13.95	0.20	0.00	0.20	2.79	16.74
Urgent	12451.00	2.33	29010.83	2028.00	14.31	0.20	0.00	0.20	2.86	17.17
Standard	8685.00	1.42	12332.70	2028.00	6.08	0.20	0.00	0.20	1.22	7.30
Non urgent	1117.00	0.58	647.86	2028.00	0.32	0.20	0.00	0.20	0.06	0.38
										42.32

Please note the calculation above does not include nursing staff required in triage or patients awaiting an inpatient bed.							
TRIAGE STAFF CALCULATION							
No of RNs on triage	hours provided	Total Hrs required	Clinical WTE required	Replacement factor (annual, sick and study leaves)	Maternity leave	Replacement WTE required	Total direct clinical WTE required for triage
1.00	24.00	24.00	4.32	0.86	0.00	0.86	5.18

OVERALL STAFFING REQUIRED	
ED Activity	42.32
Triage	5.18
Total	47.50
Skill Mix	
RN's including CNM 1s and RANP's	40.38
HCA's	7.13
CNM 2	0.00
CNM3	0.00
ADON	0.00
Total Nursing staff requirements	47.50

NHpPP Calculations – Hospital 6

2018	Attendances	Hours	Total Hours req	Yearly hours	WTE required	Replacement	Maternity leave %	Total replacement factor	Replacement WTE required	Total direct clinical WTE required
Immediate	1016.00	6.13	6228.08	2028.00	3.07	0.20	0.00	0.20	0.61	3.69
V. Urgent	14765.00	3.83	56549.95	2028.00	27.88	0.20	0.00	0.20	5.58	33.46
Urgent	35271.00	2.33	82181.43	2028.00	40.52	0.20	0.00	0.20	8.10	48.63
Standard	4822.00	1.42	6847.24	2028.00	3.38	0.20	0.00	0.20	0.68	4.05
Non urgent	3530.00	0.58	2047.40	2028.00	1.01	0.20	0.00	0.20	0.20	1.21
										91.04

Please note the calculation above does not include nursing staff required in triage or patients awaiting an inpatient bed.							
TRIAGE STAFF CALCULATION							
No of RNs on triage	hours provided	Total Hrs required	Clinical WTE required	Replacement factor (annual, sick and study leaves)	Maternity leave	Replacement WTE required	Total direct clinical WTE required for triage
2.00	24.00	48.00	8.64	1.73	0.00	1.73	10.37

OVERALL STAFFING REQUIRED	
ED Activity	91.04
Triage	10.37
Total	101.40
Skill Mix	
RN's including CNM 1s and RANP's	86.19
HCA's	15.21
CNM 2	0.00
CNM3	0.00
ADON	0.00
Total Nursing staff requirements	101.40

Appendix B

Agency Nurse						
	7th Point	7th Point	7th Point	7th Point	7th Point	7th Point
Hours	8 hours Mon to Fri	8 hours Mon to Fri	8 hours Sat	8 hours Sat	8 hours Sun	8 hours Sun
Shift	Day	Night	Day	Night	Day	Night
Basic Nurse fee	164.64	202.56	179.94	217.86	316.16	354.08
Holiday Pay (15.04%)	24.76	30.47	27.06	32.77	47.55	53.25
Gross Nurses Pay	189.40	233.03	207.00	250.63	363.71	407.33
PRSI (11.05%)	20.93	25.75	22.87	27.69	40.19	45.01
Administration Fee (4.5%)	6.82	6.82	6.82	6.82	6.82	6.82
Total before VAT	217.15	265.59	236.70	285.14	410.72	459.16
VAT (23.0%)	49.94	61.09	54.44	65.58	94.47	105.61
Total	267.09	326.68	291.14	350.72	505.18	564.77
Hourly Rate	33.39	40.83	36.39	43.84	63.15	70.60
Average						48.03
Bank Nurse						
	7th Point	7th Point	7th Point	7th Point	7th Point	7th Point
Hours	8 hours Mon to Fri	8 hours Mon to Fri	8 hours Sat	8 hours Sat	8 hours Sun	8 hours Sun
Shift	Day	Night	Day	Night	Day	Night
Basic Nurse fee	164.64	202.56	179.94	217.86	316.16	354.08
Holiday Pay (15.04%)	24.76	30.47	27.06	32.77	47.55	53.25
Gross Nurses Pay	189.40	233.03	207.00	250.63	363.71	407.33
PRSI (11.05%)	20.93	25.75	22.87	27.69	40.19	45.01
Total before VAT	210.33	258.77	229.88	278.32	403.90	452.34
VAT (23.0%)	48.38	59.52	52.87	64.01	92.90	104.04
Total	258.71	318.29	282.75	342.33	496.80	556.38
Hourly Rate	32.34	39.79	35.34	42.79	62.10	69.55
Average						46.98

Agency HCA						
	5th Point	5th Point	5th Point	5th Point	5th Point	5th Point
Hours	8 hours Mon to Fri	8 hours Mon to Fri	8 hours Sat	8 hours Sat	8 hours Sun	8 hours Sun
Shift	Day	Night	Day	Night	Day	Night
Basic HCA fee	126.96	158.64	137.67	169.35	253.84	285.60
Holiday Pay (14.04%)	17.83	22.27	19.33	23.78	35.64	40.10
Gross Nurses Pay	144.79	180.91	157.00	193.13	289.48	325.70
PRSI (10.85%)	15.71	19.63	17.03	20.95	31.41	35.34
Administration Fee (4.4%)	5.98	5.98	5.98	5.98	5.98	5.98
Total before VAT	166.48	206.53	180.02	220.06	326.87	367.02
VAT (23.0%)	38.29	47.50	41.40	50.61	75.18	84.41
Total	204.77	254.03	221.42	270.68	402.05	451.44
Hourly Rate	25.60	31.75	27.68	33.83	50.26	56.43
Average						37.59
Bank HCA						
	5th Point	5th Point	5th Point	5th Point	5th Point	5th Point
Hours	8 hours Mon to Fri	8 hours Mon to Fri	8 hours Sat	8 hours Sat	8 hours Sun	8 hours Sun
Shift	Day	Night	Day	Night	Day	Night
Basic Nurse fee	126.96	158.64	137.67	169.35	253.84	285.60
Holiday Pay (15.04%)	17.83	22.27	19.33	23.78	35.64	40.10
Gross Nurses Pay	144.79	180.91	157.00	193.13	289.48	325.70
PRSI (11.05%)	15.71	19.63	17.03	20.95	31.41	35.34
Total before VAT	160.49	200.54	174.03	214.08	320.89	361.04
VAT (23.0%)	36.91	46.12	40.03	49.24	73.80	83.04
Total	197.41	246.67	214.06	263.32	394.69	444.07
Hourly Rate	24.68	30.83	26.76	32.91	49.34	55.51
Average						36.67

Appendix C
Demographic profile of patients attending each of the pilot emergency department sites (excluding data from paediatric units)

	Hospital 4			Hospital 5			Hospital 6		
	2018 N = 47,059	2019 N = 47,752	2020* N = 10,419	2018 n = 30,018	2019 n = 31,251	2020* n = 6,539	2018 n = 54,687	2019 n = 54,908	2020* n = 12,371
New Attendances, n (%)	41,645 (88.5)	41,996 (87.9)	9,244 (88.7)	24,485 (81.6)	25,072 (80.2)	5,258 (80.4)	44,123 (80.7)	44,284 (80.7)	9,812 (79.3)
Scheduled returns, n (%)	1,740 (3.7)	1,764 (3.7)	336 (3.2)	2,862 (9.5)	3,433 (11.0)	691 (10.6)	7 (<0.1)	11 (<0.1)	6 (<0.1)
Other returns ≤7 days, n (%)	1,675 (3.6)	1,821 (3.8)	341 (3.3)	1,073 (3.6)	1,024 (3.3)	199 (3.0)	6,827 (12.5)	6,695 (12.2)	1,651 (13.3)
Other returns ≤28 days, n (%)	3,674 (7.8)	3,992 (8.4)	834 (8.0)	2,671 (8.9)	2,746 (8.8)	590 (9.0)	10,557 (19.3)	10,613 (19.3)	2,553 (20.6)
Total returns ≤7 days, n (%)	2,965 (6.3)	3,153 (6.6)	602 (5.8)	3,369 (11.2)	3,674 (11.8)	741 (11.3)	6,834 (12.5)	6,705 (12.2)	1,656 (13.4)
Total returns ≤28 days, n (%)	5,379 (11.4)	5,723 (12.0)	1,168 (11.2)	5,475 (18.2)	6,100 (19.5)	1,263 (19.3)	10,564 (19.3)	10,623 (19.3)	2,559 (20.7)
Age in Years, mean (SD)	50.82 (22.00)	51.39 (22.16)	50.74 (22.37)	42.01 (26.64)	41.15 (26.52)	42.40 (26.69)	47.72 (20.36)	48.14 (20.21)	47.64 (19.93)
Gender, n (%)									
Males	23,765 (50.5)	24,147 (51.1)	5,275 (50.6)	14,672 (48.9)	15,279 (48.9)	3,252 (49.7)	29,122 (53.3)	29,203 (53.2)	6,835 (55.3)
Females	23,294 (49.5)	23,605 (49.4)	5,144 (49.4)	15,346 (51.1)	15,972 (51.1)	3,287 (50.3)	25,564 (46.7)	25,703 (46.8)	5,535 (44.7)
Unknown	-	-	-	-	-	-	1 (<0.1)	2 (<.01)	1 (<.01)
Triage Category, n (%)									
Immediate	310 (0.7)	328 (0.7)	77 (0.7)	202 (0.7)	226 (0.7)	57 (0.9)	299 (0.5)	315 (0.6)	60 (0.5)
Very Urgent	14,096 (30.0)	14,416 (30.2)	3,067 (29.4)	7,386 (24.6)	7,131 (22.8)	1,564 (23.9)	14,747 (27.0)	14,881 (27.1)	3,509 (28.4)
Urgent	25,642 (54.5)	25,577 (53.6)	5,258 (50.5)	12,451 (41.5)	13,133 (42.0)	2,832 (43.3)	31,728 (58.0)	31,332 (57.1)	6,678 (54.0)
Standard	5,894 (12.5)	6,043 (12.7)	1,341 (12.9)	8,685 (28.9)	9,278 (29.7)	1,788 (27.3)	4,787 (8.8)	4,899 (8.9)	1,380 (11.2)
Non-Urgent	370 (0.8)	516 (1.1)	128 (1.2)	1,117 (3.7)	1,280 (4.1)	270 (4.1)	288 (0.5)	335 (0.6)	126 (1.0)
Admitted patients, n (%)	19,359 (41.1)	18,615 (39.0)	4,265 (40.9)	9,143 (30.5)	11,272 (36.1)	2,575 (39.4)	14,985 (27.4)	14,657 (26.7)	3,422 (27.7)
Attendances ≥75 years, n (%)	8,019 (17.0)	8,698 (18.2)	1,845 (17.7)	4,469 (14.9)	4,291 (13.7)	955 (14.6)	7,469 (13.7)	7,462 (13.6)	1,584 (12.8)
Admissions ≥75 years, n (%)	5,155 (64.3)	5,299 (60.9)	1,159 (62.8)	2,677 (59.9)	2,861 (66.7)	649 (68.0)	4237 (56.7)	4,157 (55.7)	900 (56.8)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020.

Emergency Department Patient Outcomes (excluding data from paediatric units)

	Hospital 4			Hospital 5			Hospital 6		
	2018 N = 47,059	2019 N = 47,752	2020* N = 10,419	2018 n = 30,018	2019 n = 31,251	2020* n = 6,539	2018 n = 54,687	2019 n = 54,908	2020* n = 12,371
Time to Triage (hrs), mean (SD)	0.34 (0.36)	0.38 (0.38)	0.38 (0.38)	0.36 (0.28)	0.39 (0.28)	0.36 (0.28)	0.55 (0.55)	0.51 (0.54)	0.43 (0.46)
Triage to Time Seen (hrs), mean (SD)	1.33 (2.59)	1.34 (2.55)	1.24 (2.26)	1.42 (2.15)	1.00 (1.12)	0.79 (0.86)	3.32 (3.86)	3.08 (3.87)	2.60 (3.45)
Registration to Time Seen (hrs), mean (SD)	1.61 (2.59)	1.66 (2.57)	1.54 (2.27)	1.72 (2.17)	1.34 (1.17)	1.11 (0.91)	3.81 (3.98)	3.51 (3.98)	2.98 (3.55)
PET all patients (hrs), mean (SD)	9.25 (8.36)	10.64 (10.62)	10.47 (12.20)	8.23 (12.63)	5.03 (4.45)	4.89 (4.91)	10.13 (9.85)	10.97 (11.55)	10.24 (11.73)
Admitted patients, mean (SD)	14.20 (10.38)	17.55 (13.63)	17.43 (16.15)	10.68 (14.47)	5.77 (4.07)	5.69 (4.98)	16.15 (13.02)	18.80 (16.04)	17.42 (16.76)
Non-admitted patients, mean (SD)	5.79 (3.79)	6.23 (4.04)	5.63 (3.79)	7.15 (11.57)	4.61 (4.60)	4.38 (4.78)	7.85 (7.12)	8.11 (7.60)	7.50 (7.45)
PET <6 hours, n (%)	21,547 (45.8)	20,189 (42.3)	5,069 (48.7)	18,984 (63.2)	21,610 (69.1)	4,592 (70.2)	22,938 (41.9)	22,861 (41.6)	5,677 (45.9)
PET <9 hours, n (%)	30,003 (63.8)	29,290 (61.3)	6,969 (66.9)	23,296 (77.6)	26,923 (86.2)	5,721 (87.5)	32,125 (58.7)	31.763 (57.8)	7,797 (63.0)
PET <24 hours, n (%)	44,623 (94.8)	43,028 (90.1)	9,258 (88.9)	27,853 (92.8)	31,067 (99.4)	6,504 (99.5)	49,848 (91.2)	49,036 (89.3)	11,172 (90.3)
ED care time all patients (hrs), mean (SD)	6.05 (3.93)	6.30 (4.16)	5.80 (3.80)	5.79 (6.51)	5.00 (4.43)	4.89 (4.9)	6.85 (5.63)	6.91 (5.55)	6.38 (5.39)
Admitted patients, mean (SD)	6.42 (4.10)	6.41 (4.33)	6.03 (3.79)	5.95 (4.13)	5.71 (4.03)	5.68 (4.98)	6.88 (5.45)	6.99 (5.58)	6.44 (5.24)
Trolley Time (hrs), mean (SD)	10.64 (9.17)	14.72 (12.23)	17.00 (15.25)	16.46 (21.57)	1.41 (1.79)	1.07 (1.10)	9.39 (10.33)	13.45 (13.26)	12.74 (13.99)
LWBS, n (%)	2,447 (5.2)	2,176 (4.6)	302 (2.9)	1,023 (3.4)	868 (2.8)	159 (2.4)	11,615 (21.2)	11,204 (20.4)	2,176 (17.6)

*2020 figures reflective of the period 1st January 2020 – 31st March 2020. **ED care time for non-admitted patients is the equivalent of PET for non-admitted patients