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Coláiste na hOllscoile Corcaigh

Evaluation of the ‘Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix in Emergency Departments’

Report 1 – Baseline Data



NUI Galway
OÉ Gaillimh



Programme of Research into Safe Nurse Staffing and Skill-Mix

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¹ Up to November 2018

Section 1

1.1 Introduction

The Department of Health recently 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 *et al.* 2018).

This *Framework* was followed by the recent publication of a draft document titled: *A Pilot to Implement the Framework for Safe Nurse Staffing and Skill Mix in the Emergency Care Area* (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: 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, competence and grade mix (i.e. mix of Health Care Assistant, Registered Nurse, Clinical Nurse Manager, Clinical Nurse Specialist and Advanced Nurse Practitioner).
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 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 a 24/7 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 their importance 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 local injury unit (LIU). Following on from this report, we will explore the extent to which changes in staffing will impact on the experience of patients in EDs, such as the length of time waiting for care, patient experience time and leaving without being seen. Based on our baseline findings, 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.

1.1.1 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).

1.1.1.1 Context of Safe Nurse Staffing in Ireland

In Ireland, there is currently concern regarding the ability to recruit and retain nurses within the healthcare sector. This has led to unions demanding 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).

1.1.1.2 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 our reviews for NICE (Griffiths *et al.* 2015; Simon *et al.* 2015). These 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).

1.1.1.3 Emergency Departments

In Ireland, as in other developed countries, there is increasing demand for ED care. The 2018 HSE Performance Report outlines that there were 1,098,269 emergency presentations from January 2018 to September 2018, an increase of 3.6% from the previous year (HSE, 2018). 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 3.6% increase in the year to date September 2018 in ED attendances versus the target for that period (1,059,820 attendances) (HSE, 2018).

The HSE outlines guidance in relation to ED PETs for vulnerable groups. ED PET less than 24 hours (all patients) was 96.9% and less than 9 hours was 80.1% in September 2018. ED PET less than 24 hours for patients aged 75+ was 92.6% in September, with RCSI Hospital Group showing a 93.2% compliance, SSWHG showing 87% compliance and UL showing 79% compliance (HSE, 2018). This report outlines that all patients > 75 years should have a PET 24 hours (HSE, 2018).

The *Health in Ireland: Key Trends in 2018* (Department of Health 2018) report demonstrates that 1,318,368 patients presented to EDs within Ireland in the year ending 2017; a 14.6% increase since 2008. As expected, the over 65 age group were classified as the most frequent users of emergency departments in Ireland particularly within the winter months of January-February and December (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 (DoH, 2018). Our research shows that this number continues to grow given the number of presentations experienced within the four pilot sites. On average more males than females make up ED presentations except for the over 85 age group where more female patients present (DoH, 2018).

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.

1.1.2 Aims and Objectives

Overall Aim

The overall aim of this research is to measure the implementation of the safe nurse staffing draft policy *Framework* in emergency departments. This will include:

measuring the impact of implementing the recommendations in the *Framework* on patient outcomes, staff outcomes, and organisational factors. The study also aims 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 *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 nurse outcomes (job satisfaction, burnout, intention to stay).
- Objective 5: Determine the impact of the pilot introduction of the *Framework* on organisational/ward environment factors (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*².

Section 2

Methods

2.1 Research Design

This study uses 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 is being undertaken in conjunction with changes to nurse staffing made by the Department of Health and are based on recommendations in the *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 leader) is 100% supervisory. This approach will include the measurement of the total nursing hours available pre³ and post the intervention; this will be 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 a number of approaches, including: the implementation of the Baseline Emergency Staffing Tool (BEST (RCN 2014),

² Please note, this will be measured in Phase II following changes to the nursing staff in the pilot EDs.

³ This report presents pre data.

Based on staffing measures pre the intervention (actual staff levels), nurse staffing levels and skill-mix will be adjusted (required staff levels⁴) in the pilot emergency departments based on patient acuity and dependency needs.

2.2 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).

2.2.1 Predictor/Explanatory Variables

To determine safe staffing levels in ED, a number of approaches were used; these included the implementation of BEST, which incorporated the Jones Dependency Tool (JDT) (Jones 1999). The JDT was used to measure patient dependency in ED. JDT was used to evaluate patients' needs in six areas: communication; airway, breathing and circulation; mobility; eating, drinking, elimination and personal care; environmental safety, health and social needs; and triage. The score obtained from the JDT were then entered into BEST; this then, based on the patient's level of dependency, calculated the level of staffing required in the ED.

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.

2.2.2 Outcome Measures

2.2.2.1 Patient Outcome Measures

To examine the extent to which patient outcome measures change over time as a consequence of the pilot introduction of the *Frameworks*, this phase included a retrospective analysis of all patients admitted to the emergency departments/local injury unit over the period of the research. 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/LIU over the period of one year. This data included:

⁴ Staffing levels will be adjusted if these are required.

- *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.
- *Patient Experience Time (PET)*: PET was defined as the time from triage to discharge from the ED or transfer to an inpatient bed (Chan *et al.* 2010).

2.2.2.2 Patient Safety Care Left Undone Events

The *Framework* (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 recommends 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 developed; these 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 will measure the prevalence of Safety CLUES both pre and post the introduction of the recommendations in the *Framework*. 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.

2.2.2.3 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 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* -In the results of pilot study in medical and surgical settings (Drennan *et al.* 2018), it was identified that there were high levels of job dissatisfaction and intention to leave amongst staff; therefore, for this component of the study, a decision has been made to measure the relationship between nurse staffing and burnout of nurses working in EDs. 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 LIU. The HS-MBI was used to measure three areas

associated with burnout: emotional exhaustion, depersonalisation and personal accomplishment.

2.2.2.5 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.

2.2.2.6 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).

2.3 Settings

The sites to test the pilot implementation of the recommendations in the *Frameworks* were identified by the Department of Health. Hospitals were chosen according to their location and specialist functions and within each of the six hospital groups. For the purpose of this report and confidentiality, the three EDs and the one LIU are referred to with a code. Eligibility criteria included ED settings providing 24-hour, seven-day care for adults and/or child populations; the LIU provided care on a seven-day basis and operated from 8am to 8pm.

2.4 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.

2.5 Administrative Data

We collected administrative data for all patients who attended the three EDs and one LIU on a daily basis over a period of one year; 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 EDs; these systems included: *iPMS*, *iSOFT* and *PatientCentre*.

2.6 Procedure

As in the pilot programme, research staff were placed in each of the hospitals to facilitate data collection with the support of hospital staff. Orientation sessions were held in each of the departments and consent was obtained from staff to undertake the research. All nurses employed on 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 will be necessary to collect data from the same members of staff at different time points. Once data collection and data entry has been completed, staff data will be irrevocably anonymized.

2.7 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.

2.8 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).

2.9 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 the Emergency Care Area* 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 setting of the skill-mix 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 3

Results from the Pilot Hospitals

3.1 Introduction

This section outlines the results to date from the research for the pilot hospitals 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. Primary staffing data collected using BEST, incorporating the Jones Dependency tool to collect data hourly to calculate the WTE and skill-mix required for the departments. Secondary data, collected from administrative systems, was used to collate data on a number of patient outcomes related to staffing in the Emergency Department (collected from iPMS, an iSOFT product and Patient Centre) and was also used to calculate staffing based on the New South Wales model of staffing, the California mandated ratios model and the Tasmania model of NHPPD. Cross-sectional data was collected from nursing staff working on the four pilot wards. Nursing staff provided data on nursing work, job satisfaction and intention to leave as well as care left undone events. The results outline the baseline functioning of the three pilot EDs and one LIU.

3.2 Staffing Data

The data for this section of the report was collected through BEST, incorporating the JDT (RCN 2014). The BEST tool calculates ED nurse staffing requirements through the measurement of current rostered staffing, the number of patients attending the department and the level of patients' dependency; dependency Data was collected from all four sites and allowed for the following calculations:

- Patient dependency based on communication, ABC factors, mobility, eating, drinking, elimination and personal care, environmental safety, health and social needs and triage scores
- Nurse-to-Patient hourly ratios per area (i.e. resus, majors, etc.) used to calculate staffing based on the NICE recommendations
- Nurse-to-Patient individual hourly ratios
- Proportion of care delivered by agency staff

Additionally, we used the Nursing Hours per Patient Day model (NHPPD) (Department of Health and Human Services 2011) to calculate staffing utilising administrative system data. We also used the administrative data to calculate the New South Wales model of 1-RN to 3-patients, along with the California model which stipulates mandated ratios, of 1:4 for all ED with the exception of trauma and critical care patients and the unpublished NICE Guidelines for safe staffing in EDs (NICE 2016).

Table 3.2.1: Data collection period for BEST and NICE

		Data collection Period	Cubicles	Ave. Daily Presentations
Hospital 4		2/12/2018 – 9/12/2018	22	177
Hospital 5		18/11/2018 – 25/11/2018	11	75
Hospital 6		10/12/2018 – 17/12/2018	32	177
Hospital 7	Unit 1	9/11/2018 – 15/11/2018	5	35
Hospital 7	Unit 2	9/11/2018 – 15/11/2018	8	12.4

3.2.1 BEST

BEST workforce planning tool which was designed for local level data collection and highlights differences between rostered staffing and required staffing. The *BEST* tool collects data on the following domains:

- Patient dependency over the period of 24 hours, 7 days a week
- Rostered staffing level

From this data, the tool calculates the WTE and skill-mix required based on data collection from all patients over 24 hours for seven days a week. *BEST* is based on the UK calculation where staff work 37 hours a week and they receive a 25% increase to account for annual leave, sick leave and study leave. As the Irish model is different, this has been recalculated to as Irish staff work a 39-hour week and there is an allowance of 20% for leave. Data is analysed under these considerations. Appendix A, section i outlines the calculations for *BEST*.

The calculation for *BEST* includes those patients who have been admitted but are still waiting on a bed in the emergency department. As such, Table 3.2.1.1 below shows the staffing requirement for each of the hospitals including this patient cohort. The data indicates that Hospital 6 requires the greatest uplift at 104 WTEs, followed by Hospital 5 at 40.22 WTEs, Hospital 4 at 33.97 WTEs and Hospital 7 at 5.26 WTEs. Of the WTE, 10% is allocated for CNMs, with the remaining WTE proportion having an 85:15 ratio for RNs to HCAs in line with the recommendations of the Framework.

The introduction of the WRC agreement in 2016⁵ stipulates that “boarded patients” are staffed separately from the core ED patients. This latter calculation is currently an estimation as it is relying on staff to accurately identify those with a decision to admit and accurately indicate the correct time this decision was made at. As such, excluding this cohort from the calculation may have resulted in an over or under representation of the staffing requirement. Table 3.2.1.2 shows *BEST* without those “boarding” in the department and it is apparent that Hospital 6 remains the hospital that requires the greatest uplift of 61.58 WTE, followed by Hospital 5 at 24.92 WTE. Hospital 4 is slightly overstaffed while Hospital 7 was not affected and their data indicates that they require 5.26 WTE extra based on *BEST*.

⁵ See Appendix

Table 3.2.1.1: BEST WTE calculation including admitted patients waiting on a bed in ED

	Hospital 4	Hospital 5	Hospital 6	Hospital 7
<i>Recommended</i>				
CNM	15.94	8.42	18.50	2.58
RN	121.93	64.42	141.54	20.18
HCA	21.52	11.37	24.98	3.56
<i>Available</i>				
CNM	17.00	8.00	14.00	2.06
RN	93.14	30.30	61.00	19.00
HCA	11.27	5.70	6.00	0.00
<i>Uplift required</i>				
CNM	-1.06	.042	4.50	.52
RN	28.79	34.12	80.54	1.18
HCA	10.25	5.67	18.98	3.56
Total uplift	37.97	40.22	104.02	5.26

Table 3.2.1.2 BEST WTE calculation excluding admitted patients waiting on a bed in ED

	Hospital 4	Hospital 5	Hospital 6	Hospital 7
<i>Recommended</i>				
CNM	12.08	6.89	14.26	2.58
RN	92.44	52.73	109.08	20.18
HCA	16.31	9.30	19.25	3.56
<i>Available</i>				
CNM	17.00	8.00	14.00	2.06
RN	93.14	30.30	61.00	19.00
HCA	11.27	5.70	6.00	0.00
<i>Uplift required</i>				
CNM	-4.92	-1.11	0.26	.52
RN	-0.70	22.43	48.08	1.18
HCA	5.04	3.60	13.25	3.56
Total uplift	-0.58	24.92	61.58	5.26

The BEST calculations for Hospital 4 above include paediatrics as the staffing compliment cover both areas. However, for the purpose of this research, the required WTE for paediatrics in Hospital 4 was calculated separately. According to BEST paediatrics requires 2.99 Nurse Managers, 2.90 registered nurses and 4.04 health care assistants. These figures, while slightly lower, are similar for boarded paediatric patients, see Table 3.2.1.3 below.

Table 3.2.1.3: BEST WTE calculation for paediatrics, including and excluding patients admitted but waiting on a bed

Hospital 4	Including boarders	Excluding boarders
<i>Recommended</i>		
CNM	2.99	2.84
RN	22.90	21.75
HCA	4.04	3.84

3.2.2 NICE recommendations

The NICE recommendations for Nurse-to-Patient ratios are detailed in Table 3.2.2.1. Of note, these recommendations do not include HCAs and thus adjustments would need to be made to the number of HCAs available in line with the Framework recommendations of an 85:15 skill-mix. There are currently no recommendations for minor areas or paediatrics. Additionally, ratios of 1:2 with the capacity for 2:1 for trauma patients in recommended for resuscitation. However, with the complexities of the clinical setting, it is not possible to calculate this ratio accurately and thus using a ratio of 1:1.5 for resuscitation was used for this calculation as it allows for the additional capacity for trauma or cardiac patients. NICE does not have separate guidelines for boarded patients and thus they remain as part of the overall cohort, see Table 3.2.2.2. However, due the ability within our data to remove this cohort, there is also the staffing data without boarded patients, Table 3.2.2.3. Both calculations are based on the actual number of staff that delivered care per patient for each hour that they were present. The ratio is calculated and compared to the recommended ratio to determine if there was a shortfall. The requirement is then calculated based on this including the additional 20% for leave. The exception for this is Hospital 7 which was calculated based on the roster. However, many staff members were reassigned to other areas of the hospital and thus were not available to deliver care. As with the BEST data discussed above, this data is also reliant on a high capture rate. See Appendix A, section ii for calculations.

Table 3.2.2.2 below details the uplift required for each of the Hospitals based on NICE recommendations. It is apparent that Hospital 6 requires the largest uplift of 31.16 WTE, followed by Hospital 4 at 11.15 WTE, with hospital 5 requiring a much smaller uplift of 1.85 WTE and Hospital 7 not requiring any uplift of registered nurses.

The pattern for staffing based on the NICE recommendations remains similar when boarded patient are excluded (Table 3.2.2.3). Hospital 6 remains the most understaffed requiring 20.28 addition RNs with the remaining Hospitals requiring no additional RNs.

Table 3.2.2.1: NICE recommendations

	Ratio
Resus	1:2 with the capacity for 2:1 for trauma and cardiac patients; average 1:1.5
Majors	1:4
Minors	none; suggest 1:4 as high patient caseload
Obs	none; suggest 1:6 as high patient caseload

Paediatrics none; suggest 1:3 as high patient caseload

Table 3.2.2.2: NICE Ratios including admitted patients waiting on a bed in ED

	Hospital 4	Hospital 5	Hospital 6	Hospital 7 Unit 1	Unit 2
Resus	1:1.46	1:1.18	1:2.12	-	-
Majors	1:5.78	1:4.50	1:9.7	2.46	1.94
Minors	1:4.20	1:1.73	1:5.38	-	-
Obs	-	-	1:8.93	-	-
Paeds	1:4.73	-	-	-	-
Uplift required	14.63	2.01	29.73	not applicable	

Table 3.2.2.3: NICE Ratios excluding admitted patients waiting on a bed in ED

	Hospital 4	Hospital 5	Hospital 6	Hospital 7 Unit 1	Unit 2
Resus	1:1.22	1:0.82	1:2.12	-	-
Majors	1:3.20	1:2.95	1:6.09	2.46	1.83
Minors	1:4.07	1:1.73	1:2.46	-	-
Obs	-	-	1:8.38	-	-
Paeds	1:4.45	-	-	-	-
Uplift required	-1.63	-7.20	20.28	none	

3.2.3 Individual Nurse-to-Patient Ratios

Our data allowed us to calculate the average number of patients' individual nurses were caring for per hour, see Table 3.2.5.1, with the exception of Hospital 7. It is apparent that Hospital 6 has the highest caseload for individual nurses ranging from 1.47-9.08, with an average of one nurse to 4.66. This is closely followed by Hospital 4 with an average of 1 nurse to 3.70 (1.00-8.67) and Hospital 5 having the mean ratio of 1 nurse to 2.87 (1.00-7.36). The ranges for each the hospitals were quite large however; this is to be expected as some nurses were in resuscitation resulting in low ratios compared to paediatrics or minors, which would result in high ratios.

Table 3.2.4.1: Average Individual Nurse-to-Patient Ratios

Mean (SD)	Hospital 4	Hospital 5	Hospital 6	Hospital 7
Minimum	1.00 (0.00)	1.00 (0.00)	1.47 (0.69)	not available
Maximum	8.67 (5.70)	7.36 (5.21)	9.08 (1.98)	not available
Average	3.70 (1.74)	2.87 (1.56)	4.66 (2.11)	not available

3.2.4 Agency Use

The hourly data allowed us to calculate the proportion of hours of care that were delivered by agency or bank staff, see Table 3.2.6.1. The highest proportion of this was seen in Hospital 4 (21.5%), followed by Hospitals 6 (17.2%) and Hospital 5 (15.4%). Hospital 7 used no agency staff during their data collection week.

Table 3.2.5.1: Agency/Bank staff

	Hospital 4	Hospital 5	Hospital 6	Hospital 7
Hours (%)	418 (21.5)	151 (15.4)	258 (17.2)	0 (0)

3.2.5 California Model

California have mandated ratios of 1:4 (RN:Patient) for every hour that the patient is present in the emergency department including patients who have been admitted but are waiting in the ED for a bed. The California model does not distinguish between the areas patients are being treated in and it does not have a skill-mix level. However, it does stipulate that trauma patients should have a ratio of 1:1 and critical care patients should have a ratio of 1:2. As we are unable to determine this from our data with specificity, we have treated patients under the Triage category of immediate as “trauma” and those under very urgent as “critical care”. This data is based on a year for Hospitals 4, 5 and 6, and a week aggregated to a year for Hospital 7; see Appendix A, section iii for calculations.

Based on this data Hospitals 4 and 7 have excess staff; while Hospitals 5 and 6 which require uplifts of 3.61 and 67.51 WTEs respectively.

Table 3.2.5.1 California model

	Hospital 4	Hospital 5	Hospital 6	Hospital 7
RN				
Required	68.00	49.71	128.51	2.86
Available	93.14	30.3	61.00	9.5
Uplift	-25.14	19.41	67.51	-6.64

3.2.6 New South Wales Model

The NSW model recommends a ratio of nurse-to-patient ratio of 1:3 for every hour that the patient is present in the emergency department irrespective of their dependency or the area of the department they are being treated in. This includes patients who are in the department awaiting a bed and does not account for skill-mix. The data for this model comes from the administrative data, ideally over one year; however, this was aggregated to the year when not available, i.e. Hospitals 5 and 7. Patient Experience Time for all patients for the year are calculated, divided by 3 and the WTE is then calculated. See Appendix A, section iv for calculations.

This model indicates that three of the four hospitals are slightly understaffed, with Hospital 4 requiring an uplift of 7.56WTEs, Hospital 5 requiring an additional 4.40 RNs and Hospital 6 requiring the greatest uplift of 68.44 WTEs.

Table 3.2.6.1 New South Wales Model

	Hospital 4	Hospital 5	Hospital 6	Hospital 7
<i>RN</i>				
Required	100.70	48.71	129.44	3.71
Available	93.14	30.30	61.00	9.50
Uplift	7.56	18.41	68.44	-5.79

3.2.7 NHPPD

The calculation of NHPPD considers all patients in the department and accounts for their entire stay. The patient's triage score is used to calculate the nursing hours for each patient per category. The required staffing calculated is inclusive of RNs and HCAs; however, it does not provide a calculation for CNMs or those staff not delivering direct patient care. The calculation in Table 3.2.7.1 below includes a skill-mix of 85:15. Administrative data was not available for Unit 2 of Hospital 7 therefore the available staff of 19WTE was divided to account for the staff being split between the two units. Hospitals 4 and 6 are based on a one year's data and thus the most accurate while Hospitals 5 and 7 were calculated based on one week and aggregated up to the year and should be treated with caution. The data shows that Hospital 6 requires the greatest uplift to staff at 105.13 WTEs, followed by Hospital 5 requiring 20.36 WTEs and Hospital 4 requiring the least at 11.62 WTEs. See Appendix A, section v for overall calculation for NHPPD.

Table 3.2.7.1: NHPPD

	Hospital 4	Hospital 5	Hospital 6	Hospital 7
<i>RN</i>				
Required	98.63	60.81	146.31	5.93
Available	93.14	30.3	61.00	9.5
Uplift	5.49	30.51	85.31	-3.57
<i>HCA</i>				
Required	17.40	10.73	25.82	1.04
Available	11.27	5.7	6.00	0.00
Uplift	6.13	5.03	19.82	1.04
Total uplift	11.62	35.54	105.13	-2.53

3.2.8 Conclusion

Each of the different staffing methods used above indicate that Hospital 6 requires a large uplift in staffing regardless of the method of calculating staffing employed. The data from the administrative system is more objective than that of the paper-based data collection method. However, it is apparent that the patients in Hospital 6 are more dependent, have greater acuity, longer PET times and a greater number of attendances than those of the other hospitals (see Appendix A). As a result, this has led to the vast difference in the staffing requirements in the hospitals.

While Hospital 7 does not come out as requiring additional RNs in most models, it does consistently come out as requiring one HCA. It is recommended that this is calculated as 1 HCA per shift split between the two units which comes to a total of 2.60WTE to cover the 39-hour week and leave. Additionally, staff in Hospital 7 are regularly allocated to other areas of the hospital; thus, we recommend that the minimum staffing level of 2RNs is upheld in Unit 1 of Hospital 7. All methods of calculating staffing in Unit 2 proved ineffective and a different method such as NHPPD for wards is recommended in Unit 2.

Both BEST and NICE rely on a very high capture rate of patients throughout their emergency department stay. There are logistic difficulties in applying these methods in practice and they require a high level of staffing resources; as such, having an additional team is an important factor for such an intensive data collection period. Data from administrative systems are a much more objective and accurate way of calculating staffing requirement.

The other methods rely on administrative data and accuracy of administrative data. For example, patients may have a long LOS in the emergency department at a high triage category. However, 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. These should be staffed separately under the WRC 2016 agreement. Thus, they would no longer require care from the core ED staff; however, there is currently no way 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.

3.3 Administrative Data

This section outlines the administrative data results to date from the three emergency departments and one local injury unit pilot sites. The administrative data in each pilot hospital site was reviewed to determine potential outcomes that could be assessed in relation to safe staffing.

The results are outlined in a number of sections and provide an overview of each the pilot hospital site areas. Data was collected from each hospital's administrative system and is reflective of the year ending 31st December 2018. The administrative systems utilised by the hospitals information and communications technology departments (ICTs) included iSOFT iPMS and Patient Centre.

The administrative data was explored in relation to a timeline of one year in order to present a comprehensive overview trajectory and to consider seasonal variation. Whilst the data is taken from each hospital's administrative systems and was compiled with hospital ICT staff collaboration, the purpose for this initial report is to present the utilisation of administration data as a means of examining outcomes associated with nurse staffing. Hence, the results should be interpreted with caution at this stage in the research, with the focus on providing an overall view 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: average length of stay, Patient Experience Time (PET), time to triage and time from triage to being seen by a decision maker.

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

- Patient Demographics
- Patient Attendances including- new attendances and returns
- Numbers Leaving Without Being Seen
- Numbers of Patients Admitted
- Average Length of Stay
- Wait Times including:
 - PET
 - Time to Triage
 - Time from triage to time to be seen by a decision maker.

Administrative data was also collected during the week of testing the BEST tool in terms of the rostered and actual staff working shifts in order to determine if any potential relationship existed between staffing and outcomes. This will require further ongoing analysis but is outlined here for illustrative purposes.

3.3.1 Patient Demographics

Overall, from January 1st 2018 up to and including 31st December 2018, 178,045 patients attended the three pilot EDs and one LIU. The majority of patients attending

had a mean age of 45.08 years. Patient ages ranged from less than 1 month to 98.68 years with only one site providing specific emergency services for paediatrics (outside of trauma and burns). Table 3.3.1.1 outlines patient demographics for each site.

Table 3.3.1.1: Demographic profile of patients attending each of the pilot sites

	Hospital 4 n = 67883	Hospital 5 n = 30018	Hospital 6 n = 68972	Hospital 7 n = 11172 ⁶
New Attendances	64,495 (95%)	25,457 (84.8%)	63,045 (91.4%)	-
Returns	3,388 (5%)	4,561 (15.19%)	5,927 (8.5%)	-
Age in Years (Mean (SD))	40.1 (23.76)	42.01 (16.24)	48.2 (20.03)	50.01 (17.55)
Gender				
<i>Males</i>	34,964 (51.5%)	14,672 (48.8%)	36,474(52.9%)	5,913 (52.9%)
<i>Females</i>	32,919 (48.4%)	15,346 (51.12%)	32,496(47.1%)	5,259 (47.07%)
<i>Unknown</i>	-	-	2 (0.002%)	-
Attendances Over 75 years	9,140 (13.4%)	4,468 (14.88%)	9,261 (13.4%)	788 (7%)
Average LOS (in hours)	7	8	9	2
Number of Admitted Patients	22,005 (32%)	9,142 (30%)	17,330 (25%)	0.1 (0%) ⁷
Patients >9 hours in Department	17,535 (25.8%)	7,240 (24.1%)	22,972 (33.3%)	125 (1.1%)

Patient demographic data attained from hospital administrative data for year ending 31st December 2018. Data on new presentations versus returns was not available for Hospital 7, hence overall numbers are presented. For patients > 9 hours in a department, only data for Hospital 4, 6 and 7 was available. 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.

3.3.1.1 Attendances

A combined number of 178,045 patients were seen across the 4 hospital sites over the year. Attendances were a combination of both new patients and returns with the

⁶ Data was not available from this site separating new attendances and returns.

⁷ Patients are not usually admitted from this site as it is a Local Injury Unit, therefore data presented is minimal.

majority reflective of new attendances (over 85%). Table 3.3.1.1 outlines the breakdown of attendances in terms of new presentations and returns.

Attendances were also categorised by age group into those who were over 75 years of age and those under 75 years of age. Hospital 5 had the highest percentage of patients over 75 years being treated (14.9%, n=4,468). In Hospital 6, 13.3% (n=9,261) and Hospital 4, 13.4% (n=9,140) of their cohort were over 75 years of age (Table 3.3.1.1). In terms of Hospital 7, 7% (n=788) of their patients were over 75 years. Other age group categories were applied individually by each hospital system administrator however as these category groupings varied considerably only > 75 years and < 75 years is presented.

3.3.1.2 Number of Patients Admitted

The hospital with the highest number of admitted patients was Hospital 4 (n=22,005, 32% of all attendances), followed by Hospital 6 (n=17,330, 25% of all attendances), and Hospital 5 (n=9,142, 30%). The rate of admissions per day from the three hospital sites was extensive, with Hospital 4 having on average 60.3 admissions per day; Hospital 6 having, on average, 47.5 admissions per day and Hospital 5, 25 admissions per day. Data pertaining to admitted patients for Hospital 7 was minimal as this particular Local Injury Unit does not regularly admit patients. Admitted patients made up over 27% (n=48,477) of all patients who attended the ED, across the three sites.

3.3.1.3 Length of Stay

Hospital 5 and 6 had the longest average length of stay (ALOS) with Hospital 6 at 9 hours and Hospital 5 at 8 hours. Hospital 4, was 7 hours and Hospital 7 ALOS was 2 hours (Table 3.1). Over 26% of patients waited longer than 9 hours within the departments (n=47,872) with Hospital 6 having the highest number of patients >9 hours in ED (n=22,972, 33.3%). Over 25% of patient waited > 9 hours in Hospital 4 (n=17,535), with just under a quarter of patients at Hospital 5 (n=7,240, 24.1) and less than 1.1% of patients (n=125) at Hospital 7 waiting > 9 hours.

In summary, the majority of patients who attended the departments at the pilot hospital sites were male (51%, n=92,023) and over 40 years, although patient demographics varied within each hospital. New presentations made up over 85% of all attendances across the four sites. Patients who were over 75 years of age accounted for over 13% (n=23,657) of all attendances. Over a quarter of all patients (26.88%) were > 9 hours within the department.

The next section of this report presents the emergency department patient outcomes pertaining to the four pilot hospital sites.

3.3.2 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 3.3.2.1 depicts the outcomes reviewed.

3.3.2.1 Wait Times

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, patient experience times (PET), length of stay (in department and within hospital-for admitted patients), time waiting to be triaged, time waiting from being triaged to being seen by either a doctor or advanced nurse practitioner (ANP), and the time the decision to admit was made.

3.3.2.2 Patient Experience Times

Across the four sites PET- total time of patients' experience within the department/unit ranged from an average of 0.3 hours to 42.71 hours. Hospital 6 demonstrated the highest average PETs (9.08 hours), followed by Hospital 5 (8.08 hours on average) and Hospital 4 (7.5 hours on average), with Hospital 7 indicating the lowest average PETs at less than 2 hours (1.67 hours) (Table 3.3.2.1).

In general, PETs were twice as long for admitted patients in comparison to non-admitted patients (Table 3.3.2.1). Admitted patients incurred significantly longer overall PETs when compared with non-admitted patients. Overall PETs for admitted patients was double that of non-admitted patients (Table 3.3.2.1). On average, admitted patients PET was approximately five hours longer than patients who were not admitted and over double that of overall average PETs.

3.3.2.3 Time to Triage

On average, patients waited just over 25 minutes from check in at reception to being triaged i.e. time to triage (TTT), across the four hospitals. Hospital 6 had the longest average TTT at 38 minutes (Table 3.3.2.1). Hospital 7 had the shortest TTT at 19 minutes on average (Note: this is a Local Injury Unit).

3.3.2.4 Triage to Being Seen

Overall wait times from initial registration to time seen by a decision maker were shorter for patients seen by advanced nurse practitioners (ANPs) in comparison to patients seen by Doctors (including all doctors - interns, senior house officers and registrars) (Table 3.3.2.1). Hospital 5 did not separate patients seen by doctors and ANPs and hence comparison for this site is not feasible.

In summary, on average, patients spend approximately 6.58 hours within the emergency department (PET). Once registered, time to triage takes, on average, 25 minutes, with time to being seen estimated to average 98 minutes depending on the site and healthcare professional attended. The research team noted the potential to utilise the above emergency department outcomes in order to assess safe staffing in emergency departments. In the following section emergency department outcomes are examined in relation to nurse staffing over a duration of a week in order to determine if these outcomes offer a viable method of assessing adequate staffing levels.

3.3.2.5 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, left before treatment commencement or completion or left before being seen by a health care professional. For Hospital 5, LWBS was defined as patients who self-discharged or left before treatment completion. For Hospital 6, LWBS referred to self-discharging patients, patients who left before treatment completion and before being seen. In Hospital 7, LWBS referred to patients that left before being seen by a health care professional.

In total over 15,246 patients (8.6%) left without being seen (LWBS) or self-discharged across the pilot sites over the last year (1st January 2018 to 31st December 2018). This figure represents patients who presented to the reception area but left the department before being seen by a health care professional or prior to commencing or completing treatment. Data on reasons for LWBS or self-discharge was not available (Table 3.3.2.1). Hospital 7 had the lowest number with less than 1% (n=111) of patients LWBS. Hospital 6 demonstrated the highest numbers of patients LWBS (n=12,145, 17.6%).

Table 3.3.2.1: Emergency Department Outcomes

	Hospital 4 n = 67883 Mean (SD)	Hospital 5 n = 30018 Mean (SD)	Hospital 6 n = 68972 Mean (SD)	Hospital 7 n = 11172 Mean (SD)
Average Time to Triage (TTT) (in minutes)	0.22 (9.8)	0.21 (9.8)	0.38 (8.9)	0.19 (0.69)
Average time from Triage to Time Seen (in hours)	3.08 (40.15)	0.39 (22.1)	2.5 (38.1)	0.45 (6.6)
Average Time to Being Seen by Doctor	2.24 (45.12)	(Not Available) ⁸	(Not Available) ⁸	0.5 (20.67)
Average Time to Being Seen by ANP	0.21 (31)	(Not Available)	(Not Available)	0.2 (20.02)
Average PET	7.5 (2.6)	8.08 (2.54)	9.08 (3.5)	1.67 (0.8)
Average PET admitted patients	11.06 (12.1)	11.0 (10.8)	17.43 (11.4)	0.1 (0.8)
Average PET non-admitted patients	4.59 (1.09)	7.0 (1.45)	5.6 (1.16)	1.63 (0.35)
Numbers LWBS/Self Discharged, n (%)	1,968 (2.8)	1,022 (3.4)	12,145 (17.6)	111 (0.90)

In order to further examine nursing workload in the EDs, the national trolley figures for each of the days of the data collection week. The TrolleyGAR⁹ metric system was employed for this.

3.3.4 TrolleyGAR

The TrolleyGAR system provides a three-time daily count of patients on trolleys within acute hospitals and reports the number of patients awaiting admission to an inpatient hospital bed. TrolleyGAR captures data at 8am, 2pm and 8pm outlining the number of patients on trolleys, patients waiting >24hours and patients waiting >9hours on trolleys

⁸ Data from this site did not segregate patients seen by ANP or doctors.

⁹ Three times daily at 8 a.m., 2 p.m. and 8 p.m. acute hospitals report the number of patients in ED awaiting admission to an inpatient hospital bed.

within Irish hospitals. TrolleyGAR provides overall total number of patients waiting on trolleys within acute hospitals and allows for daily monitoring of emergency departments performance. As part of the HSE Winter initiative target, all hospitals aim to meet an 8 a.m. TrolleyGAR threshold which is 236 patients waiting for a bed on a national basis (HSE, 2019).

The TrolleyGAR system was reviewed for daily reports for the year 2018 and during the week of data collection for each of the pilot sites (Hospital 4, 5, 6 and 7). Overall, daily figures were compiled (Figure 3.3.4.1) and compared with national recommendations. As Hospital 7 did not have patients on trolleys and is not catalogued in the TrolleyGAR system individually but as a cohort of a larger hospital, results for this site are not presented.

3.3.4.1 Data Collection Week

At its highest point during the data collection week, Hospital 4 had 21 patients on trolleys at 8am (Table 3.3.4.1A). Overall, Day 1 and 2 within Hospital 4 showed the highest numbers of patients on trolleys. The national average total for this week was 357 of which Hospital 4 made up just over 2.3% of this.

Hospital 5 showed Day 5 as having the highest number of patients on trolleys (n=21) at 8 am. Of these 4 patients were on trolleys for longer than 24 hours (Table 3.3.4.1B). On average throughout the week, Hospital 5 had 6.7 patients on trolleys. National figures showed over 2,538 patients on trolleys during this week with 1,260 of these waiting > 9 hours. On average, throughout the week 317.25 patients were on trolleys on a daily basis with Hospital 5 representing 2.5%.

Hospital 6 had the highest number of patients on trolleys during their week of data collection on Day 4 with 29 patients on trolleys at 8am count (3.3.4.1C). Of these 8.37 on average were waiting longer than 9 hours. In Hospital 6, There was, on average, 14.5 patients waiting on trolleys at 2pm with 7.12 waiting longer than 9 hours; with, on average, 9.12 patients waiting on trolleys at the 8pm count with 4.5 waiting >9 hours. Throughout the week an average of 13.5 staff were rostered. The national average for the week was 359.8 patients on trolleys with 170.8 > 9 hours.

Figure 3.3.4.1A TrolleyGAR Data for Hospital 4

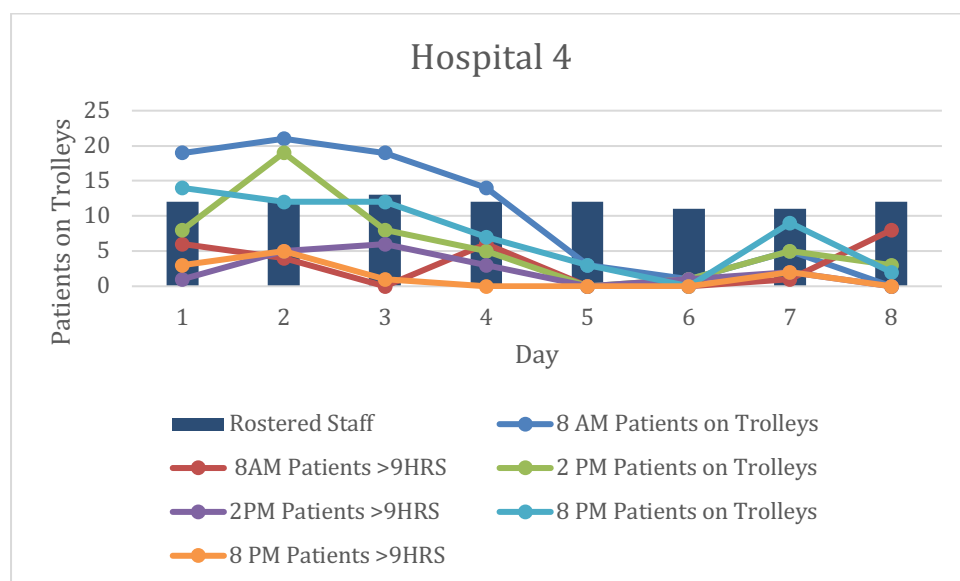


Table 3.3.4.1A: TrolleyGAR Data for Hospital 4

Date	Patients on Trolleys >24 Hours			8am	8am >9 Hours	2 pm	2pm >9 Hours	8 pm	8pm >9 Hours	Staff	National Number of Patients on Trolleys
	8 am	2pm	8pm								
3.12.18	0	2	0	19	6	8	1	14	3	12	289
4.12.18	0	0	0	21	4	19	5	12	5	12	405
5.12.18	2	0	1	19	0	8	6	12	1	13	422
6.12.18	0	0	0	14	6	5	3	7	0	12	382
7.12.18	0	0	0	3	.	.	.	3	.	12	356
8.12.18	0	0	0	1	0	1	1	.	.	11	306
9.12.18	0	0	0	5	1	5	2	9	2	11	331
10.12.18	0	0	2	0	8	3	0	2	0	12	365
Weeks Average	0.25	0.25	0.37	10.25	3.57	7	2.57	8.4	1.83	11.9	357
Weeks Total	2	2	3	82	25	49	18	59	11	95	2,856
National Total Number of Patient > 9 hours on Trolley during data collection week					1,373						
National Average Number of Patients > 9 hours on Trolley during data collection week					171.62						

Figure 3.3.4.1B:TrolleyGAR Data for Hospital 5

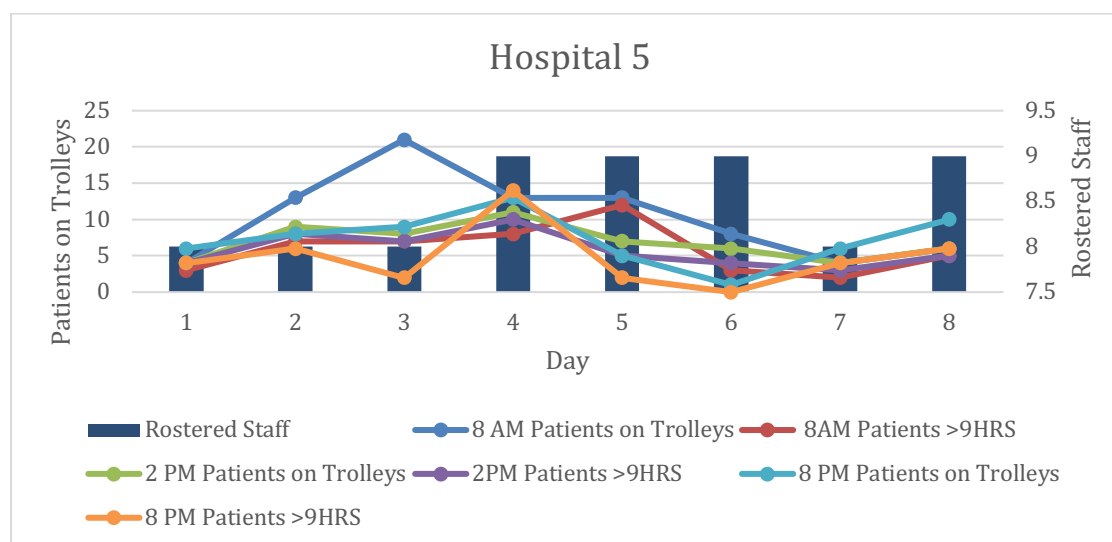


Table 3.3.4.1B:TrolleyGAR Data for Hospital 5

Date	Patients on Trolleys >24 Hours			8am	8am >9 Hours	2pm	2pm >9 Hours	8pm	8pm >9 Hours	Staff	National Number Patients on Trolleys
	8am	2pm	8pm								
18.11.18	2	2	3	4	3	4	4	6	4	8	200
19.11.18	3	2	3	13	7	9	8	8	6	8	320
20.11.18	4	2	1	21	7	8	7	9	2	8	430
21.11.18	2	2	4	13	8	11	10	13	14	9	387
22.11.18	7	1	1	13	12	7	5	5	2	9	359
23.11.18	0	0	0	8	3	6	4	1	0	9	297
24.11.18	0	0	1	4	2	4	3	6	4	8	235
25.11.18	3	3	4	6	5	6	5	10	6	9	310
Weeks Average	2.62	1.5	2.12	10.2	5.87	6.87	5.75	7.25	4.75	8.5	317.25
Weeks Total	21	12	17	82	47	55	46	58	38	68	2,538
National Total Number of Patient > 9 hours on Trolley during data collection week					1260						
National Average Number of Patients > 9 hours on Trolley					157.5						

Figure 3.3.4.1C: TrolleyGAR Data for Hospital 6

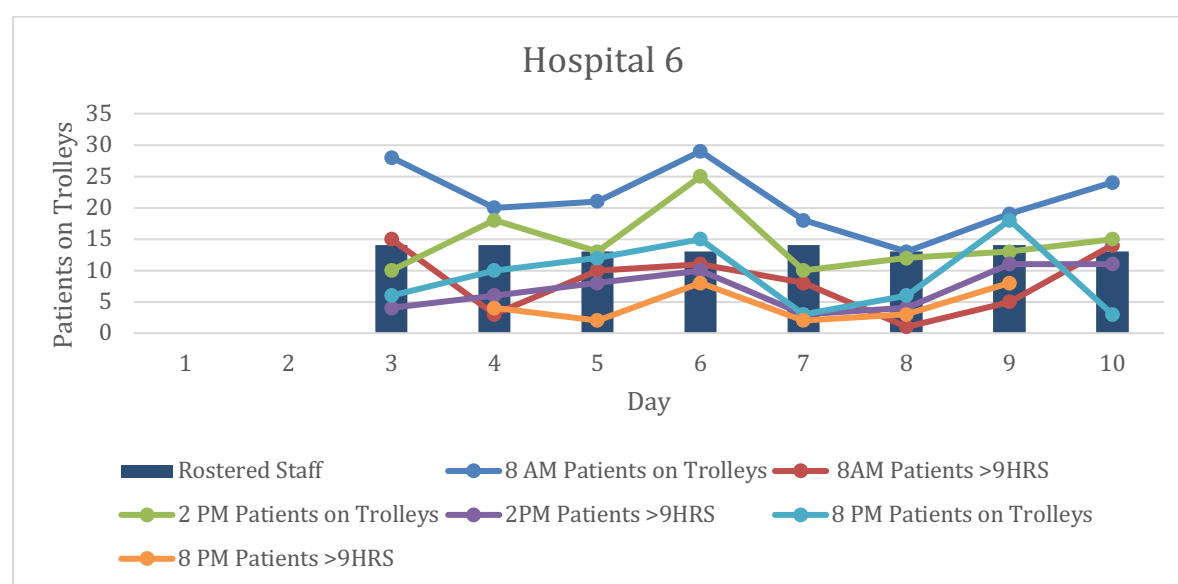


Table 3.3.4.1C: TrolleyGar Data for Hospital 6

Date	Patients on Trolleys >24 Hours			8am	8am >9 Hours	2pm	2pm >9 Hours	8pm	8pm >9 Hours	Staff	National Number Patients on Trolleys
	8am	2pm	8pm								
10.12.18	6	0	1	28	15	10	4	6	.	14	365
11.12.18	0	0	0	20	3	18	6	10	4	14	473
12.12.18	1	.	0	21	10	13	8	12	2	13	458
13.12.18	1	0	0	29	11	25	10	15	8	13	402
14.12.18	2	0	0	18	8	10	3	3	2	14	334
15.12.18	1	0	2	13	1	12	4	6	3	13	223
16.12.18	2	0	1	19	5	13	11	18	8	14	235
17.12.18	6	0	4	24	14	15	11	3	.	13	382
Weeks Average	2.37	0	1	21	8.37	14.5	7.12	9.12	4.5	13.5	359.8
Weeks Total	19	0	8	172	67	116	57	73	27	108	3,239
National Total Number of Patient > 9 hours on Trolley during data collection week					1,538						
National Average Number of Patients > 9 hours on Trolley					170.8						

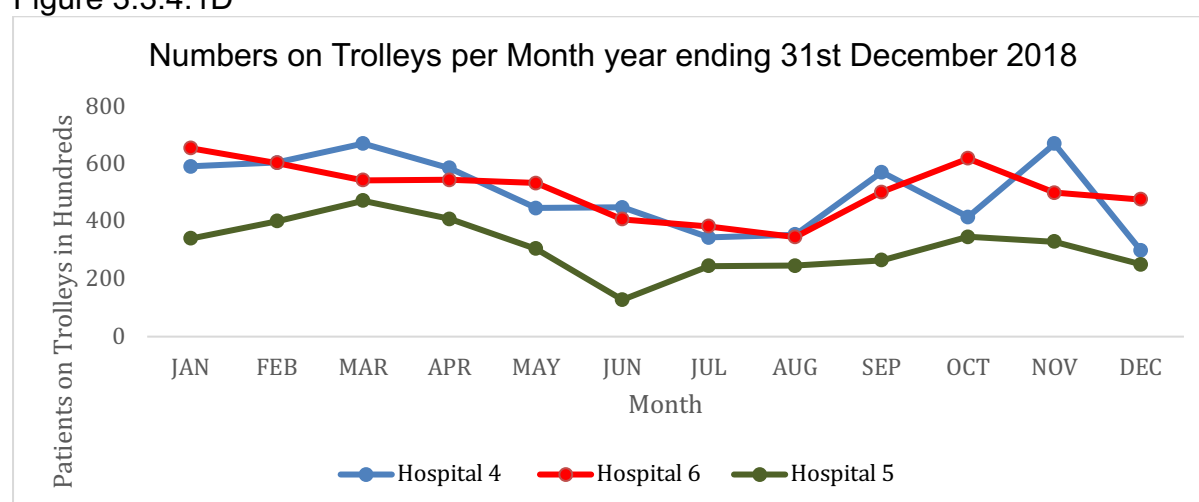
3.3.4.2 Annual TrolleyGar Data

Annually, Hospital 4 and 6 were comparable in terms of the numbers on Trolleys with Hospital 4 indicating 6,004 patients per year and Hospital 6 indicating 6,117 patients per year. Hospital 5 was substantially lower in terms of patient numbers on trolleys with 3,741. These figures are reflective of the 8 am daily count. Table 3.3.4.1D illustrates the number of patients on trolleys per site per month over the year 2018. On average, Hospital 6 had 16.85 patients on trolleys, Hospital 4 had 16.44 and Hospital 7 had 10.24 patients on trolleys (Figure 3.3.4.1D).

Table 3.3.4.1D Number of Patients on Trolleys per Site per Month Year Ending 2018

Month	Hospital 4	Hospital 5	Hospital 6
JAN	591	341	655
FEB	605	401	604
MAR	671	472	544
APR	586	409	545
MAY	447	305	534
JUN	449	128	408
JUL	344	245	383
AUG	354	247	346
SEP	571	265	502
OCT	416	347	619
NOV	670	330	500
DEC	300	251	477
Annual Total Number of Patients on Trolleys	6,004	3,741	6,117

Figure 3.3.4.1D



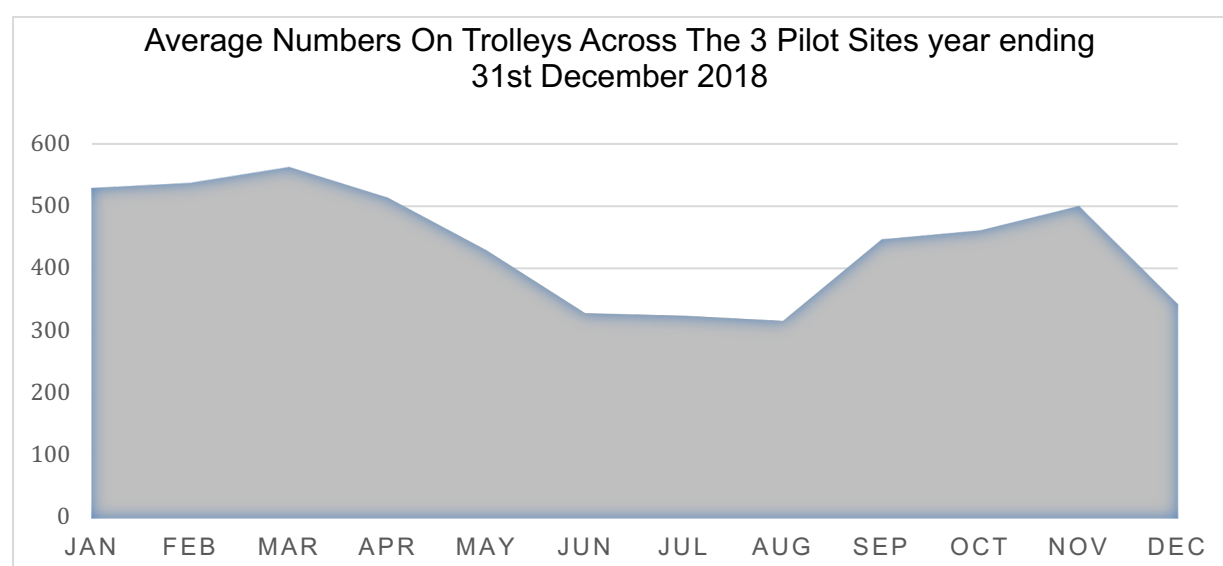
On average, the three pilot sites represented 440.61 patients on trolleys. Table 3.3.4.1E demonstrates the average number of patients on trolleys across the 3 pilot sites. Winter months were representative of higher number of patients on trolleys, with

specific peak time periods noted between January to March and October to November (Figure 3.3.4.1E).

Table 3.3.4.1E Average Number of Patients on Trolleys per Month Year Ending 2018

Month	Average Numbers on Trolleys across the 3 Pilot Sites	Numbers on Trolleys in Relation to Annual Average across 3 sites
JAN	529	↑
FEB	536.6667	↑
MAR	562.3333	↑
APR	513.3333	↑
MAY	428.6667	↓
JUN	328.3333	↓
JUL	324	↓
AUG	315.6667	↓
SEP	446	↑
OCT	460.6667	↑
NOV	500	↑
DEC	342.6667	↓
Overall Annual Average Number of Patients on Trolleys across 3 Pilot Sites	440.6111	

Figure 3.3.4.1E



The TrolleyGAR system allowed for data from the week of data collection for each site to be reviewed in terms of national figures. This presented an overall picture of where

each site was positioned in terms of national statistics. Future utilisation of the TrolleyGAR system throughout this research project may offer a means of determining staffing requirements for patients who are admitted but waiting on a bed.

3.3.6 Conclusion

In conclusion, the administrative data provided a comprehensive overview of the departments within the hospitals. It is apparent that certain outcomes can be identified utilising the administrative data which provides a useful resource for measuring outcomes, particularly over a longitudinal period of time. However, the four hospital departments vary significantly 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 initial report. In addition to this, the data presented here is representative of one-year data collection, with a sample of a week's rostering associated with emergency department outcomes presented and should therefore, be interpreted with caution. Whilst it is anticipated that further review of the data over sustained periods of time would provide a greater depth and breadth to the data, the results presented here offer a key insight into emergency departments/local injury units within the Irish context and present a viable means of assessing emergency department outcomes in relation to staffing over time, within a future context.

3.4 Cross-sectional staff survey

Staff across the four study sites, including clinical nurse managers (CNMs), staff nurses and healthcare assistants (HCAs), were asked to complete the staff survey. 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.

3.4.1 Demographics and Education

The demographic profile of the respondents is outlined in Table 3.4.1.1. The majority of respondents were RNs (76%) with CNMs comprising 15% of the staffing cohort. A large proportion held full-time contracts and had been working in their current unit for approximately 5 years. Respondents were in large part female and had an average of 14 years' experience as a registered nurse (RN). The majority had completed degree level education (93%). Of those surveyed, over 40% had received a specialist qualification in emergency nursing. Information gathered in relation to the type of shift last worked can be found in Table 3.4.3.

Staff also provided country of nursing pre-registration training, as shown in Table 3.4.1.2. Over 35% received their nursing accreditation overseas, mainly in the UK (42.3%) or India (23.1%).

Table: 3.4.1.1: Profile of respondents

Characteristic	Hospital 4 (n = 51)	Hospital 5 (n = 43)	Hospital 6 (n = 43)	Hospital 7 (n = 17)	Total
Response rate, %	53.1	73.3	69.7	76.7	68.1
<i>Job Title, n (%)</i>					
CNM	6 (11.8)	6 (14)	3 (7)	1 (5.9)	16 (10.4)
RN	38 (74.5)	24 (55.8)	30 (69.8)	14 (82.4)	106 (68.8)
HCA	7 (13.7)	13 (30.2)	10 (23.3)	2 (11.8)	32 (20.8)
<i>Nursing Qualifications, n (%)</i>					
<i>RN only</i>					
Registered nurse – cert.	2 (4.4)	4 (10.8)	1 (2.5)	3 (20.0)	10 (7.3)
Registered nurse – diploma	5 (11.1)	3 (8.1)	1 (2.5)	1 (6.7)	10 (7.3)
Registered nurse – degree	19 (42.2)	11 (29.7)	19 (47.5)	2 (13.3)	51 (37.2)
Post-graduate certificate	4 (8.9)	3 (8.1)	1 (2.5)	2 (13.3)	10 (7.3)
Post-graduate diploma	11 (24.4)	15 (40.5)	14 (35.0)	7 (46.7)	47 (34.3)
Masters in Nursing	4 (8.9)	1 (2.7)	4 (10.0)	0 (0.0)	9 (6.6)
<i>Educational Qualification, n (%)</i>					
No Formal Education	0 (0.0)	0 (0.0)	1 (2.6)	0 (0.0)	1 (0.7)

Junior Cert./Intermediate Cert.	2 (4.3)	0 (0.0)	3 (7.7)	0 (0.0)	5 (3.5)
Leaving Cert (or equivalent)	24 (51.1)	18 (42.9)	19 (48.7)	9 (56.3)	70 (48.6)
Vocational/Technical	3 (6.4)	6 (14.3)	5 (12.8)	2 (12.5)	16 (11.1)
<i>Qualification</i>					
Certificate (Third-level)	3 (6.4)	3 (7.1)	2 (5.1)	1 (6.3)	9 (6.3)
Diploma (Third-level)	2 (4.3)	4 (9.5)	2 (5.1)	4 (25)	12 (8.3)
Bachelor's Degree	12 (25.5)	8 (19)	7 (17.9)	0 (0.0)	27 (18.8)
Master's Degree	1 (2.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.7)
Doctoral Degree (e.g. PhD)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
<i>Specialist qualification in emergency nursing, n (%)</i>					
Yes	19 (41.3)	17 (44.7)	19 (47.5)	4 (23.5)	59 (41.84)
No	25 (54.4)	19 (50.0)	21 (52.5)	12 (70.6)	77 (54.6)
FETAC level 5 (HCA only)	4 (80)	5 (100)	3 (100)	-	12 (93)
<i>Working Contract, n (%)</i>					
Full-time	42 (84)	34 (79)	37 (86)	13 (81.2)	126 (83)
Part-time	8 (16)	3 (6.9)	4 (9.3)	3 (18.7)	18 (12)
Agency	0 (0.0)	5 (11.6)	0 (0.0)	0 (0.0)	5 (3)
Other	0 (0.0)	1 (2.3)	2 (4.6)	0 (0.0)	3 (2)
<i>Gender, n (%)</i>					
Female	41 (82.00)	35 (81.4)	34 (79.1)	14 (87.5)	124 (81.6)
Male	9 (18)	8 (18.6)	9 (20.9)	2 (12.5)	28 (18.4)
<i>Years as a nurse/HCA mean (SD)</i>					
As Nurse/HCA	12.40 (10.39)	14.27 (8.58)	9.06 (7.28)	20.49 (8.92)	12.74 (9.39)
Current Hospital	6.96 (8.14)	6.95 (6.71)	5.33 (6.45)	6.89 (6.99)	6.50 (7.14)
Current Unit	6.65 (8.03)	5.47 (5.56)	4.20 (6.21)	3.84 (4.28)	5.35 (6.58)
Agency	1.21 (1.50)	3.30 (2.00)	1.56 (1.26)	0.00 (0.00)	2.19 (1.90)
<i>Received Pre-Reg training in Ireland, n (%)</i>					
Yes	36 (70.6)	25 (58.1)	27 (62.8)	8 (47.1)	96 (62.3)
No	12 (23.5)	18 (41.9)	16 (37.2)	9 (52.9)	54 (35.1)
<i>Countries</i>					
UK	4 (33.3)	9 (50)	4 (23.5)	9 (100)	26 (46.4)
India	2 (16.7)	3 (16.7)	7 (41.2)	0 (0)	12 (21.4)
Other EU	4 (33.3)	0 (0)	1 (5.9)	0 (0)	5 (8.9)
Philippines	2 (16.7)	6 (33.3)	3 (17.6)	0 (0)	11 (19.6)
Other Worldwide	0 (0)	0 (0)	2 (11.8)	0 (0)	2 (3.6)

Table: 3.4.1.2: Profile of respondents' shift type

	Hospital 4 (n = 50)	Hospital 5 (n = 43)	Hospital 6 (n = 43)	Hospital 7 (n = 15)	Total
Day Shift (8 hours)	1 (2.0)	2 (4.7)	3 (7.0)	2 (13.3)	8 (5.3)
Day Shift (12 Hours)	25 (51.0)	19 (44.2)	24 (55.8)	11 (73.3)	79 (52.7)
Night shift (12 hours)	23 (46.9)	19 (44.2)	16 (37.2)	0 (0.0)	58 (38.7)
Other	0 (0.0)	3 (7.0)	0 (0.0)	2 (13.3)	5 (3.3)

3.4.2 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 3.4.2.1 outlined the nurse-to-patient ratios. Some apparent outliers existed within the Hospitals (i.e. values greater than 100 and values of 0). When these were removed, an average of 12.03 patients per nurse per shift was found, bearing in mind that these figures included those nurses based in Triage. A maximum patient caseload of 14.36 patients per shift (on average) was found across the four hospitals.

Also examined within this questionnaire, was the differential staff-to-patient ratios between day and night staff. Day staff were responsible for an average of 13.76 per shift patients, while night staff had an average of 10.56 patients per shift through the duration of their last shift. With Hospital 4 having a ratio in excess of this.

While interpreting this data, it should be noted that this represents self-report and also represents the total number of patients cared for rather than on an hourly basis. Thus, this may not accurately reflect the workload of nurses.

Table: 3.4.2.1: Number of Patients Cared for by Nurses Over a Shift

Ratios, mean (SD)	Hospital 4 (n =36)	Hospital 5 (n =23)	Hospital 6 (n =30)	Hospital 7 (n = 13)	Total Ave (n = 154)
Minimum patients	11.94 (12.50)	4.83 (2.04)	7.50 (10.49)	6.00 (3.30)	8.53 (10.16)
Maximum patients	21.29 (16.72)	8.30 (1.69)	10.83 (5.54)	12.83 (9.79)	14.36 (12.26)
Average patients	16.61 (15.29)	6.84 (2.85)	10.70 (13.65)	9.11 (7.29)	12.03 (12.93)
Ave Patients per RN per shift Day Shift	19.77 (19.17)	6.83 (1.33)	11.74 (17.07)	10.57 (7.52)	13.76 (16.15)
Ave Patients per RN per shift Night Shift	14.17 (10.68)	7.18 (3.57)	8.91 (3.15)	1.00 (0.00)	10.56 (8.13)

3.4.3 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.

The mean of each subscale can be seen in Table 3.4.3.1 at hospital level and overall for all 4 hospitals. The highest scores were reported for Nurse Manager, Leadership and Support, with this highest in Hospital 7. The lowest scores were consistently reported for Staffing and Resource Adequacy across all 4 hospitals.

Table: 3.4.3.1: Nursing Work Index

NWI, mean (SD)	Hospital 4 n=45	Hospital 5 n=38	Hospital 6 n=40	Hospital 7 n=14	Overall n=137
Nurse Participation in Hospital Affairs	2.37 (0.45)	2.36 (0.46)	2.58 (0.49)	2.68 (0.28)	2.46 (0.46)
Nursing Foundations for Quality of Care	2.54 (0.40)	2.52 (0.44)	2.62 (0.41)	2.77 (0.38)	2.58 (0.42)
Nurse Manager Ability, Leadership, and Support of Nurses	2.64 (0.55)	2.41 (0.47)	2.88 (0.49)	2.95 (0.35)	2.68 (0.53)
Staffing and Resource Adequacy	1.62 (0.47)	1.94 (0.60)	1.65 (0.66)	2.21 (0.50)	1.78 (0.60)
Collegial Nurse-Doctor Relations	3.17 (0.46)	2.52 (0.51)	3.08 (0.56)	3.05 (0.39)	2.95 (0.56)

3.4.4 Time Availability and Quality of Care

Single item measures were used to assess staff perceptions (RNs and HCAs) 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.” The majority of staff (44.4%) reported that they had “about the same time as usual” available to them to provide care on their last shift while 43.7% of staff reported having “less time than usual” to provide care to patients on their last shift.

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.” 93.9% of staff reported that they required additional time to provide patient care across all Emergency Departments. The majority of staff (43.2%) 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. Responses to these items are detailed in Table 3.4.4.1 by each individual Emergency Department and by an overall total.

Nursing staffs’ perceptions of the quality of care delivered on their most recent shift are detailed in Table 3.4.4.1. Staff were asked to rate the quality of care provided on

their last shift on a 4-point scale ranging from “poor” to “excellent.” Baseline measures show that the majority of staff across all Emergency Departments rated the quality of care provided on their last shift as either “fair” (36.7%) or good (46.0%).

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.” The majority of staff gave their Emergency Department a grade of “acceptable” (38.7%) for patient safety. A combined total of 46% of staff graded their Emergency Department as either “failing” or “poor” in its provision of patient safety.

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”. The majority (49%) of staff stated that the quality of care provided in their Emergency Department “remained the same” while 46.2% of staff stated that the quality of care provided had “deteriorated” and only 4.6% of staff stated the quality of care provided in their Emergency Department had “improved”.

Table: 3.4.4.1: Quality of care

Quality of care, n (%)	Hospital 4	Hospital 5	Hospital 6	Hospital 7	Total
<i>Time available to deliver care</i>					
Less time than usual	18 (35.3)	22 (51.2)	21 (50.0)	5 (33.3)	66 (43.7)
Same amount of time	24 (47.1)	17 (39.5)	17 (40.5)	9 (60.0)	67 (44.4)
More time than usual	9 (17.6)	4 (9.3)	4 (9.5)	1 (6.7)	18 (11.9)
<i>Additional time needed</i>					
No more time needed	3 (5.9)	3 (7.1)	1 (2.4)	2 (14.3)	9 (6.1)
Less than 15 minutes	11 (21.6)	4 (9.5)	2 (4.9)	4 (28.6)	21 (14.2)
15 to 30 minutes	24 (4.1)	20 (47.6)	15 (36.6)	5 (35.7)	64 (43.2)
31 to 45 minutes	5 (9.8)	5 (11.9)	12 (29.3)	2 (14.3)	24 (16.2)
46 to 60 minutes	2 (3.9)	6 (14.3)	5 (12.2)	0 (0.0)	13 (8.8)
Greater than 60 minutes	6 (11.8)	4 (9.5)	6 (14.6)	1 (7.1)	17 (11.5)
<i>Quality of care</i>					
Poor	5 (10.0)	3 (7.0)	4 (9.5)	0 (0.0)	12 (8.0)
Fair	14 (28.0)	18 (41.9)	21 (50.0)	2 (13.3)	55 (36.7)
Good	25 (50.0)	21 (48.8)	13 (31.0)	10 (66.7)	69 (46.0)
Excellent	6 (12.0)	1 (2.3)	4 (9.5)	3 (20.0)	14 (9.3)
<i>Grade of patient safety</i>					
Failing	15 (29.4)	9 (20.9)	11 (26.2)	0 (0.0)	35 (23.3)
Poor	11 (21.6)	10 (23.3)	12 (28.6)	1 (7.1)	34 (22.7)
Acceptable	18 (35.3)	19 (44.2)	14 (33.3)	7 (50.0)	58 (38.7)
Very good	4 (7.8)	5 (11.6)	4 (9.5)	2 (14.3)	15 (10.0)
Excellent	3 (5.9)	0 (0.0)	1 (2.4)	4 (28.6)	8 (5.3)
<i>Quality of care, last 6 months</i>					
Deteriorated	23 (46.9)	22 (52.4)	21 (51.2)	2 (13.3)	68 (46.2)
Remained the same	24 (49.0)	18 (42.9)	18 (43.9)	12 (80.0)	72 (49.0)
Improved	2 (4.1)	2 (4.8)	2 (4.9)	1 (6.7)	7 (4.8)

3.4.5 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 3.4.5.1 at a total level and across each separate Emergency Department. Baseline measurements showed 75.2% of nurses reported that at least one item of care was left undone due to a lack of time during their last 12-hour shift. Overall, baseline measurements revealed that, on

average, 3.15 necessary care activities were left undone per shift due to a lack of time to complete these tasks.

Across all Emergency Departments, the items of care most frequently reported as left undone were hygiene care (49.6%), educating patients and their families (40.9%) and engaging in comfort talk with patients and/or their families (35%). The items of care reported as least frequently left undone across all four Emergency Departments were the provision of medications on time (3%), pain management (3.8%) and the monitoring of deteriorating patients (6%).

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. 93.1% of nurses reported that the provision of at least one item of necessary care was delayed during their last shift. Baseline reports by nurses revealed that on average a total of 9.51 care tasks per shift were delayed in their provision due to a lack of time available.

Across all four Emergency Departments, baseline measurements revealed that the items of care most frequently reported by nurses as delayed, but not left undone, during their last shift were updating nursing documentation (77.1%), observations of vital signs (73.3%) and monitoring of deteriorating patients (70.2%). Oral hygiene care (28.2%) and education of patients and/or families (33.6%) were least frequently reported as delayed by nurses. However, it should be noted that the likely cause of this is due to these items being left undone rather than infrequently delayed as reported above.

A single item also assessed if staff meal breaks had been missed or delayed due to lack of time. The majority of staff reported having missed or delayed meal breaks on their most recent shift (38.7% and 38.0% respectively). A small proportion (7.3%) reported that they had both a missed and a delayed meal break while 16.1% reported neither a missed or delayed meal break on their last shift. A full breakdown of missed and delayed meal breaks experienced by nursing staff in during their most recent shift can be found in Table 3.4.5.2.

Table: 3.4.5.1: Care left undone and care delayed overall total

CLUEs	Hospital 4	Hospital 5	Hospital 6	Hospital 7	Total
Number of activities undone, mean (SD)	4.05 (3.06)	2.75 (3.48)	3.05 (2.48)	1.36 (2.54)	3.15 (3.05)
Shifts with at least one item undone, n (%)	38 (88.4)	22 (61.1)	33 (84.6)	4 (36.4)	97 (75.2)
Number of activities delayed, mean (SD)	9.66 (4.18)	10.67 (5.01)	9.58 (3.76)	4.73 (3.74)	9.51 (4.50)
Shifts with at least one item delayed, n (%)	42 (95.5)	33 (89.2)	38 (97.4)	9 (81.8)	122 (93.1)

Table 3.4.5.1: Missed and/or Delayed meal breaks

	Hospital 4	Hospital 5	Hospital 6	Hospital 7	Total
Meal break missed, n (%)	21 (46.7)	14 (36.8)	15 (37.5)	3 (21.4)	53 (38.7)
Meal break delayed, n (%)	11 (24.4)	11 (28.9)	23 (57.5)	7 (50)	52 (38.0)
Missed and Delayed, n (%)	10 (22.2)	0 (0.0)	0 (0.0)	0 (0.0)	10 (7.3)
Neither missed or delayed, n (%)	3 (6.7)	13 (34.2)	2 (5)	4 (28.6)	22 (16.1)

3.4.6 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 3.4.6.1. The highest levels of job dissatisfaction were reported in Hospital 4 with staff in Hospital 7 reported the highest level of job satisfaction. Respondents' intention to leave is reported in Table 3.4.6.1. Approximately half of respondents in Hospital 4 reported that they would definitely or probably leave their current employment in the future. Just under half (44.2%) of respondents for Hospital 5 & 6 also reported intention to definitely or probably leave in the future. Hospital 7 reported the highest (84.7%) intention of staying in their current employment. 52.3 % of respondents from Hospital 5 would not recommend their Hospital as a good place to work to a colleague. Nearly half of respondents from Hospital 4 (45.1%) and Hospital 6 (41.9%) would definitely or probably not recommend their work place to a colleague. However, 100% of respondents from hospital 7 would recommend their hospital as a good place to work.

Overall, the majority (71.6%) of respondents would definitely or probably recommend their department to family or friends should they require hospital care.

Table: 3.4.6.1: Job satisfaction and intention to leave overall total

Job Satisfaction and Intention to leave	Hospital 4 n (%)	Hospital 5 n (%)	Hospital 6 n (%)	Hospital 7 n (%)	Total n (%)
<i>Satisfaction with current job</i>					
Very dissatisfied	6 (11.8)	5 (11.9)	5 (11.6)	0 (0.0)	16 (10.7)
Dissatisfied	19 (37.3)	12 (28.6)	15 (34.9)	1 (7.1)	47 (31.3)
Satisfied	23 (45.1)	23 (54.8)	20 (46.5)	9 (64.3)	75 (50.0)
Very satisfied	3 (5.9)	2 (4.8)	3 (7.0)	4 (28.6)	12 (8.0)
<i>Satisfaction with being a nurse</i>					
Very dissatisfied	1 (2.0)	4 (9.3)	2 (4.7)	0 (0.0)	7 (4.7)
Dissatisfied	15 (29.4)	7 (16.3)	3 (23.3)	3 (23.1)	35 (23.3)
Satisfied	17 (33.3)	21 (48.8)	5 (58.1)	5 (38.5)	68 (45.3)
Very satisfied	17 (33.3)	11 (25.6)	6 (14.0)	5 (38.5)	39 (26.0)
<i>Recommend unit to colleague</i>					
Definitely no	5 (9.8)	6 (7.1)	6 (14)	0 (0.0)	14 (9.3)
Probably no	18 (35.3)	19 (45.2)	12 (27.9)	0 (0.0)	49 (32.7)
Probably yes	23 (45.1)	17 (40.5)	20 (46.5)	8 (57.1)	68 (45.3)
Definitely yes	5 (9.8)	3 (7.1)	5 (11.6)	6 (42.9)	19 (12.7)
<i>Recommend unit to family/friends</i>					
Definitely no	1 (2.0)	4 (9.3)	1 (2.3)	0 (0.0)	6 (4.0)
Probably no	10 (19.6)	16 (37.2)	10 (23.3)	0 (0.0)	36 (23.8)
Probably yes	27 (52.9)	21 (48.8)	20 (46.5)	5 (35.7)	73 (48.3)
Definitely yes	13 (25.5)	2 (4.7)	12 (27.9)	8 (57.1)	35 (23.3)
<i>Feelings about future in hospital</i>					

Definitely will leave	4 (7.8)	3 (7.0)	2 (4.7)	0 (0.0)	9 (6.0)
Probably will leave	22 (43.1)	16 (37.2)	17 (39.5)	2 (15.4)	57 (38.0)
Probably will not leave	20 (39.2)	22 (51.2)	21 (48.8)	5 (38.5)	68 (45.3)
Definitely will not leave	5 (9.8)	2 (4.7)	3 (7.0)	6 (46.2)	16 (10.7)
Leave due to job dissatisfaction (yes)	20 (39.2)	22 (51.2)	13 (30.2)	2 (15.4)	57 (38.0)
Leaving for					
Nursing in another hospital	12 (54.5)	11 (52.4)	14 (66.7)	1 (33.3)	38 (56.7)
Nursing, but not in a hospital	6 (27.3)	7 (33.3)	6 (28.6)	2 (66.7)	21 (31.3)
Non-Nursing	4 (18.2)	3 (14.3)	1 (4.8)	0 (0.0)	8 (11.9)

3.4.7 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; depersonalization; lack of 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 every day = 6). High scores in emotional exhaustion and depersonalization and low scores in personal accomplishment indicate burnout.

Nurses in Hospitals 4 and 6 reported emotional exhaustion several times a month on average, but not every week. Scores for depersonalisation were low across all four hospitals particularly so for Hospital 7 who also had the lowest emotional exhaustion score and highest personal accomplishment. Nurses in the sample, across the four hospitals, reported personal accomplishment once a week on average (Table 3.4.7.2).

Table: 3.4.7.1: 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: 3.4.7.2: Maslach burnout inventory scores overall

MBI mean, (SD)	Hospital 4 (n=50)	Hospital 5 (n=46)	Hospital 6 (n=43)	Hospital 7 (n=13)	Total (n=148)
Emotional Exhaustion	3.40 (1.58)	3.02 (1.21)	3.48 (1.31)	1.75 (1.13)	3.17 (1.39)
Depersonalisation	2.12 (1.44)	1.90 (1.29)	2.54 (1.37)	0.82 (0.97)	2.07 (1.41)
Personal Accomplishment	4.35 (1.04)	4.27 (0.96)	4.34 (1.04)	5.02 (1.87)	4.38 (1.12)

3.4.8 Prevalence of Violence and Aggression

The Conflict Scale was 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. This is a 10-item survey divided into three separate elements; physical, psychological and conflict.

The physical mistreatment of staff is displayed below in Table 3.4.8.1. Overall, more than half of respondents had a patient throw something at them (56%) and has been pushed, grabbed, shoved or pinched by a patient (55.1%) at least once. 48.7% of all respondents have also been slapped or hit at least once in the last 3 months. Furthermore, 41.5% of all respondents have been kicked or hit with their fist.

Table 3.4.8.1 Physical Prevalence of Violence and Aggression

Physical	Hospital 4	Hospital 5	Hospital 6	Hospital 7	Total
<i>Patient thrown something at you</i>					
Never	23 (45.1)	17 (39.5)	11 (25.6)	10 (58.8)	61 (39.6)
Once	11 (21.6)	14 (32.6)	10 (23.3)	2 (11.8)	37 (24.0)
2-10 times	12 (23.5)	12 (27.9)	18 (41.9)	2 (11.8)	44 (28.6)
>10 times	3 (5.9)	0 (0.0)	3 (7.0)	0 (0.0)	6 (3.9)
<i>Patient slapped or hit you</i>					
Never	23 (45.1)	19 (44.2)	21 (48.8)	10 (58.8)	73 (47.4)
Once	4 (7.8)	9 (20.9)	7 (16.3)	1 (5.9)	21 (13.6)
2-10 times	18 (35.3)	13 (30.2)	12 (27.9)	3 (17.6)	46 (29.9)
>10 times	4 (7.8)	2 (4.7)	2 (4.7)	0 (0.0)	8 (5.2)
<i>Patient kicked you or hit you with their fist</i>					
Never	29 (56.9)	21 (48.8)	22 (51.2)	10 (58.8)	82 (53.2)
Once	6 (11.8)	10 (23.3)	7 (16.3)	1 (5.9)	24 (15.6)
2-10 times	10 (19.6)	11 (25.6)	12 (27.9)	2 (11.8)	35 (22.7)
>10 times	3 (5.9)	0 (0.0)	1 (2.3)	1 (5.9)	5 (3.2)
<i>Patient pushed, grabbed, shoved or pinched you</i>					
Never	23 (45.1)	15 (34.9)	15 (34.9)	10 (58.8)	63 (40.9)
Once	8 (15.7)	10 (23.3)	8 (18.6)	1 (5.9)	27 (17.5)
2-10 times	14 (27.5)	14 (32.6)	16 (37.2)	1 (5.9)	45 (29.2)
>10 times	4 (7.8)	4 (9.3)	3 (7.0)	2 (11.8)	13 (8.4)

The Psychological Prevalence of Violence and Aggression is reported in Table 3.4.8.2. In total, 83.1% of respondents have been sworn at or insulted at least once in the last 3 months. 85.1% of respondents have been shouted at in anger. 61.1% of staff reported patients threatening to hit or throw something at them in the last 3 months.

Hospital 6 reported the highest level of psychological mistreatment while Hospital 7 reported the lowest level of psychological mistreatment.

Table 3.4.8.2 Psychological Prevalence of Violence and Aggression

Psychological/Verbal	Hospital 4	Hospital 5	Hospital 6	Hospital 7	Total
<i>Patient insulted or sworn at you</i>					
Never	8 (15.7)	5 (11.6)	4 (9.3)	3 (17.6)	20 (13.0)
Once	7 (13.7)	8 (18.6)	3 (7.0)	5 (29.4)	23 (14.9)
2-10 times	19 (37.3)	19 (44.2)	6 (14.0)	4 (23.5)	48 (31.2)
>10 times	15 (29.4)	11 (25.6)	29 (67.4)	2 (11.8)	57 (37.0)
<i>Patient shouted at you in anger</i>					
Never	6 (11.8)	5 (11.6)	1 (2.3)	4 (23.5)	16 (10.4)
Once	11 (21.6)	6 (14.0)	5 (11.6)	4 (23.5)	26 (16.9)
2-10 times	13 (25.5)	19 (44.2)	6 (14.0)	4 (23.5)	42 (27.3)
>10 times	19 (37.3)	12 (27.9)	30 (69.8)	2 (11.8)	63 (40.9)
<i>Patient threatened to hit or throw something at you</i>					
Never	19 (37.3)	16 (37.2)	10 (23.3)	9 (52.9)	54 (35.1)
Once	9 (17.6)	6 (14.0)	3 (7.0)	2 (11.8)	20 (13.0)
2-10 times	13 (25.5)	15 (34.9)	11 (25.6)	1 (5.9)	40 (26.0)
>10 times	8 (15.7)	6 (14.0)	18 (41.9)	2 (11.8)	34 (22.1)

Table 3.4.8.3 illustrates the level of conflict experienced by respondents. Altogether, 92.2% of respondents experienced patients arguing with them about waiting to be seen. The majority (78%) of respondents reported patients' complaints about care they had received. Additionally, 79.2% of respondents report experiencing conflict with patient's visitors at least once in the last 3 months.

Table 3.4.8.3 Conflict Reported within Prevalence of Violence and Aggression

Conflict	Hospital 4	Hospital 5	Hospital 6	Hospital 7	Total
<i>Patient argued with you about waiting to be seen</i>					
Never	2 (3.9)	1 (2.3)	0 (0.0)	3 (17.6)	6 (3.9)
Once	4 (7.8)	4 (9.3)	0 (0.0)	3 (17.6)	11 (7.1)
2-10 times	11 (21.6)	11 (25.6)	6 (14.0)	6 (35.3)	34 (22.1)
>10 times	32 (62.7)	27 (62.8)	36 (83.7)	2 (11.8)	97 (63.0)

<i>Patient complained to you about their care</i>					
Never	8 (15.7)	11 (25.6)	4 (9.3)	4 (23.5)	27 (17.5)
Once	12 (23.5)	5 (11.6)	2 (4.7)	3 (17.6)	22 (14.3)
2-10 times	9 (17.6)	13 (30.2)	11 (25.6)	6 (35.3)	39 (25.3)
>10 times	20 (39.2)	14 (32.6)	25 (58.1)	1 (5.9)	60 (39.0)
<i>Experienced conflict with a patient's visitor</i>					
Never	9 (17.6)	10 (23.3)	3 (7.0)	4 (23.5)	26 (16.9)
Once	4 (7.8)	5 (11.6)	2 (4.7)	2 (11.8)	13 (8.4)
2-10 times	16 (31.4)	12 (27.9)	14 (32.6)	6 (35.3)	48 (31.2)
>10 times	20 (39.2)	16 (37.2)	23 (53.5)	2 (11.8)	61 (39.6)

Overall, 72.6% of staff reported that they experienced a physical assault, 92.5% psychological/verbal mistreatment and 96.6% conflict with patients (conflict with family was removed for this analysis). The highest proportion for each mistreatment was experienced in Hospital 6 and of those reporting these assaults, verbal mistreatments and conflicts, the majority reported this occurred more than once in the last three months.

Table: 3.4.8.4 Overall Mistreatment Experienced by staff

	Hospital 4	Hospital 5	Hospital 6	Hospital 7	Total
Physical assault	33 (68.8)	33 (78.6)	35 (83.3)	5 (35.7)	106 (72.6)
Verbal mistreatment	45 (91.8)	39 (92.9)	41 (97.6)	11 (78.6)	136 (92.5)
Conflict	47 (95.9)	42 (97.7)	42 (100)	12 (85.7)	143 (96.6)

3.4.9 Qualitative comments

A content analysis with open coding was used to interpret the qualitative data. Open comments from participants were copied into an Excel worksheet and coded in a hierarchical manner. Codes were applied to the data which were then group into larger categories. As the content units contained large chunks of text, certain codes overlapped.

Of the 154 staff who returned completed surveys 59 (38%) provided open comments. Following analysis, the comments were grouped under ten domains: challenges of working within an Emergency Department, staffing and skill mix, support and teamwork, job satisfaction, workload, prioritizing quality patient care, missed care, burn out and stress, capacity, organisational and environmental issues.

3.4.9.1 Challenges of working within an Emergency Department

Staff outlined the particular challenges of working within Emergency Departments/Local Injury Units. Whilst the majority of staff were positive towards their nursing roles some described it as a “testing” and “challenging” environment.

“Emergency department is a good place to work, to look after patients, to get good experience. If we have good support with staff (doctors, nurses, care assistants) and good equipment.”

“I love my job as a nurse but the last few months have been really testing.”

This was seen as being representative of the high patient numbers that the EDs/LIU's provide care to.

“... sometimes [the] workload [is] far too high for acuity...”

“While many of my answers are on the negative side, the main reason for that is the high volume of patients.”

This high volume of patients combined with inappropriate staffing/training was expressed by staff as being difficult and adding to the challenges.

“As a newly qualified nurse ... my last shift was in the paediatric area. I spent the majority (10 hours) of this shift on my own as the only nurse as the paed nurse was required in resus. Not having training in paed meant this shift was particularly difficult for me and perhaps patient and families.”

However, one nurse indicated that although the job can be challenging the work environment can be positive.

“I find my job challenging and at times impossible. However, I work with amazing staff and we create the best work environment possible, therefore I would recommend it to others. I would love to provide a better service, but I believe we do the best we can with the resources we have.”

3.4.9.2 Staffing and Skill Mix

One of the biggest areas mentioned in the open comments focused on staffing levels and skill mix, with 44% of staff referring to it. On the whole, staff expressed concern regarding staff levels within departments.

“I absolutely love my job and love working with people but time constraint, and lack of adequate staffing level which leads to reduced quality of patient care is very disheartening.”

“The main concern I have is being short staffed especially ED qualified experienced staff. Time is needed and resources to upskill staff to a

competent staff level. Management are happy to fill staffing posts but not with experience. This leads to burnout in Senior staff as they are allocated to stressful environments (triage, resus) everyday."

"I need more space and more staff to care for the numbers and the acuity of patients that I look after."

Areas highlighted as most in need of appropriate staff were majors, paediatrics and ambulatory areas as well as cubicles and overflow.

"Majors area is always very busy as well as having a large number of patients through the section, these patients are very dependant with regards ADLS and often I find it difficult to keep up with the amount of care required for each patient."

"Ambulatory and Paediatrics are particularly unsafe at present as volume of patients versus staff nurses to care for them"

"There are plenty of staff for the most part in the [resus] area...Having said that the cubicle and overflow areas are extremely difficult to work in. My colleagues often have double the normal quota of patients..."

The shortage of staff was seen as having a direct impact on patient care provision.

"Nurses are usually over stretched to try [to] accomplish basic care plus urgent interventions..."

"Patient safety [at] weekends of high dependency or ill patients e.g. sepsis and the workload can be high and acuity of care for 2 nurses then becomes unsafe..."

"We need more nurses each shift, along with more doctors."

In addition to this, participants noted the impact that agency staff can have within the department.

"...high number of new and agency staff have put further strain on regular nurse. I was working in 10-14 at the start of the week. The nurse in 5-9 and overflow were agency and could not hang Iv's, so I was responsible for IV care of about 20 patients on top of my regular work."

Staff expressed that whilst staffing was an issue for them this may be alleviated with adequate and appropriate support.

"I believe the ED, although very busy would be a nice place to work long term if there was adequate support and enough staff daily for shifts..."

Whilst support was seen as important this was not always evident at a senior management level.

"I feel confident with the current skill mix present in the dept. in terms of staff nurses & CNM1s... However Senior Management are less supportive and more fixated on patient wait times and breach times. More system failures evident than individual failures."

3.4.9.3 Support and Teamwork

Support was seen as being crucial to the development of staff and the promotion of a positive working environment.

"As my role in CNM2 position I have to daily take patient load as well as run the shift due to understaffing. I feel no support from my line manager or nursing administration therefore making a shift very stressful also feel very little support from some of the CNM1'S & RGN's - No staff morale or comradery present in dept."

Support from other health care professionals as well as senior management was highlighted as essential, although often this was lacking.

"CNS don't provide input for ED patients. only when admitted. Would be beneficial to have their input and expertise for emergencies e.g. thrombolysis. STEMI, FAST positives. No Emergency consultant working on the floor, impedes learning for everyone, lack of support for complex cases, means that ED is completely reliant on the input of either the med or surg consultant on call."

Support in terms of that from colleagues as well as the provision of funding and training for new roles were identified as potentially allowing nursing staff to focus on care and key nursing duties.

"Funding for education for upskilling nurses i.e. phlebotomist, ECG technicians. We spend so much time wasted with these two vital skills at both triage and within the rest of the department. Funding for two positions who would free up so much time for nurses to perform other care and speed up triage time greatly. Funding for an additional SHO"

"The fact that there is no clinical facilitation means new staff are very much left to sink or swim and as a result report dissatisfaction in their work environment. I have often left a work shift so tired I have been in tears frustrated with being unable to provide the standard of care required by our patients."

Overall building a sense of teamwork and fostering comradery as well as feeling supported were key areas identified by staff.

3.4.9.4 Job Satisfaction

Staff indicated that having job satisfaction was an important element in providing good care. Whilst some staff expressed good job satisfaction.

“I really enjoy Emergency nursing- after all these years I am still learning and experiencing new events regularly. I work with a wonderful dedicated supportive colleagues and enjoy interacting with and caring for patients.”

“Overall working as a nurse has been very fulfilling for me, being able to help patients and whoever is in need but working in a toxic environment sometimes takes a toll in your life especially people in the workplace trying to put you down. I know myself that I am a hard worker, I was brought up to do the job rather than complain but working here a reward for a good job is more jobs which is sometimes exhausting. There are some who are just plain rude and racist which sometimes puts our self-esteem down but we don't let that effect how we manage our patient care.”

“...it is the hype and unimaginable fulfilment that I usually get after every shift (regardless it is physically draining) that keeps me going by all means. A mere thank you and appreciation from a job well done fuels me personally to keep doing, what I love doing. That is to provide care and alleviate discomfort.”

Job dissatisfaction was expressed as being associated with feelings of being “undervalued” and “underappreciated”:

“I love being a nurse. I loved being an ED nurse and wanted my future career to be in ED but since working in this Department I feel I am undervalued and underappreciated. I would not recommend nursing as a career to anyone considering being a nurse unless drastic changes happen.”

“I enjoy the work and enjoy working with people. I enjoy being part of a team, but feel that the team doesn't get enough support and sometimes feel that we are unappreciated. There is not enough emphasis on staff welfare.”

The busy environment of the ED/LIU's was seen as being a contributing factor also to job dissatisfaction in staff.

“...I love my job but cannot [keep] at this pace for much longer as it is detrimental to both patient and personal health if it continues.”

3.4.9.5 Workload

Staff illustrated that the workload within the ED/LIU can be hectic and very heavy.

“The workload here in ED can be very heavy”

“Emergency department is a place of non-stop working”

“My problem with Emergency nursing is that in recent years our workload has increased greatly, our patients are aging and are therefore more complex and need more assistance with ADL’s etc. We cannot continue to give the quality of care we want to give under these pressures...”

As a result of this heavy workload often health promotion and patient education can be left undone or missed.

“Due to volume of work opportunities for Health Promotion/education is missed”

This is often further compounded by engaging in non-nursing tasks/work within the ED/LIU.

3.4.9.6 Non-Nursing duties

Nurses indicated that engaging in other non-direct patient contact tasks was having an effect on their care, particularly evident in Hospital 7. These non-nursing tasks included: stock taking, cleaning, administrative duties, documentation, covering clerical duties etc.

One nurse gave specific examples of the non-nursing tasks she regularly engaged in.

“...some examples of non-nursing duties that add to your day with regards to work load within our work place e.g. telephone answering and general admin duties. No secretary in our unit. Emptying of clinical waster e.g. yellow bags and replacing. Stock counting and cleaning duties at the weekend. Administrative staff down at the weekends further adds to your work load. Holding of cardiac arrest bleep which means you may be called from duties in event of emergency.”

“...Huge amount of non-nursing duties undertaken e.g. photocopying, cleaning beds/trolleys/equipment, ordering supplies, putting away supplies, phoning patients re appointments, telephone triage.”

This workload and taking on of other non-nursing tasks can result in missed care and have impacts on patients.

“...I believe the care delivered to patients [name of unit redacted] is very good despite challenges faced by staff. There is no HCA in either unit. Therefore, no appropriate cleaning between patients. Clinical bins are emptied by nursing staff. Stores are compiled by nursing staff. Stores are put away by nursing staff. Missed care opportunities due to nursing staff carrying out non nursing roles.”

A health care assistant expressed similar views regarding workload duties.

“Health Care Assistance in the ED are expected to take on too much patient care on top of our priority list but while doing this we are asked to do portering jobs or doing nursing duties like doing observations on the busy ED overflow which is not our priority but a nurse’s. Portering is for porters, in which case we have only one in our Dept. Sometimes patient care doesn’t get done cause of all these extra jobs.”

The engagement in duties that take away from direct patient contact was highlighted as having a huge impact on care and overall increase in staff workload.

3.4.9.7 Prioritizing Quality Patient Care

Nurses expressed a key focus on prioritising quality patient care within the ED/LIUs. However, this was seen as not always being achievable.

“My priority is patients and not the numbers on the screen ...”

“ED is the front line dept. of the whole hospital, so it is absolutely necessary to have a good working environment, appropriate nurse-patient care ratio and available resources in our department. Sometimes we lack all of these and quality patient care is compromised. As a nurse we want quality [rather] than quantity but due to unexpected events we really cannot do anything about it. If ever the hospital will add more staff beds and resources, then the hospital will provide a more productive and quality care to the patients.”

Time constraints and environment pressures were highlighted as impacting on quality patient care.

“There is never enough time to look after patients in the way that you would like to. Although the staff are extremely hardworking, there is never enough time to get everything done.”

“We cannot continue to give the quality of care we want to give under these pressures.”

Whilst staff expressed their focus on delivering quality care to patients, they felt that this was not always achievable.

3.4.9.8 Missed Care

Missed care or care left undone can have a huge impact on patient outcomes. In the qualitative data 10% of staff expressed areas where care had been missed or left undone.

“Care delayed. Sometimes when patients present in LIU as out of critical (urgent) They can take time to deal with. Dealing with immediate treatment/plan of care i.e. whether they are transferred to MAU if any availability or transfer to UHL A/E if needs specialist treatment. This can have a domino effect on the care of their patients (non-urgent). Our daily or weekly

cheeks/ordering stocks etc. During clinical duties -Answering phones cleaning trolleys between patient care."

As well as patient care being missed staff also outlined missed breaks due to increased workload and reduce staff numbers.

"There should be more of an emphasis on self-care during each shift. Getting to go to your break at all or on time would be a start."

"Being unable to take scheduled breaks during shift leads to exhaustion and low mood."

"Most of the shifts we have less staff. So we are not getting any breaks, that can cause most of them to get sick."

The busyness of the departments was seen as resulting in an increase in missed care and care left undone which was expressed as having a negative impact on both staff and patients.

3.4.9.9 Burnout and Stress

Among issues expressed by staff burn out, stress and fatigue were mentioned by over 15% of staff.

"I don't know how long more I can keep running and racing in work and worrying about losing my nursing registration because of my inability to care for sick patients adequately."

"I love where I work but feel pressure growing all the time. ED nursing is my passion but I feel myself burning out. The pace of the place is too furious."

The stressful environment combined with shortages of staff and overcrowding were highlighted as areas of concern for staff, with these having an effect on patients.

"Our work environment is very stressful. Overcrowding. Staff shortages. Lack of capacity are huge contributing factors. Being unable to support new and junior members of staff is very frustrating and also leads to patient care being compromised."

"A patient has argued more than 200 times about waiting to be seen. The job is hard, but becoming less and less rewarding. Senior Staff won't stay any longer. Department cannot retain staff. Those who do stay have the pressure of two people on them."

Inappropriate usage of the ED was identified as a potential contributing factor to the stressful environment and overcrowding.

"...I am proud to be an ED nurse but sometimes I wonder if it's worth being so stressed in a job in my 20's with absolutely no financial gain. There needs to

be more money put into educating the public on how to use an emergency department appropriately.”

Adding that due to burn out retention of staff can be problematic.

“We are a very close knit department and all get on very well, but we are continuously losing great nurses due to burnout and fatigue.”

Overall, burnout, stress and fatigue were areas identified by staff as paying a key role in their work.

3.4.9.10 Capacity

Bed capacity and space issues were highlighted by over 8% of staff. Limited number of beds was identified as affecting patient care and the provision of resources.

“As a nurse we want quality [rather] than quantity but due to unexpected events we really cannot do anything about it. If ever the hospital will add more staff beds and resources then the hospital will provide a more productive and quality care to the patients.”

“... the trolley situation which can take over the main ED unit with patients that require monitoring and no beds available”

“Lack of isolation beds on wards resulting in majors and trolley space being blocked and used inappropriately for isolation.”

“The current overcrowding and understaffing crisis is leading to extreme difficulties in our ED. Care is often substandard, basic nursing care is often neglected. Care on the corridor is unsafe and several times elderly/septic/falls risk patients etc. are nursed unsafely per week. We regularly fail to meet our KPI's – e.g. triage times.”

3.4.9.11 Organisational and Environmental Issues

Staff (10%) outlined organisational and environmental issues as areas for concern. These related to roles and responsibilities, inappropriate usage of unit, size of physical environment and a lack of recognition.

“...fixed nurse and doctor roles means that doctors don't work up ED patients until nurse has taken responsibility first, can affect patients care and lengthens the waiting time for patients.”

“I feel that a big sign at the entrance to the hospital would reduce the out-of-criteria' cases we see in [name of unit redacted]”

“Paediatrics is too small, there aren't enough spaces for the volume of patients attending.”

“I have worked in the ED for many years but have found that the organisational culture in general does not appreciate the work and commitment and care given by nurses to their patients.”

The above comments highlight the issues that staff worki9mg within the ED/LIU's identified in the open comments of the survey.

3.4.10 Conclusion

Overall, the response rate was above 50% for each hospital allowing accurate conclusions to be drawn. The profile of the respondents in each hospital was relatively similar, with the exception of staff in Hospital 7 having more overall experience. 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. Therefore, the current question may require some alterations as it may not be the best reflection of workload.

The results from the NWI indicate that there are issues around feeling adequately staffed. However, despite this, nurses generally perceive the quality of care as relatively good, while the nurse manager role overall is above neutral but still room for improvement. Regarding quality of care, it is evident that a large proportion of staff feel that the quality of care delivered is poor, has deteriorated and patient safety is not acceptable, with a large majority (93.9%) of staff stated that they require more time to deliver care. This may have also resulted in care being left undone or delayed as it is clear that 75% of shift reported on had at least one item of care left undone and 93% at least one item delayed. While the overall number of items undone was relatively low (3.15 out of 16), care delayed was relatively high (9.51 out of 16). This was also evident as many staff members reported missing or delaying their meal breaks and a small percentage reported both missing and delaying a meal break.

Job dissatisfaction was relatively high although this did not quite follow over to dissatisfaction with the profession entirely. However, a large proportion stating that they intended to leave due to job dissatisfaction. Many staff reported that they would not recommend the unit to colleagues (with the exception of Hospital 7) however; they were more likely to recommend the unit to family or friends. Staff reported relatively high levels of emotional exhaustion but low levels of depersonalization. However, their personal accomplishment scores remain high indicating that they 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. 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.

Overall, the staff data indicate a number of issues, most of which can be related to staffing resources and availability of time which may be resulting in a number of the adverse staffing outcomes highlighted above.

Section 4

Discussion, Conclusions

4.1 Introduction

This section outlines a number of conclusions from the baseline research and highlights a number of recommendations for the next phase of 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, excessive wait times for patients to be seen and evidence of excessive crowding.

4.2 Calculating Staffing in ED

A number of approaches were used to determine safe staffing levels in Ed; 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. While Hospital 7 does not come out as requiring additional RNs in most models, it does consistently come out as requiring one HCA. It is recommended that this is calculated as 1 HCA per shift split between the two units which comes to a total of 2.60WTE to cover the 39-hour week and leave.

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 period.

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. 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.

4.3 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 initial report. In addition to this, the data presented here is representative of one-year data collection, with a sample of a week's rostering associated with emergency department outcomes presented and should therefore, be interpreted with caution. Whilst it is anticipated that further review of the data over sustained periods of time would provide a greater depth and breadth to the data, the results presented here offer a key insight into emergency departments/local injury units within the Irish context and present a viable means of assessing emergency department outcomes in relation to staffing over time.

4.4 Staff Survey Results

The results from the staff survey identified challenges for staff working in the three pilot EDs with positive outcomes from staff in the pilot LIU. Over half the staff surveyed had no specialist qualification in emergency nursing with a generally junior workforce in the departments surveyed. The Nursing Work Index highlighted low scores on the scale measuring staffing and resource adequacy in the three EDs, with relatively moderate scores on the other areas measured. The majority of staff (44.4%) reported that they had "about the same time as usual" available to them to provide care on their last shift while 43.7% of staff reported having "less time than usual" to provide care to patients on their last shift. There was variability in the perceptions of quality of care delivered in the four sites surveyed. Quality of care was reported at the highest level in staff surveyed in the LIU with approximately 60% of staff in the ED with the lowest staffing levels reporting that care was poor or fair. In addition, over 40% of staff in the EDs reported that patient safety was poor or failing or that the quality of care had deteriorated in the last 6 months. On average, EDs reported between 2.8 and 4.1 items of care left undone ranging from 61.1% to 88.4% of shifts with one or more item left undone. There were relatively low levels of care left undone identified in the LIU. The highest levels of job dissatisfaction were reported in Hospital 4 with staff in Hospital 7 reported the highest level of job satisfaction. Approximately half of respondents in Hospital 4 reported that they would definitely or probably leave their current employment in the future with 44.2% of respondents in Hospitals 5 and 6 also reporting intention to definitely or probably leave in the future. Hospital 7 (LIU) reported the highest (84.7%) intention of staying in their current employment. However, the majority of staff would recommend their unit to family and friends requiring care. Emotional exhaustion was relatively high across the ED sites with the highest level in the ED with the poorest staffing levels. Overall, 72.6% of staff reported that they experienced a physical assault, 92.5% psychological/verbal mistreatment and 96.6% conflict with patients. The highest proportion for each mistreatment was experienced in Hospital 6 (poorest staffing levels) and of those reporting these assaults, verbal mistreatments and conflicts, the majority reported this occurred more than once in the last three months.

4.5 Conclusion

This is the first study in Ireland to examine nurse staffing and related outcomes in EDs and an LIU. There are challenges in accurately identifying safe staffing levels; however, administrative data can be used in this regard. While BEST had utility, there are logistical issues in its implementation. The administrative data collected identified variables that can be used to measure the association between nurse staffing and patient outcomes such as leaving without been seen; this will be measured on an on-going basis. The results from the staff, especially for those nurses in EDs, identified a number of challenges including adequate staffing resources, relatively high levels of missed care and care left undone. In addition, staff in the EDs reported high levels of job dissatisfaction and relatively high levels of emotional exhaustion. Overall, this report provides a basis for further research in ED as well as providing data that can be used to identify a safe staffing level in EDs and LIUs.

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Appendix A

Section I – BEST

Including Boarded patients

Hospital 4 - including boarders	Required
Daily hours required	740
Daily hours + on costs @ 20%	888
Weekly hours	6216
Whole-time equivalent (divide weekly by 39)	159.3846
Skill-mix	Required
CNM (10% of WTE)	15.93846
RN (85% after 10% deduction for CNM)	121.9292
HCA (15% after 10% deduction for CNM)	21.51692

Hospital 5 - including boarders	Required
Daily hours required	391
Daily hours + on costs @ 20%	469.2
Weekly hours	3284.4
Whole-time equivalent (divide weekly by 39)	84.21538
Skill-mix	Required

CNM (10% of WTE)	8.421538
RN (85% after 10% deduction for CNM)	64.42477
HCA (15% after 10% deduction for CNM)	11.36908

Hospital 6 - including boarders	Required
Daily hours required	859
Daily hours + on costs @ 20%	1030.8
Weekly hours	7215.6
Whole-time equivalent (divide weekly by 39)	185.0154
Skill-mix	Required
CNM (10% of WTE)	18.50154
RN (85% after 10% deduction for CNM)	141.5368
HCA (15% after 10% deduction for CNM)	24.97708

Hospital 7 - including boarders	Required	Required	Required
	Unit 1	Unit 2	Total
Daily hours required	49	71	
Daily hours + on costs @ 20%	58.8	85.2	
Weekly hours	411.6	596.4	
Whole-time equivalent (divide weekly by 39)	10.55385	15.29231	25.84615
Skill-mix	Required	Required	Required
	Unit 1	Unit 2	Total
CNM (10% of WTE)	1.055385	1.529231	2.584615
RN (85% after 10% deduction for CNM)	8.223205	11.95492	20.17813
HCA (15% after 10% deduction for CNM)	1.451154	2.109692	3.560846

Excluding Boarded patients

Hospital 4 - excluding boarders	Required
Daily hours required	561
Daily hours + on costs @ 20%	673.2
Weekly hours	4712.4
Whole-time equivalent (divide weekly by 39)	120.8307692
Skill-mix	Required
CNM (10% of WTE)	12.08308
RN (85% after 10% deduction for CNM)	92.43554
HCA (15% after 10% deduction for CNM)	16.31215

Hospital 5 - excluding boarders	Required
Daily hours required	320.00
Daily hours + on costs @ 20%	384.00
Weekly hours	2688.00
Whole-time equivalent (divide weekly by 39)	68.92
Skill-mix	Required
CNM (10% of WTE)	6.89
RN (85% after 10% deduction for CNM)	52.73
HCA (15% after 10% deduction for CNM)	9.30

Hospital 6 - excluding boarders	Required
Daily hours required	662.00

Daily hours + on costs @ 20%	794.40
Weekly hours	5560.80
Whole-time equivalent (divide weekly by 39)	142.58
Skill-mix	Required
CNM (10% of WTE)	14.26
RN (85% after 10% deduction for CNM)	109.08
HCA (15% after 10% deduction for CNM)	19.25

Hospital 7 - excluding boarders	Required	Required	Required
	Unit 1	Unit 2	Total
Daily hours required	49.00	71.00	120.00
Daily hours + on costs @ 20%	58.80	85.20	144.00
Weekly hours	411.60	596.40	1008.00
Whole-time equivalent (divide weekly by 39)	10.55	15.29	25.85
Skill-mix	Required	Required	Required
	Unit 1	Unit 2	Total
CNM (10% of WTE)	1.06	1.53	2.58
RN (85% after 10% deduction for CNM)	8.22	11.95	20.18
HCA (15% after 10% deduction for CNM)	1.45	2.11	3.56

Section II – NICE

Including Boarded patients

Hospital 4 - including boarders	Minors (1:4)	Majors (1:4)	Resus (1:1.5)	Paediatrics (1:4)	Total
Required hours with ratio	327.5	1020.75	238	310.75	
Available hours delivered	312	706	244	263	
Difference	15.5	314.75	-6	47.75	
Additional WTE required	0.397435897	8.07051282	-0.15384615	1.224358974	
WTE + 20%	0.476923077	9.68461538	-0.18461538	1.469230769	11.44615

Hospital 5 - including boarders	Minors (1:4)	Majors (1:4)	Resus (1:1.5)	Total
Required hours with ratio	13	836.5	40	
Available hours delivered	30	744	49	
Difference	-17	92.5	-9	
Additional WTE required	-0.435897436	2.37179487	-0.2307692	
WTE + 20%	-0.523076923	2.84615385	-0.2769230	2.0461538

Hospital 6 - including boarders	Minors (1:4)	Obs	Majors (1:4)	Resus (1:1.5)	Total
Required hours with ratio	187	232.17	1079.5	710.67	
Available hours delivered	139	156	445	503	
Difference	48	76.17	634.5	207.67	
Additional WTE required	1.230769231	1.95307692	16.26923077	5.324871795	
WTE + 20%	1.476923077	2.34369231	19.52307692	6.389846154	29.73354

Excluding Boarded patients

Hospital 4 - excluding boarders	Minors (1:4)	Majors (1:4)	Resus (1:1.5)	Paediatrics (1:4)	Total
Required hours with ratio	317.75	565.25	198.67	390.33	
Available hours delivered	312	706	244	263	
Difference	5.75	-140.75	-45.33	127.33	
Additional WTE required	0.147435897	-3.608974	-1.162307	3.264871795	
WTE + 20%	0.176923077	-4.3307692	-1.394769	3.917846154	-1.6307692

Hospital 5 - excluding boarders	Minors (1:4)	Majors (1:4)	Resus (1:1.5)	Total
Required hours with ratio	13	549.25	26.67	
Available hours delivered	30	744	49	
Difference	-17	-194.75	-22.33	
Additional WTE required	-0.435897	-4.993589	-0.572564	
WTE + 20%	-0.523076	-5.992307	-0.6870769	-7.20246

Hospital 6 - excluding boarders	Minors (1:4)	Obs	Majors (1:4)	Resus (1:1.5)	Total
Required hours with ratio	187	327	677.5	710.67	
Available hours delivered	139	156	445	503	
Difference	48	171	232.5	207.67	
Additional WTE required	1.230769231	4.384615385	5.961538462	5.324871795	
WTE + 20%	1.476923077	5.261538462	7.153846154	6.389846154	20.28215385

Section III - California

Hospital 4	Trauma (1:1)	Critical care (1:2)	All other patients (1:4)	Total WTE
Overall yearly hours	1045.05	97440.25	260610.9	
Set ratio for each hour	1045.05	48720.125	65152.725	
WTE required	0.515310651	24.02373028	32.12659024	
WTE + 20%	0.618372781	28.82847633	38.55190828	67.9987574

Hospital 5	Trauma (1:1)	Critical care (1:2)	All other patients (1:4)	Total WTE
Overall yearly hours	1076.883	85839.35	160046.7167	
Set ratio for each hour	1076.883	42919.675	40011.67917	
WTE required	0.531007396	21.16354783	19.72962484	
WTE + 20%	0.637208876	25.3962574	23.6755498	49.70901607

Hospital 6	Trauma (1:1)	Critical care (1:2)	All other patients (1:4)	Total WTE
Overall yearly hours	6954.29	191628.84	457654.14	
Set ratio for each hour	6954.29	95814.42	114413.535	
WTE required	3.429137081	47.24576923	56.41693047	
WTE + 20%	4.114964497	56.69492308	67.70031657	128.5102041

Hospital 7	Trauma (1:1)	Critical care (1:2)	All other patients (1:4)	Total WTE
Overall yearly hours	99.67	189.8	18525	
Set ratio for each hour	99.67	94.9	4631.25	

WTE required	0.049146943	0.046794872	2.283653846	
WTE + 20%	0.058976331	0.056153846	2.740384615	2.855514793

Section IV – New South Wales

	Hospital 4	Hospital 5	Hospital 6	Hospital 7
Overall yearly hours required	510568.15	246963	656237.27	18814.46667
1:3 ratio for each hour	170189.3833	82321	218745.7567	6271.488889
WTE required	83.91981427	40.59220907	107.8627991	3.092450142
WTE + 20%	100.70	48.71	129.44	3.71

Section V - NHPPD

Hospital 4	Assessment	Ongoing care	ED ALOS	Time ALOS	Total NHpPD	No. pts	Total hrs req
Immediate	2	1	2.407949309	2.407949309	5.407949309	434	2347.05
V. Urgent	1	0.5	5.517255535	2.758627767	4.258627767	17661	75211.625
Urgent	0.5	0.33	6.031529817	1.99040484	2.82040484	33370	94116.9095
Standard	0.5	0.25	3.883767251	0.970941813	1.720941813	13405	23069.225
Non-urgent	0.25	0.17	3.055319396	0.519404297	0.939404297	1435	1348.045167
						Total yearly hours	196092.8547
						WTE	96.69272913
						WTE + 20%	116.031275
						RN	98.62658371

						HCA	17.40469124
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Hospital 5	Assessment	Ongoing care	ED ALOS	Time ALOS	Total NHpPD	No. pts	Total hrs req
Immediate	2	1	5.331106	5.331106	8.331106	202	1682.883412
V. Urgent	1	0.5	11.62189954	5.81094977	7.31094977	7386	53998.675
Urgent	0.5	0.33	8.578383262	2.830866477	3.660866477	12451	45581.4485
Standard	0.5	0.25	5.314597966	1.328649491	2.078649491	8685	18053.07083
Non-urgent	0.25	0.17	5.917144136	1.005914503	1.425914503	1117	1592.7465
						Total yearly hours	120908.8242
						WTE	59.61973582
						WTE + 20%	71.54368299
						RN	60.81213054
						HCA	10.73155245

Hospital 6	Assessment	Ongoing care	ED ALOS	Time ALOS	Total NHpPD	No. pts	Total hrs req
Immediate	2	1	5.02	5.02	8.02	1384	11099.68
V. Urgent	1	0.5	12.98	6.49	7.99	14766	117980.34
Urgent	0.5	0.33	9.33	3.0789	3.9089	36954	144449.4906
Standard	0.5	0.25	6.42	1.605	2.355	4933	11617.215
Non-urgent	0.25	0.17	5.09	0.8653	1.2853	4480	5758.144
						Total yearly hours	290904.8696
						WTE	143.4442158
						WTE + 20%	172.1330589

						RN	146.3131001
						HCA	25.81995884

Hospital 7	Assessment	Ongoing care	ED ALOS	Time ALOS	Total NHpPD	No. pts	Total hrs req
Immediate	2	1	0.638888889	0.638888889	3.638888889	3	10.91666667
V. Urgent	1	0.5	1.825	0.9125	2.4125	2	4.825
Urgent	0.5	0.33	3.383333333	1.1165	1.9465	5	9.7325
Standard	0.5	0.25	1.89375	0.4734375	1.2234375	144	176.175
Non-urgent	0.25	0.17	1.359864	0.23117688	0.65117688	39	25.39589832
						Total weekly hrs	227.045065
						Total yearly hours	11806.34338
						WTE	5.821668333
						WTE + 20%	6.986002
						RN	5.9381017
						HCA	1.0479003