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Evaluation of the 'Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix'

Report 4
Pilot and Extension Wards
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Section 1

1.1 Executive Summary

1.1.1 Background

Determining safe and appropriate nurse staffing levels can be challenging and, for many years, decisions on nurse staffing in the Irish healthcare system were based on historical need and legacy issues rather than using a systematic approach. Previous research has identified that failings in care and poor nurse staffing can result in adverse patient outcomes including mortality and failure to rescue as well as outcomes affecting nursing staff such as increased staff turnover and decreased job satisfaction. To address these issues, the Department of Health published the *Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland* (Department of Health 2016) (henceforth referred to as the *Framework)*. This report set out for the first time in Ireland an evidenced based approach to determining safe nurse staffing and skill mix levels across general and specialist medical and surgical in-patient care settings in acute hospitals. The recommendations in the *Framework* included: the Clinical Nurse Manager (CNM) - grade 2 role is fully 100% supervisory (that is, they carry no patient caseload), and 'that a systematic…evidence based approach to determine nurse staffing and skill mix requirements is applied' (Department of Health 2016: 9). Furthermore, it was recommended that 80% of nurse staffing in medical and surgical wards is provided by registered nurses (RNs). A key recommendation of the report was to implement a pilot testing of the recommendations from the *Framework* across a range of acute hospitals of varying size and complexity.

The objectives outlined in the *Framework* were to:

- Develop a staffing (Registered Nurse (RN)) and Health Care Assistant (HCA)) and skill mix ranges framework related to general and specialist medical and surgical care settings in acute adult hospitals based on best available international evidence;
- Set out clearly the assumptions upon which the staffing and skill mix ranges are determined;
- Make recommendations around implementation and monitoring of the *Framework* including the necessary education, training, and guidance required.

This report outlines the methods and results of the programme of research that has evaluated the implementation of the *Framework* in three pilot sites. It builds on two previous reports of research that evaluated the pilot between July 2016 and June 2017: *Evaluation of the Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix – Report 1* (Drennan *et al.* 2017a) and, *Evaluation of the Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix – Report 2* (Drennan *et al.* 2017b). This report further evaluates the implementation of the

recommendations in the *Framework* in six pilot wards and in 29 extension wards in a Model 4, Model 3 and Model 2 hospitals. Data are reported up to May 2019.

1.1.2 Aims and Objectives

The aim of this research was to measure the impact of implementing the recommendations of the *Framework for Safe Nurse Staffing and Skill Mix* on nurse-sensitive patient outcome measures, staffing outcomes and organisational factors in three pilot sites. In addition, the evaluation measured the economic impact of implementing the *Framework* and provides an evidence-based assessment of the adoption and implementation of the initiative in practice to guide future national roll-out decisions. The objectives of the evaluation were to: examine the extent to which nurse sensitive patient outcome measures changed over time as a consequence of the introduction of the recommendations in the *Framework*; explore the impact of the intervention on adverse patient outcomes and care left undone events; examine the extent to which the *Framework* impacted on staff and patient experiences and; to measure the impact of the implementation of the *Framework* on organisational factors.

1.1.3 Methods

The methods used in this evaluation were based on a number of previous studies including those used to evaluate the introduction of Nursing Hours Per Patient Day (NHPPD) in Western Australia (Twigg & Duffield 2009, Twigg *et al.* 2012), a report on the association between nurse staffing and skill-mix and patient outcomes (Duffield *et al.* 2007) and the methods used in the RN4CAST study (Sermeus *et al.* 2011).

The setting for the research were all medical, surgical and specialist wards in three pilot hospitals (excluding intensive care units, emergency and outpatients' departments). This consisted of the original six pilot wards and the addition of 29 wards across the three pilot sites; of these additional 29 wards, 10 applied the recommendations in the Framework. The sample in this report consisted of all multi-day patients and all patient days over the duration of the study from the wards within three hospitals chosen to take part in the implementation of the *Framework*. In addition, all nurses and healthcare assistants involved in the provision of direct patient care on the selected wards were included. A number of approaches were used in the research, including the collection of administrative and cross-sectional data. Administrative data were collected prior to (Time 1) and following (Time 2) the introduction of the recommendations from the *Framework.* Data reported here covers the timeframe June 2016 to May 2019 and builds on previous reports. Data at ward level was collected through the *TrendCare system* as well as accessing data available through the *Hospital In-Patient Enquiry (HIPE)* system. Administrative data was used to measure the association between the introduction of the recommendations from the *Framework* and nursing sensitive outcome indicators (mortality, urinary tract infections, skin pressure ulcers, hospital acquired pneumonia, deep vein thrombosis/pulmonary embolism, upper gastro-intestinal bleeding, central nervous system complications, sepsis and shock/cardiac arrest, wound infection, pulmonary failure, metabolic derangement and length of stay). The cross-sectional component of the study measured the association between key elements of the *Framework* and

nursing work, nurse satisfaction, staff burnout, patient satisfaction, environmental complexity and care left undone (missed care). In total four domains were measured by administrative and cross-sectional data: nurse staffing, nursing workload, working environment and patient outcomes.

1.1.4 Summary of Results – Pilot Wards[1]

The results are reported according to the timeframes in which the data was collected. Administrative (HIPE) data reports on Time 1 (prior to the introduction of the recommendations in the *Framework*) and Time 2, following the implementation of the recommendations. Cross-sectional data is reported at four time-points: Time 1 (prior to the introduction of the recommendations in the *Framework*), Transition (during the implementation of the recommendations) and Time 2 and Time 3 (following the implementation of the recommendations).[2]

Nursing Hours per patient Day, Agency Usage and Sickness Absence

- As a consequence of measuring patient acuity and dependency and introducing NHPPD as the method for identifying appropriate nurse staffing, there was an increase in whole time equivalents (WTEs) between Time 1 and Time 2 in those wards where a negative variance between NHPPD required and available was identified; adjustments to staffing were also made in Time 3. Overall, the variance in HPPD and hours worked during the various shifts are stabilising in Time 3 of the study following the implementation of the recommendations of the *Framework* being put in place; however, adjustments in staffing are still required and a number of wards face challenges as the levels of patient acuity and dependency change.

- The results show that the amount of time the CNM2 is spending in a supervisory role increased in Time 2 and Time 3 when compared to Time 1 in line with the recommendations of the *Framework*. In many cases, due to the stabilisation of nursing staff in each of the sites, there is now the potential for CNM2s to undertake 100% of their role as supervisory.

- A further recommendation in the *Framework* was that the RN to HCA ratio should approximate 80% RN to 20% HCA. Rostered skill-mix, that is the core complement of staff, demonstrated that skill-mix is close to or at the 80% RN to 20% HCA ratio recommended in the *Framework*. Clinical skill-mix, while variable, generally increased over the timeframe of the study; it is envisaged that, as new staff integrate into the wards, the skill-mix on a shift-by-shift basis will match that outlined in the roster; that is hours currently allocated to the supervision of new staff, which are impacting on the skill-mix will become available for clinical care.

[1] Detailed discussion of the results of the Pilot Wards are reported in subsequent sections of the Report.

[2] The programme of research is on-going over a three-year period (2017 to 2020). Further outcomes will be reported over this timeframe.

- One of the most significant results following implementation of the recommendations in the *Framework* was the reduction in agency usage on the majority of wards that implemented the recommendations in the *Framework*. In all wards in Hospital 1 that received amended staffing as a result of the introduction of NHPPD, there was a reduction in the proportion of nursing hours provided by agency staff. In Hospital 1, there were substantial reductions in agency hours following the uplift reducing from 13.4% of all nursing hours in Time 1 to 1.5% of all nursing hours in Time 3. Agency usage in Hospital 2 remains challenging; however, initiatives have been put in place to reduce the dependency on agency staff. The pilot ward in Hospital 3 saw an increase in agency usage between Time 1 and Time 2 as a consequence in the change in patient profile; however, this is now beginning to decline in Time 3.

- It is of note that in the Pilot wards in Hospital 1 that, over the course of the research, the reductions in the number of hours provided by agency have not only reduced, but have been sustained. This points to greater ward stability and the potential for longer lasting stabilisation of the workforce as the majority of care is now provided by ward based staff.

- In Time 1 of the study the research identified that a relatively high proportion of nursing hours were provided by one-to-one specialling. Overall, in the pilot wards that received a staffing uplift, the requirement of one-to-one specialling for patients reduced substantially. Hospital 1 reduced the requirement for one-to-one specialling from 19.7% of total nursing hours in Time 1 to 6.9% in Time 3, a 65% decrease. Hospital 2 also had a 49.6% decrease in one-to-one specialling nursing hours required from Time 1 (prior to implementation) to Time 3 (post implementation).

- Absenteeism, in particular sickness absence, may be an indicator of increased workloads or a poor working environment. Overall absenteeism decreased from Time 1 through to Time 3 in the majority of wards included in the implementation of the recommendations in the *Framework*. Sickness absence overall increased in Time 3 but was relatively close to the national average of 4.9% (HSE 2018).

- Bed occupancy rates in the pilot wards ranged from 89.73% to 101.11% in Time 1, from 87.8% to 105.3% in Time 2 and 92.45% to 101.6% in Time 3; these rates were all above the OECD average for acute bed occupancy at 77.3% with a number of wards above the national average bed occupancy rate of 93.8% (OECD 2016). These high bed occupancy rates have implications for nursing work and occupancy data is beneficial in planning the nursing resource required to care for patients on wards that have high levels of patient turnover.

- Overall, the variance in HPPD and hours worked during the various shifts are stabilising in the Pilot wards in Time 3 of the study following the implementation of the recommendations of the *Framework* being put in place; however, adjustments in staffing are still required and a number of wards face challenges as the levels of patient acuity and dependency change and bed occupancy

remains high. The implementation of the recommendations in the *Framework* has, to date, resulted in an increase in staffing numbers in those wards where a negative variance between NHPPD required and available was identified in Time 1 (i.e. before the introduction of the recommendations); in addition, the implementation of the recommendations from the *Framework* have resulted in the stabilisation of skill mix (generally a higher proportion of RNs providing care), an increase in the proportion of time allocated to the CNM2 as supervisory, an overall reduction in agency use, and an associated reduction in the need for one-to-one specialling.

Nursing Sensitive Patient Outcome Measures

- Average length of stay (AvLoS) demonstrated a fall across two of the three sites with AvLoS reducing from 10.5 days at Time 1 in Hospital 1 to 10.02 days in Time 2; Hospital 2 also had a slight reduction from 8.8 days in Time 1 to 8.6 days in Time 2. It is of note that in wards that have the least variance between staff required and staff available there was a consistent reduction in AvLoS: AvLoS in Ward 2 reduced from 13.3 days in Time 1 to 11.6 in Time 2 and in Ward 2 from 10.4 days in Time 1 to 10.2 days in Time 2.

- Based on the Poisson regression, the estimated death count on day 1 was 0.31 (95% CI 0.2 to 0.496). Over the first time period, from day 1 to day 178, the death count increased by 0.1% (95% CI -0.199 to 0.404) per day. During the second time period onwards (following the introduction of the Framework), the death count decreased by -0.023% per day. The model estimated death counts across the two respective periods (before and after the introduction of the Framework).

- A number of patient outcomes sensitive to nursing care were measured through an analysis of data from the Hospital In-Patient Enquiry (HIPE) system. The time series analysis shows that the count of NSO increased per day by 0.15% in Time 1 but decreased by 0.003% in Time 2, showing stabilisation.

- The regression model demonstrated that the odds of developing an NSO began to decline in Time 2, but this was no longer apparent after adjusting for case-mix.

- Data on nursing sensitive outcome measures, at this time, needs to be treated with caution. Further data collection and analysis is on-going as part of the longitudinal programme of research.

Nursing Work

- The research undertook, to date, four cross-sectional surveys of nursing staff in the Pilot wards: Time 1 - before the introduction of the recommendations in the *framework*; Transition phase - during the implementation of the recommendations and; Time 2 and Time 3 - following the implementation of the recommendations.

- The number of patients cared for per nursing staff (RN and HCA) decreased from an average of 5.3 at Time 1 to 4.9 at Time 3.

- Overall staff perceptions of staffing and resource adequacy increased from Time 1 through Transition to Time 3; however, this reduced at Time 3 across all wards. Perceptions of Nurse Manager Ability, Leadership and Support and nurse participation in hospital affairs showed slight increases across the three time periods; however, there were negligible changes in the perceptions of nurse doctor relationships and nursing foundations for quality of care.

- Respondents' perceptions that the quality of care delivered was poor or fair fell from 36.3% in Time 1 to 30.3% in Time 3, with the perception that the quality of care was good or excellent increasing from 63.7% in Time 1 to 69.8% in Time 3.

- Another area measured as part of the research were care left undone events or missed care, referred to as Safety CLUEs. In Time 1, 75.6% of nurses reported that at least one necessary item of care was left undone due to lack of time on their last shift while 61.9% reported the same in the Transition phase, which further dropped to 31.8% in Time 2. A small increase was recorded in Time 3 with 39.3% of respondents reporting that at least one necessary item of care was left undone but this remained substantially below the baseline of 75.6% at Time 1. Overall, an average of 2.51 care activities were left undone per shift in Time 1 while 1.94 activities, on average, were left undone at Transition, 0.75 undone at Time 2 and 1.08 undone at Time 3; again, this was below the baseline recorded at Time 1.

- Care delayed was also measured. In comparison to care left undone, care delayed showed less of a decline; In Time 1, 93.3% of staff reported at least one care task was delayed on their last shift while, 88.9%, 84.1% and 95% reported the same at Transition, Time 2 and Time 3 respectively. Overall, an average of 5.43 activities per shift were reported as delayed in Time 1 while 4.17 were reported as delayed at Transition which had a slight increase to 4.92 at Time 2 and further increasing to 6.56 at Time 3.

- Missed meal breaks for staff fell proportionally over the four time periods, with 50.0% of RNs reporting a missed meal break per shift in Time 1; this reduced to 44.4% in the Transition phase, 22.7% in Time 2 and 15.3% in Time 3.

- Job satisfaction and intention to leave remained relatively similar at the overall level but demonstrated differences at ward level. Generally, the prevalence of intention to leave was lower and job satisfaction higher at Transition and Time 2 time-points (i.e. following the introduction of the recommendations in the *Framework*) when compared to Time 1. In one site, which received the majority of the staffing uplifts, overall levels of job satisfaction increased from 56.3% in Time 1 to 86.1% in Time 2. However, levels of job satisfaction and intention to leave remained challenging at Time 3. Overall, the level of job satisfaction was higher at Transition and Time 2 time-points (i.e. following the introduction of the recommendations in the *Framework*) when compared to Time 1; however, this has decreased to similar to that of the baseline (Time 1) at Time 3.

- This phase of the research also measured burnout; however, as this measure was not included in the original pilot, comparisons are not available with Time 1 but are available between Time 2 and Time 3. Overall, in the pilot wards, staff scored relatively low on emotional exhaustion and depersonalisation and relatively high on personal accomplishment and Time 2 and Time 3[3]. However, total emotional exhaustion scores have increased at Time 3 in comparison to Time 2. Overall scores of personal accomplishment remained similar and relatively high across both time-points.

Economic Analysis[4]

- The economic costs of implementing the recommendations in the *Framework* were measured through the collection of data on the following: cost of the staffing changes (where required); cost of agency staff usage and; costs associated with nursing sensitive outcome measures.

- Overall, the monthly cost of implementing the uplift staff required (€79,574) was less than the agency savings realised (€82,480). Therefore, in implementing the recommendations of the *Framework* to date, there was a net monthly saving (€2,905) to the Department of Health across the six pilot wards. The reduction in agency spend following the implementation of the recommendations was, on average, €82,480 per month.

- The economic impact of a patient experiencing an NSO were estimated using data on Diagnostic Related Groups and presence of an NSO collected from the six pilot wards. Controlling for age, gender, admission type, complexity, length of stay and time period, the presence of a nurse sensitive outcome increased the average in-patient case-mix cost per case by €2,397 (p=0.001) holding all else constant. This estimated impact of nurse sensitive outcomes on inpatient case-mix cost per case can be used to estimate the cost of nursing sensitive outcomes avoided[5].

1.1.5 Summary of Results –Extension Wards[6]

This section outlines the data from the extension wards to date. These wards were added to the phase of the programme of research into safe nurse staffing and skill-mix. To distinguish them from the six original baseline wards, the additional 29 wards for the purpose of this report will be referred to as extension wards. The results are reported according to the timeframes in which the data was collected (August 2017 to April 2019). Administrative data reports on Time 1 (prior to the introduction of the

[3] Higher scores on the emotional exhaustion and depersonalisation subscales indicate negative outcomes; higher scores on the personal accomplishment subscale indicate better outcomes.
[4] This economic analysis was undertaken as part of the initial pilot project.
[5] The measurement of costs associated with nursing sensitive outcome measures is on-going in the longitudinal programme of research.
[6] Detailed discussion of the results of the Extension Wards are reported in subsequent sections of the Report.

recommendations in the *Framework*) and Time 2, following the implementation of the recommendations. Cross-sectional data is reported at two time-points: Time 1 (prior to the introduction of the recommendations in the *Framework*), and Time 2 (following the implementation of the recommendations). The Framework was implemented in 10 of the 29 wards.

Nursing Hours per patient Day, Agency Usage and Sickness Absence

- As a consequence of measuring patient acuity and dependency and introducing NHPPD as the method for identifying appropriate nurse staffing, there was an increase in whole time equivalents (WTEs) between Time 1 and Time 2 in those 10 extension wards where a negative variance between NHPPD required and available was identified. Overall, the variance in HPPD and hours worked during the various shifts are stabilising in Time 2 in these wards following the implementation of the recommendations of the *Framework* being put in place; however, adjustments in staffing are still required and a number of wards that did not have an adjustment face challenges as the levels of patient acuity and dependency change.

- The results show that the amount of time the CNM2 is spending in a supervisory role in Time 2 in the extension wards in which the Framework recommendations were implemented increased from Time 1. There are still a some challenges in Hospital 1where 55% of the total wards are 80% or above supervisory status for CNMs. Hospital 2 has achieved 95% or above time allocated to supervisory status with the majority of wards in Hospital 3 also at that level.

- A further recommendation in the *Framework* was that the RN to HCA ratio should approximate 80% RN to 20% HCA. Rostered skill-mix, that is the core complement of staff, demonstrated that skill-mix is close to or at the 80% RN to 20% HCA ratio recommended in the *Framework*. Overall, the ratio for the implementation wards was 80% RN to 20% compared to the non-implementation wards of 75% RN to 25% HCA. It is envisaged that, as new staff integrate into the wards, the skill-mix on a shift-by-shift basis will match that outlined in the roster; that is hours currently allocated to the supervision of new staff, which are impacting on the skill-mix will become available for clinical care.

- In the majority wards that implemented the recommendations in the Framework there was, on average, a reduction in agency usage. Overall percentage of hours provided by agency staff reduced from 16% in Time 1 to 13% in Time 2 (Hospitals 1 and 3 combined) in those wards . This compared to an increase in agency usage in wards that did not adjust staffing where agency usage increased from 6% of total nursing hours in Time 1 to 14% in Time 2. It should be noted that there was variability in agency usage at ward level; however, the overall trend in the implementation wards in relation to agency usage was downward. Although Hospital 2 did not adjust its staffing levels, it did implement the recommendations in the Framework as well as an enhanced care programme; this resulted in a fall in the hours provided by agency staff from 14% in Time 1 to 10% in Time 2.

- The hours of care used for one-to-one specialling varied greatly across wards and hospitals. In Time 1 of the study, the research identified that a relatively high proportion of nursing hours were provided by one-to-one specialling; this specialling was predominantly provided by agency staff. In Hospital 1, overall, in the wards that received a staffing uplift, the requirement of one-to-one specialling for patients reduced from 27.7% in Time 1 to 19.9% in Time 2; this was in comparison to the wards that did not receive an uplift where the requirement for one-to-one specialling increased from 10.8% in Time 1 to 21.7% in Time 2[7]. Hospital 2 increased the requirement for one-to-one specialling from 197.4% of total nursing hours in Time 1 to 21.8% in Time 2. In the wards in Hospital 3 that received an uplift, the proportion of nursing hours required for one-to-one specialling decreased from 22.8% in Time 1 to 10.1% in Time 2.

- Absenteeism, in particular sickness absence, may be an indicator of increased workloads or a poor working environment. The national rate of sickness absence among nursing staff is 4.9% (HSE 2018); the majority of wards in Hospital 1 were below this rate, with only two wards above; while Hospital 2 has two wards surpassing this level and Hospital 3 was generally below the national level. Overall sickness absence decreased from Time 1 to Time 2 with only one ward being above the national rate of sick leave. Hospital 2 showed a different pattern of absenteeism rates in Time 2, with six of the eight wards absenteeism rates increasing, one remaining unchanged and one decreasing; while three wards had sick leave rates over the national average and one at the national level; the remaining four wards had sick leave rates below the national average.

- Bed occupancy is an important measure as high bed occupancy may increase workload. Overall, Hospital 1 had the highest level of bed occupancy ranging from 86% to 103%. Hospital 2 had a greater range from 72% to 109% while the lowest levels were apparent in Hospital 3, ranging from 69% to 81%. At Time 2 bed occupancy rates have remained high, between 82.13% and 106.15% in Hospital 1, 72.11% and 111.26% in Hospital 2 and 89.16 to 94.05% in Hospital 3. These rates were all above the OECD average for acute bed occupancy at 77.3% with a number of wards above the national average bed occupancy rate of 93.8% (OECD 2016). These high bed occupancy rates have implications for nursing work and occupancy data is beneficial in planning the nursing resource required to care for patients on wards that have high levels of patient turnover.

- Overall, required nursing hours per patient day at Time 1 were higher than actual hours available; however, Time 2 is beginning to show signs of stabilisation, this was particularly the case in the 10 ward that implemented the recommendations in the framework. The majority of wards in Hospital 2 and Hospital 3 reported a positive variance; that is, the actual nursing hours available are matching or slightly above those required. Variance at shift level was also measured with lower levels of variance noted on night shifts; however, there were substantial variances on day shifts across wards. Time 2, however, shows that overall shift variance is beginning to improve. There was a large

[7] Wards that did not reach 95% actualisation in Trendcare have been removed from this analysis.

variability in the extent to which CNM2s were at 100% supervisory level at both time points and further ongoing analysis is required in this regard. In particular, this measurement needs to take into account wards that have 20 or fewer patients. Skill-mix was variable across the three sites and across wards. However, the general pattern is that rostered skill-mix is moving towards the recommended 80:20 skill-mix ratio at Time 2; this was particularly the case in wards that received an adjustment to their staffing levels. Agency use across wards and hospitals was variable with the vast majority of agency staff at HCA level; however, the overall trend in the implementation wards in relation to agency usage was downward this pattern was also seen in the proportion of nursing hours required for one-to-one specialling. Those wards who had less variance in actual nursing hours available and required nursing hours had reduced rates of one-to-one specialling. Absenteeism rates related to sickness varied across the sites; however, in the vast majority of wards, levels of sickness absence were below the national average. Bed occupancy rates were high in Hospital 1 and, to a lesser extent in Hospital 2; these levels of occupancy rates are an indicator of a high nursing workload.

Nursing Sensitive Patient Outcome Measures

- Average length of stay (AvLoS) demonstrated a fall across all sites between Time 1 and Time 2. AvLoS reduced from 10.7 days at Time 1 to 9.45 days in Time 2 in those wards that received an uplift; a reduction in AvLoS of 1.26 days. However, it should be noted that there was also a fall in the AvLoS in the comparison wards from 11.87 days in Time 1 to 9.91 days in Time 2.

- We used a segmented time series model to estimate the effect of the uplift in the 29 extension wards (15/08/2017 to 30/04/2019), for which 10 received implementation of the *Framework* from 01/09/2019, while the other 19 did not. Consequently, we allowed the NSO time-trend in the post-uplift period to vary across these two groups using an interaction term. The parallel time trend in the two groups of wards suggests that there was no change in the NSO rate that could be attributed to the uplift (and the p-value for the interaction was 0.87). An analysis using the daily count of deaths as the outcome yielded similar results.

- Data on nursing sensitive outcome measures, at this time, needs to be treated with caution. Further data collection and analysis is on-going as part of the longitudinal programme of research.

Nursing Work

The research undertook, to date, two cross-sectional surveys of nursing staff: Time 1 - before the introduction of the recommendations in the *framework*; and; Time 2 - following the implementation of the recommendations.

- The number of patients cared for per nursing staff (RN and HCA) decreased slightly in both wards that received an adjustment in staffing and those that remained at the same level of staffing; The number of patients cared by wards that received an adjustment reduced from 4.83 at Time 1 to 4.47 at Time 2, a

reduction of 0.36. In comparison, the wards that did not receive an adjustment reduced from 4.59 in Time 1 to 4.49 in Time 2, a reduction of .01.

- Overall staff perceptions of staffing and resource adequacy slightly decreased from Time 1 to Time 2 across all wards. This reduced from 2.08 in Time 1 to 1.98 in Time 2 in the implementation wards, a difference of .01 whereas the non-implementation wards fell from 2.15 in Time 1 to 2.04 in Time 2, a difference of 0.11. Perceptions of Nurse Manager Ability, Leadership and Support and nurse participation in hospital affairs showed slight increases across the two time periods in the implementation wards; however, there were negligible changes in the perceptions of nurse doctor relationships and nursing foundations for quality of care which were at a moderate to high level prior to and after the implementation of the Framework.

- Respondents' perceptions that the quality of care delivered was good or excellent fell from 75.6% in Time 1 to 68.4% in Time 2, in the implementation wards; in comparison, the non-implementation wards fell from 73.0% in Time 1 to 70.3% in Time 2.

- Another area measured as part of the research were care left undone events or missed care, referred to as Safety CLUEs. In Time 1, 58.9% of nurses in the implementation ward and 40.1% in the non-implementation wards reported that at least one necessary item of care was left undone due to lack of time on their last shift while this fell to 52.3% in the implementation wards, it increased to 51.3% in the non-implementation wards in Time 2. The number of activities left undone in the implementation wards per shift fell from an average of 1.69 in Time 1 to 1.55 in Time 2; in comparison, the number of activities left undone in the non-implementation wards increased from 0.93 in Time 1 to 1.32 in Time 2.

- Care delayed was also measured. In comparison to care left undone, care delayed showed less of a change; In Time 1, in the implementation wards 89.3% of staff reported at least one care task was delayed on their last shift; this increased to 93% in Time 2. Similarly, in the non-implementation wards 87.3% of staff reported at least one care task was delayed on their last shift; this increased to 90.7% in Time 2. Overall, care left undone showed a downward decline in the implementation wards with an increase in the non-implementation wards; however, care delayed showed a slight increase in both implementation and non-implementation settings.

- Missed meal breaks remained similar in both time periods both in the both the implementation and non-implementation wards with a decrease in breaks delayed in both settings.

- Job satisfaction and intention to leave remained relatively similar at the overall level but demonstrated differences at ward level. Generally, satisfaction with current job was higher at Time 1 timepoints (i.e. prior to the introduction of the recommendations in the *Framework*) when compared to Time 2. However, there was little overall change with satisfaction with nursing which remained at approximately 75% in both cohorts over the two time periods. There was a slight increase in the extent to which respondents in the implementation wards would

recommend their ward to colleagues: 70.2% in Time 1 and 73.2% in Time 2 with a slight decrease in the non-implementation wards: 79.9% in Time 1 and 75.1% in Time 2. Intention to leave current employment remained relatively similar over the two timepoints: implementation wards – 53% in Time 1 and 54.5% in Time 2; non-implementation wards – 50.2% in Time 1 and 50.5% in Time 2.[8]

- This phase of the research also measured burnout and comparisons are made between Time 1 (prior to the implementation of the Framework) and Time 2 (following the implementation of the recommendations in the Framework. Overall, in both the implementation and non-implementation wards, staff scored relatively low on emotional exhaustion and depersonalisation and relatively high on personal accomplishment in Time 1 and Time 2[9]. However, total emotional exhaustion scores increased at Time 1 in comparison to Time 2. Overall scores of personal accomplishment remained similar and relatively high (positive) across both time-points.

Economic Analysis

- The economic costs of implementing the recommendations in the *Framework* were measured through the collection of data on the following: cost of the staffing changes (where required) and cost of agency staff usage.

- Implementation wards have substantially less annual agency costs than the non-implementation wards following the implementation of the recommendations in the *Framework*.

1.1.6 Recommendations

Implementing Nursing Hours per Patient Day (NHPPD)

The results of this research demonstrated that assumptions 1 and 2, as outlined in the *Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland* (Department of Health 2016) were evident; that is patient care needs differ and nurse staffing numbers, profile and skill-mix are key to ensuring safe, high quality care for patients. Furthermore, it was fond that using a systematic approach to determining nurse staffing and skill-mix (in this case NHPPD), resulted in the stabilisation of the nursing workforce over the period of the research. The use of this approach enabled, in association with clinical judgement, an informed decision-making process to be put in place. The evaluation also identified that NHPPD measured in the pilot study broadly matched the NHPPD ranges outlined in the *Taskforce* report.

[8] Data collection occurred in a timeframe prior to an industrial dispute by the nursing representative union (INMO).
[9] Higher scores on the emotional exhaustion and depersonalisation subscales indicate negative outcomes; higher scores on the personal accomplishment subscale indicate better outcomes.

Recommendation: It is therefore recommended that NHPPD be introduced nationally on an incremental basis as the means for determining nurse staffing and skill-mix needs in medical, surgical and specialist settings.

Governance and Oversight

The Taskforce recommended that: 'the process of setting and maintaining safe nurse staffing levels is collaborative and involves Clinical Nurse Managers, Senior Nurse Managers and Directors of Nursing with support from Human Resources Management, Quality and Safety, and Finance.' To ensure that this recommendation was fulfilled, each of the Pilot Sites put in place a Local Pilot Planning and Implementation Group. These structures were central to ensuring that the reallocation of staff and the staffing resources were put in place as the recommendations from the *Framework* were implemented.

Recommendation: It is therefore recommended that these LPITs (henceforth to be referred to as Local Implementation Teams) be introduced on a phased basis in clinical sites that are involved in the introduction of the safe nurse staffing and skill-mix programme in tandem with the national rollout. The role of these teams is to support the implementation and monitoring of the safe nurse staffing and skill-mix programme at local and group levels. It is further recommended that a dedicated resource to support the programme be considered at local/group level as recommendations in the *Framework* are implemented.

Enhanced Care

There was a larger than expected prevalence of one-to-one specialling across all three pilot sites when data was collected at Time 1 (baseline). However, as the workforce stabilised the requirement for one-to-one specialling reduced substantially. One-to-one specialling was reflective of different levels of patient dependency and the profile of the wards across all sites. It is acknowledged, in some cases, the prevalence of one-to-one specialling matched the NHPPD range for specialist wards; however, the extent of one-to-one specialling identified in non-specialist wards required extensive resources to match demand. Previous research suggests that many acute hospitals are not equipped with the skills and resources to provide quality one-to-one specialling to patients who require this level of care. To address this, active assessment and management of one-to-one care through a process of enhanced care should be put in place.

Recommendation: It is therefore recommended that a set of high-level key principles for enhanced care developed as part of the Pilot are included in the *Framework*. To explicitly reflect this point; a more structured, patient-centred approach (enhanced care) to one-to-one specialling would significantly reduce costs, as well as improving the quality of care patients receive and enhance the patient experience. It is further recommended that these high-level key principles be put in place at an organisational level, taking local processes into account, whereby the roles and responsibilities of all staff engaged in one-to-one specialling be clearly identified. Therefore, it is recommended that the *Framework* be amended to include these recommendations

Supervisory Status of the CNM2

The *Taskforce* recommended that 100% of the CNM2 role and function should be allocated to a supervisory capacity. It further recommended that organisations invest in appropriate resource of CNM1s to support the role and function of the CNM2 and provide effective succession planning. The extent to which the CNM2s in the pilot sites reached the target of being 100% supervisory increased over the phases of the research. There is evidence that having these senior posts at supervisory level has a number of positive outcomes for both staff and patients; in addition, as supervisory status of CNM2s increased, staff perceptions of the extent to which they were supported by nursing leadership also increased.

Recommendation: It is therefore identified that this recommendation in the *Framework* has a number of positive benefits and should continue to be implemented in the next stage of implementation of the recommendations in the *Framework*.

Organisational Culture and Ward Environment

Assumption 3 in the *Framework* stated that the organisational environment, where patients receive and staff deliver care, has an impact on the ability to deliver safe effective care. The *Framework* recommended that the elements influencing a positive organisational culture and ward climate form an integral part of the approach to safe nurse staffing decisions. A number of issues related to the ward environment were identified in the evaluation; these included quality of care delivered, complexity of the working environment, nurse participation in hospital affairs, nurse manager ability, leadership and support and staffing resources.

Recommendation: It is therefore recommended that consideration be given to introducing organisational practices similar to that recognised by the Magnet programme (Aiken *et al.* 2000); these would include active involvement in identifying and measuring nurse sensitive outcome indicators, active programmes of quality assurance and structures to actively promote the involvement of clinical nurses in the setting of hospital policies and governance.

Workforce Planning and Workload Management System

The introduction on a trial basis of a workforce planning and workload management system (*TrendCare*) for nursing was central in ensuring a systematic approach to measure patient acuity and dependency and required nursing hours per patient day was used. This workforce planning and workload management system allowed the nursing resource to be calculated according to patient need rather than relying on a nurse to patient ratio estimates or a historical staffing complements. The data collected through the *Trendcare* system was instrumental in facilitating decision making from both an operational and research perspective. In particular, it enabled decisions to be made on the staffing resource based on patient acuity and dependency as measured through the required NHPPD.

Recommendation: Consideration should be given to the national implementation of a workforce planning and workload management system. This system should be

capable of capturing all components of the recommendations in the *Framework* and needs to include: patient acuity measures, skill mix measures, workload management and patient allocation, calculation of NHPPD (required, actual and variance), agency use, one-to-one specialling, overtime and absenteeism. It is also key that the system integrates with organisational level patient information management systems to enable the development of nursing intensity weight based costing relative to patient Diagnostic Related Groups.

Nurse Sensitive Outcomes/Tipping Points

The *Framework* recommended that a patient safety *Tipping Points* at ward level be monitored and determined locally. The *Framework* further recommended that 'ward and organisation wide mechanisms be put in place, to measure and monitor, at a minimum, nurse sensitive outcome key performance indicators on patient falls, pressure ulcers, staff and patient experience.' While, in theory, it was identified that this data would have utility in exploring the relationship between nurse staffing and adverse outcomes such as slips, trips and falls, in practice this was difficult to achieve due to the variability in the quality of NIMS data received from the three sites. Issues identified included a lack of information relating to the time and date of the incident and contextual information associated with the cause of the adverse event. However, HIPE data was identified as being of utility in measuring the association between nurse staffing and nursing sensitive outcomes. Nationally the Office of the Nursing and Midwifery Services Director is implementing the Nursing & Midwifery Quality Care-Metrics to provide a systematic approach to the capture of nursing process KPIs known also a nursing metrics. The development of these will have utility in monitoring the association between nurse staffing and outcomes as they are incorporated at ward level.

Recommendation: It is recommended that the recommendation in the *Framework* that nurse sensitive outcome key performance indicators on patient falls, pressure ulcers, staff and patient experience be monitored from ward level data is retained. Hospitals should also monitor and report on staff turnover, absenteeism rates as an indicator of the impact of the safe nurse staffing policy as highlighted in the *Framework*. Decision making on nurse staffing should be based on a systematic approach that takes into consideration high quality data collected at ward level.

Care Left Undone Events (CLUEs)

The *Framework* recommended that a process to assess, escalate and respond to missed care events (referred to as "Safety CLUEs") is put in place at ward and organisational level to indicate the adequacy of the nurse staffing resource. This recommendation was implemented through incorporating the safety CLUES into the *TrendCare* system. Safety CLUEs are important in exploring the association between nurse staffing and missed or delayed care.

Recommendation: It is therefore recommended that the current recommendation in the *Framework* that a process to assess, escalate and respond to missed care events

remains in place. It is further recommended that future software based workload planning or workload systems must have the facility to record this data at ward level.

Skill-Mix

The Framework recommended that 'an initial nursing to healthcare assistant grade mix of 80%/20% (once a safe nurse staffing level exists) is recommended for use in the current environment, and that this is the subject of on-going review.

Recommendation: It is recommended that the skill mix ratio recommended in the *Framework* remains in place. This is based on the results of this study and other research undertaken internationally that have identified that a skill-mix with a higher proportion of RNs is associated with better patient and staff outcomes. This recommendation should be subject to on-going review as roles and specialities develop.

Patient Experience

Assumption 4 in the *Framework* stated that 'positive patient … outcomes are important indicators of the safety and quality of nursing care.' As well as undertaking a number of proxy measures of patient care, a key approach in the study was the measurement of the patient experience. The introduction of a National Patient Experience Survey (NPES) in Ireland provides the opportunity for research at a national level of the association between nurse staffing and the patient experience.

Recommendation: It is recommended that, as outlined in the *Framework,* patient experience is monitored at ward and hospital level. The introduction of the National Patient Experience Survey provides the opportunity to assess the quality of the patient experience at hospital level.

National Roll Out

The results of the evaluation identified that the introduction of the recommendations in the *Framework* were suggestive of increased job satisfaction and a reduction in reports of intention to leave in pilot wards were changes were made based on the *Framework*. The overall impact of the implementation of the *Framework* was to stabilise the nursing workforce in the pilot sites. This stabilisation, through the introduction of an evidence-based approach for determining nurse staffing and skill-mix, will, it is suggested on the results to date, have positive implications for the future recruitment and retention of the nursing workforce. In addition, the introduction of a systematic approach to determining safe staffing levels and the required skill-mix, backed up by a workload management system, will also facilitate the goal of stabilising the nursing workforce and enable the provision of high quality care, improvements in the economic value to patient care as costs associated with nursing sensitive outcomes and agency use are reduced.

Recommendation: It is therefore recommended that the introduction of the recommendations in the *Framework* are implemented nationally on a phased basis. This national implementation should be supported by local pilot implementation teams;

these were key to the successful implementation of the pilot. This process should be supported and informed by an on-going programme of research.

Section 2
Evaluation of the Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix

2.1 Introduction

To meet the challenge of identifying safe and effective staffing and in response to issues highlighted in recently published reports that identify the adverse events that can occur when staffing levels are not at a level to meet patient need (Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry 2013), the Department of Health published and launched the *Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland* (Department of Health 2016) (henceforth referred to as the *Framework)*. This report set out for the first time in Ireland, an evidenced based approach to determine safe nurse staffing and skill mix levels across general and specialist medical and surgical in-patient care settings in acute hospitals.

The *Framework* was developed following consultation with key stakeholders in the healthcare system and included national and international experts. The consultation resulted in a number of recommendations, including: the Clinical Nurse Manager (CNM) - grade 2 role is fully 100% supervisory (that is, they carry no patient caseload), and 'that a systematic…evidence based approach to determine nurse staffing and skill mix requirements is applied' (Department of Health 2016: 9). Furthermore, it was recommended that 80% of nurse staffing in medical and surgical wards is provided by registered nurses (RNs). The *Framework* also recommended the undertaking of quality research on the association between nurse staffing and patient outcomes.

This research report outlines the methods and results of the programme of research that has further evaluated the implementation of the recommendations in *Framework* in three pilot sites (Model 4 hospital (670 beds), Model 3 hospital (235 beds) and, a Model 2 Hospital (109 beds)). It builds on two previous reports of research: *Evaluation of the Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix – Report 1* (Drennan *et al.* 2017a) and, *Evaluation of the Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix – Report 2* (Drennan *et al.* 2017b). The *Evaluation of the Pilot Implementation of the Framework for Safe Nurse Staffing and Skill-Mix – Report 2* (Drennan *et al.* 2017b) identified a number of positive emerging patient, staff and organisational outcomes over a relatively short period of time within six wards spread across three hospitals. At the time of the report, the research team recommended that further research with a larger sample and over a longer period of time was required to explore if these outcomes identified are sustained. This report builds on that recommendation and adds further data over a longer timeframe to that outlined in the report published in June 2017.

2.1.2 Aims and Objectives

The aim of this research was to measure the impact of implementing the recommendations of the *Framework for Safe Nurse Staffing and Skill Mix* on nurse-

sensitive patient outcome measures, staffing outcomes and organisational factors in three pilot sites. In addition, the research measured the economic impact of implementing the recommendations in *Framework* and provides an evidence-based assessment of the adoption and implementation of the initiative in practice to guide future national roll-out decisions.

2.1.2 Objectives

1. Examine the extent to which nurse sensitive patient outcome measures changed over time as a consequence of the introduction of the recommendations in the *Framework*;

2. Examine the impact of introduction of the recommendations in the *Framework* on adverse patient outcomes and safety CLUEs (Care Left Undone Events);

3. Examine the impact of the pilot introduction of the recommendations in the *Framework* on patient experience;

4. Determine the impact of the recommendations in the *Framework* on nurse outcomes (job satisfaction, intention to stay, burnout);

5. Determine the impact of the introduction of the recommendations in the *Framework* on organisational/ward environment factors (ward climate, impact of Clinical Nurse Manager 2 post, leadership, quality of care);

6. Determine the cost implications arising from the introduction of the recommendations in the *Framework* and the resources required to deliver national rollout and to maintain the *Framework*;

7. Examine implementation processes/measures in the context of recommendations for future national rollout.

2.1.3 Methods

The methods used in this evaluation were based on a number of previous studies including those used to evaluate the introduction of Nursing Hours Per Patient Day (NHPPD) in Western Australia (Twigg & Duffield 2009, Twigg *et al.* 2012), a report on the association between nurse staffing and skill-mix and patient outcomes (Duffield *et al.* 2007) and the methods used in the RN4CAST study (Sermeus et al. 2011).

The sample in this section of the report consisted of all multi-day patients and all patient days over the duration of the study from the six pilot wards (Model 4 hospital - 3 wards, Model 3 hospital - 2 wards) and, Model 2 Hospital - 1 ward) and 29 extension wards within three hospitals chosen to take part in the implementation of the *Framework.* Within these three hospitals, 10 out of the 29 wards received an adjustment in staffing; this enabled us to compare implementation wards with non-implementation wards. In addition, all nurses and healthcare assistants involved in the provision of direct patient care on the selected wards were included. A number of

approaches were used in the research, including the collection of administrative and cross-sectional data. Administrative data were collected at ward level through the *TrendCare system* as well as accessing data available through the *Hospital In-Patient Enquiry (HIPE)* system. Administrative data was used to measure the association between NHPPD and nursing sensitive outcome indicators (mortality, urinary tract infections, skin pressure ulcers, hospital acquired pneumonia, deep vein thrombosis/pulmonary embolism, upper gastro-intestinal bleeding, central nervous system complications, sepsis and shock/cardiac arrest, wound infection, pulmonary failure, metabolic derangement and length of stay). The cross-sectional component of the study measured the association between key elements of the *Framework* and nursing work, nurse satisfaction, staff burnout, patient satisfaction, environmental complexity and care left undone (missed care). In total four domains were measured by administrative and cross-sectional data: nurse staffing, nursing workload, working environment and patient outcomes[10].

[10] Refer to Drennan *et al.* (2017) *Framework for Safe Nurse Staffing and Skill-Mix – Report 2* for a detailed explanation of the methods used.

Section 3
Results from the Pilot Wards

3.1 Introduction

This section outlines the results to date from the research for the pilot wards included in the programme of research into safe nurse staffing and skill-mix[11]. The results are outlined in a number of sections and present a comprehensive picture of the variables associated with nurse staffing: both secondary and cross-sectional data were collected. Secondary data, collected from administrative systems, included the calculation of nursing hours per patient day (NHPPD) (required, actual and variance), shift variance, skill mix, agency use, one-to-one specialling, overtime and absenteeism (these were collected from the *TrendCare*[12] IT system) and nurse sensitive outcomes (collected from HIPE data). Cross-sectional data was collected from nursing (RN) and healthcare assistant (HCA) staff working on the six pilot wards. Nursing staff provided data on nursing work, job satisfaction and intention to leave as well as care left undone events. The majority of the results, in particular those reporting administrative data, compare three time periods: prior to the implementation of the recommendations in the *Framework*. in particular the introduction of NHPPD[13] (Time 1) and following the introduction of the recommendations (Time 2) and (Time 3) Data from staff (RNs and HCAs) is reported over three periods of time. Table 3.1.1 presents data on the calculation of the staffing intervention (uplift and skill mix shift) required in each of the pilot wards compared with the staffing intervention that was in place at the time of the evaluation. As outlined, Wards 1, 2 and 3 in Hospital 1 all required an uplift of staff as a consequence of measuring patient acuity and dependency and subsequent required NHPPD. According to the data collected in Time 1, Hospital 2 did not require an uplift with Hospital 3 requiring an uplift of 2.5 WTE along with an alteration of skill mix. It should also be noted that the uplifts in all wards did not occur simultaneously with the majority being put into place at the mid-point of the timeframe of the evaluation (Time 2); in addition, staff levels in the six pilot wards would have fluctuated over the time period of the research. It is of note that a period of industrial cation took place during the period of data collection (30th January, 5th February 2019).

[11] Wards to which the Taskforce was extended to are discussed in Section xx

[12] *Trendcare*, is a commercial workforce planning management system (http://www.trendcare.com.au). The *Trendcare* system provides data on patient acuity and dependency measures, skill-mix and patient allocation.

[13] Please note, for anonymity purposes, hospitals and wards will be referred to by numbers. Hospital 1 (Model 4) – Wards 1,2, and 3; Hospital 2 (Model 3) – Wards 22 and 23; Hospital 3 (Model 2) – Ward 31.

Table 3.1.1 Uplift and Skill Mix Required as a Consequence of NHPPD Compared to Uplift and Skill Mix in Place at the Time 1 of Research

	Uplift required			Total ward establishment post uplift		Current uplift received	
Ward 1	RN	HCA	Total	CNM2	1.0	Total WTE recruited	8.0
DH funded	4.5	2.5	7.0	RN	26.5	Total WTE leavers	0.0
Agency conversion	0	2.0	2.0	HCA	6.5		
	4.5	4.5	9.0	Total	34	Net WTE uplift	**8.0**
						Awaiting 1 WTE to be recruited (0.5 RN, 0.5 HCA)	
Ward 2	RN	HCA	Total	CNM2	1.0	Total WTE recruited	10.0
DH funded	8.0	0.0	8.0	RN	35.5	Total WTE leavers	-4.0
Agency conversion	4.3	0.0	4.3	HCA	9.0		
Conversion (to RN)	0.0	0.4	0.4	Total	45.5	Net WTE uplift	**6.0**
	12.3	0.0	12.7				
						Of 6.0 WTE, 1 on maternity leave; 2 on adaptation – short 3 WTE	
Ward 3	RN	HCA	Total	CNM2	1.0	Total WTE recruited	10.7
DH funded	4.5	2.5	7.0	RN	28.0	Total WTE leavers	-2.0
Agency conversion	0	2.0	2.0	HCA	6.7	Awaiting WTE	-0.4
	4.5	4.5	9.0	Total	35.7	Internal Transfer	+3.0
						Net WTE	**11.3**
Ward 22	-	-		-	-	-	-
Ward 23	-	-		-	-	-	-
Ward 31	RN	HCA	Total	CNM2	1.0	Total WTE recruited	3.5
DH funded	0.0	1.5	1.5	RN	23.0	Total WTE leavers	1.0
Agency conversion	0.0	2.0	2.0	HCA	5.5		
	0.0	3.5	3.5	Total	29.5	Net WTE uplift	**2.5**

3.2 TrendCare System Administrative Data – Pilot Wards

The data for this section of the report was collected through the *TrendCare* workforce planning and workload management system. This system provided data in the following domains:

- Patient acuity measures
- Skill mix measures
- Workload management and patient allocation

Data was collected from all six wards; the period of data collection in each of the wards is outlined in table 3.2.1. The following data is reported below:

- Nursing Hours per Patient Day (NHPPD) (required, actual and variance)
- Shift variance

- Skill mix
- Agency use
- One-to-one specialling
- Overtime
- Absenteeism

Table 3.2.1: Data collection periods for Time 1, Time 2 and Time 3

	Ward Code	Time 1	Time 2	Time 3	Beds
Hospital 1	Ward 1	15/07/2016 – 28/08/2016	09/01/2017 – 01/10/2017	02/10/2017 – 30/04/2019**	35
	Ward 2	15/07/2016 – 28/08/2016	09/01/2017 – 01/10/2017	02/10/2017 – 30/04/2019**	34
	Ward 3	15/07/2016 – 02/10/2016	09/01/2017 – 01/10/2017	02/10/2017 – 30/04/2019**	24
Hospital 2	Ward 22	31/10/2016 – 11/12/2016	09/01/2017 – 01/10/2017	02/10/2017 – 30/04/2019**	26
	Ward 23	31/10/2016 - 11/12/2016	09/01/2017 – 01/10/2017	02/10/2017 – 30/04/2019**	20
Hospital 3*	Ward 31	15/07/2016 – 28/08/2016	09/01/2017 – 01/10/2017	02/10/2017 – 30/04/2019**	29

*Please note, data from Ward 31 did not reach the required 95% validation in time period 2.
**This includes data during the period of industrial action.

3.2.1 Nursing Hours per Patient Day

Table 3.2.1.1 identifies the nursing hours required per patient day (HPPD) by acuity for all patient types, the clinical nursing hours per patient day available, the total HPPD available and the variance between the required and clinically available HPPD for Time 1, Time 2 and Time 3. The wards in Hospital 1 and the one ward in Hospital 3 showed a deficit in HPPD during Time 1 (before the implementation of the recommendations) and subsequently received an alteration in their staffing (Table 3.2.1.1 below); both wards in Hospital 2 had a positive variance of HPPD during Time 1. The HPPD put in place for Time 2 for wards that required a staffing uplift was based on the required HPPD calculated in Time 1. Therefore, while the required and available HPPD can be compared in Time 2, it is more accurate to compare the required HPPD of Time 1 with the actual HPPD of Time 2, and required HPPD of Time 2 with actual HPPD of Time 3 in order to measure the extent to which staffing levels have changed. This is represented in Table 3.2.1.3 below. It is important to note when interpreting the data, that both clinically available and total available should be examined. Due to the introduction of new staff as a consequence of the calculated HPPD from Time 1, there is an increase in supervised practice hours; that is, staff were spending more time supervising new staff in Time 2 than in Time 1. This will be highlighted through the comparison of total available hours between Time 1 and Time 2, and Time 2 and Time 3.

In Hospital 1, while the variance in Ward 1 remained negative at Time 2, the variance between required at Time 1 and available at Time 2 reduced by 0.45 HPPD. However, as the number of nursing hours required increased for this ward in Time 2, this necessitates a further staff uplift to match the required staffing complement based on the change in patient acuity and dependency over this period of time. Time 3 indicates

that there remains a deficit in the clinically available HPPD: however, as the total available has increased substantially this suggests that new staff may not have been fully integrated into the ward for clinically available time and may still be undergoing induction. This demonstrates that calculating HPPD based on patient acuity and dependency requires an iterative and continuous process of measurement. Ward 2 also had a positive decrease in the variance of HPPD; however, it was much more substantial at reducing the variance at Time 2 to -0.19. As outlined in figure 3.2.1.1 depicting HPPD, this ward's staffing profile is beginning to stabilise. The variance in Ward 3 also decreased and was positive in Time 2, the profile in this ward is also showing stability at Time 2 (see figures 3.2.1 and 3.2.2). However, the deficits in these two wards slightly increased at Time 3 indicating a change in patient acuity and/ or staffing levels required to provide care.

Both Wards in Hospital 2 in Time 1 had a greater number of HPPD than was required; this resulted in no up-lift in Time 2; this indicates that they have the required staffing complement to meet their nursing needs. The staffing required remained relatively stable at Time 3.

Ward 31 of Hospital 3 had, based on the calculation of HPPD, the required staffing levels at Time 1 and the variance had a positive decrease in Time 2, with a difference of 0.76 HPPD. However, the required HPPD from Time 2 has subsequently increased and this ward is now running a relatively small deficit of HPPD (Figure 3.2.1) which increased again at Time 3; this is due to the increase in the required HPPD. This occurred due to a change in patient acuity and dependency over the time period of the study and indicates that adjustments in staffing are constantly reviewed.

Table 3.2.1.1: Nursing hours per patient day

		Time 1				Time 2				Time 3			
Hospital	Ward	Required	Clinically available	Total available	Clinical variance	Required	Clinically available	Total available	Clinical variance	Required	Clinically available	Total available**	Clinical variance
1	1	4.13	3.20	3.85	-0.93	5.16	3.65	4.3	-1.51	5.58	3.88	4.67	-1.70
	2	5.82	4.31	4.72	-1.51	4.77	4.58	5.28	-0.19	4.76	4.43	5.02	-0.33
	3	6.33	5.75	6.46	-0.58	5.29	5.33	6.42	0.04	5.42	5.25	6.08	-0.17
2	22	6.50	6.58	7.04	0.08	5.98	6.79	7.57	0.81	6.49	7.07	7.84	0.58
	23	6.60	6.98	7.57	0.38	6.15	6.55	7.56	0.4	7.46	7.37	8.26	-0.09
3	31*	4.42	4.25	4.77	-0.17	5.79	5.01	5.61	-0.78	6.39	5.43	5.93	-0.96

*Please note, data from Ward 31 had not reached the required 95% validation in time period 2; therefore, results for this stage need to be treated with caution.
**Includes period of industrial action.

Table 3.2.2.2: Clinical and Total variance in Nursing hours per patient day

		Clinical variance between HPPD required Time 1 and HPPD available Time 2	Total HPPD variance between Time 1 and Time 2	Clinical variance between HPPD required Time 2 and HPPD available Time 3	Total HPPD variance between Time 2 and Time 3
1	1	-0.48	0.45	-1.28	0.37
	2	-1.24	0.56	-0.34	-0.26
	3	-1.00	-0.04	-0.04	-0.34
2	22	0.29	0.53	1.09	0.27
	23	-0.05	-0.01	1.22	0.70
3	31	0.59	0.84	-0.36	0.32

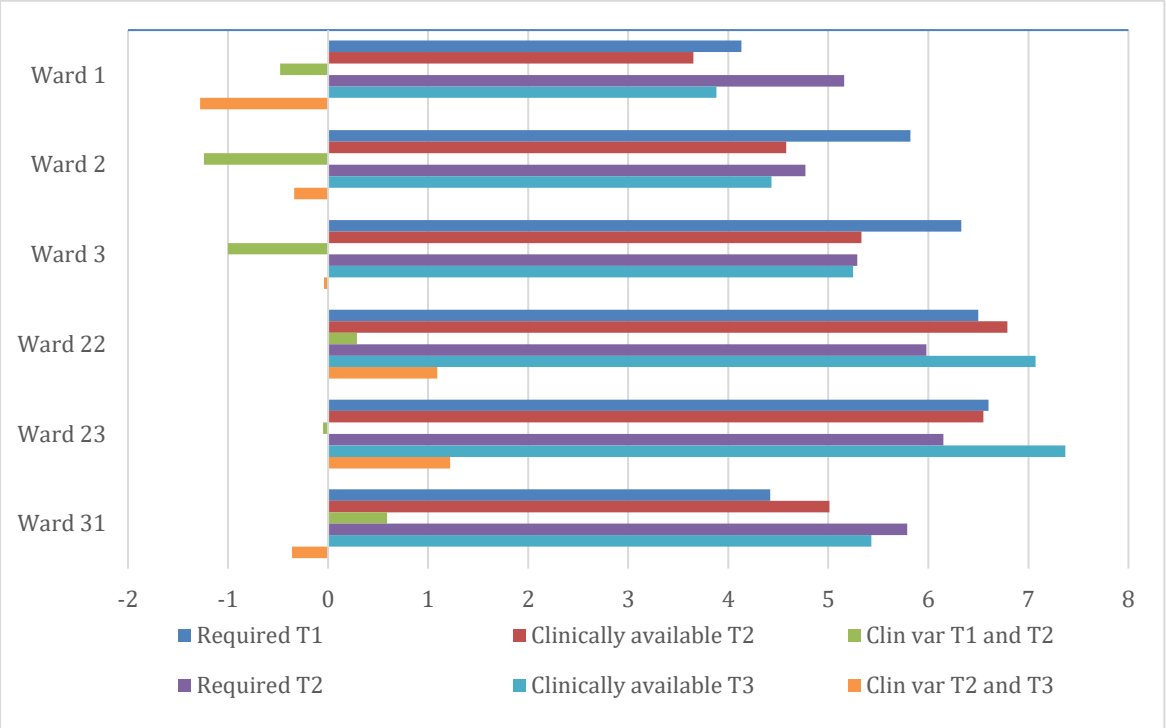

Figure 3.2.1: Required and total available HPPD at Times 1 (prior to the implementation) and Times 2 and 3 (following the implementation).

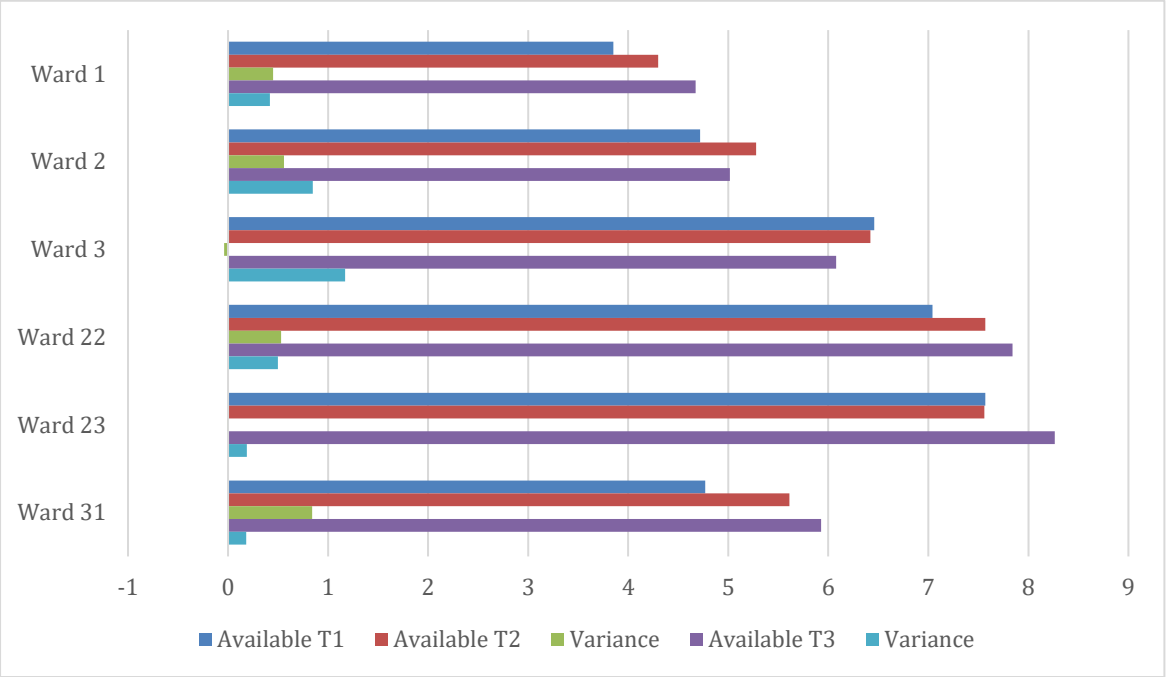

Figure 3.2.2: Difference between required HPPD at Time 1and total available HPPD at Time 2 and Time 3.

The Framework laid out ranges of required HPPD by patient acuity with descriptions of the types of wards that would fall within these ranges. This section shows the overall required HPPD for each ward for the entire duration of the study period and categorised the study wards into the ranges given in the Framework. Of note, wards

1, 22, 23 and 31 HPPD were calculated without 1:1 specialling. Ward 2 and 3 HPPD include 1:1 specialling as both of these wards have a high dependency unit and therefore require the inclusion of 1:1 specialling due to the increased acuity and dependency of their patient cohort.

Table 3.2.1.4: Description of types of wards based on patient acuity for duration of Time 2

Hospital	Ward	Required HPPD	Category	Range	Clinical Setting Description
1	1	5.16	C	5.0 – 5.4	Moderate - High Complexity Care Moderate - High intervention level Acute Ward/Unit Increasing complex medical/surgical care e.g. post complex urological surgery (prostatectomy) Typically Model 4 Hospital Care Setting
	2	4.77	C	5.0 – 5.4	Moderate - High Complexity Care Moderate - High intervention level Acute Ward/Unit Increasing complex medical/surgical care e.g. post complex urological surgery (prostatectomy) Typically Model 4 Hospital Care Setting
	3	5.29	B	5.5 - 5.9	High Complexity High intervention level Special Unit/Ward (e.g. high observation unit within a ward) Model 4 Hospital Care Setting
2	22	4.86	D	4.5 – 4.9	Moderate Complexity Care Moderate intervention level Acute Ward/Unit General medical/surgical e.g. general respiratory, gynaecological surgery, elective and emergency admission Typically Model 3 Hospital Care Setting
	23	5.15	C	5.0 – 5.4	Moderate - High Complexity Care Moderate - High intervention level Acute Ward/Unit Increasing complex medical/surgical care e.g. post complex urological surgery (prostatectomy) Typically Model 4 Hospital Care Setting
3*	31	4.40	D	4.5 – 4.9	Moderate Complexity Care Moderate intervention level Acute Ward/Unit General medical/surgical e.g. general respiratory, gynaecological surgery, elective and emergency admission Typically Model 3 Hospital Care Setting

3.2.2 Clinical Administration

The *Framework* recommended that 100% of the CNM2 role and function should be in a supervisory capacity. In *TrendCare*, this aspect is represented in the data related to the amount of HPPD dedicated to clinical administrative duties (table 3.2.2.1). It is of

note, that the staffing establishment for each of the wards in time 2, provided for 100% supervisory status for the CNM. The table below shows that there was an increase in the percentage of time that the CNM2 spent as supervisory in each of the wards, with Wards 1, 3, 23 and 31 demonstrating that supervisory status was at 80% or above at Time 2 (this is based on 0.2 HPPD being approximately equivalent to 1 WTE), with each of these wards either increasing or remaining above 80% supervisory at Time 3. Wards 2 and 22 had lower levels but demonstrated an increase in supernumerary status by 30% and 20% respectively. However, Ward 2 has had a decrease in the amount of time spent supervisory to 50%. Ward 23 had a 125% supernumerary CNM2 status in Time 1 rising to 135% in Time 2, which has decreased slightly to 130% at Time 3. This may have occurred as a consequence of supervisory status being allocated to both CNMs (grades 1 and 2) in the ward. Overall, the trend in achieving 100% supervisory status for the CNM2 grade is above 85% in all pilot wards, with the exception of Ward 2. It is of note that *TrendCare* enables the direct input from CNM grades the percentage of supervision time versus the clinical time as a proportion of the overall time they have available. Therefore, based on the NHPPD available, wards 2, 3, 22 and 23 have the potential for 100% of the CNM 2 role available for supervisory support; that is, total hours available demonstrates that the CNM2 role is available for 100% supervisory support. Although this requires further exploration, the result may be that CNM2s are choosing to allocate part of their role to clinical work.

Table 3.2.2.1: HPPD for clinical administration for Time 1 and Time 2 with difference and percentage increase

	Time 1		**Time 2**		**Time 3**	
	HPPD	% WTE	HPPD	% WTE	HPPD*	% WTE
Ward 1	0.16	80.00%	0.16	80.00%	0.23	115.00%**
Ward 2	0.06	30.00%	0.12	60.00%	0.10	50.00%
Ward 3	0.17	85.00%	0.19	95.00%	0.18	90.00%
Ward 22	0.11	55.00%	0.15	75.00%	0.18	90.00%
Ward 23	0.25	125.00%	0.27	135.00%	0.26	130.00%**
Ward 31	0.15	75.00%	0.16	80.00%	0.17	85.00%

*Includes period of industrial action **Supervisory status allocated between CNM 1 and 2

	Difference Time 1 and 2	Percentage Increase	Difference Time 2 and 3	Percentage increase
Ward 1	0	0.00%	0.07	35.00%
Ward 2	0.06	30.00%	-0.02	-10.00%
Ward 3	0.02	10.00%	-0.01	-5.00%
Ward 22	0.04	20.00%	0.03	15.00%
Ward 23	0.02	10.00%	-0.01	-5.00%
Ward 31	0.01	5.00%	0.01	5.00%

3.2.3 Shift Variance

This section outlines the variance in clinical hours available and clinical hours required by shift between Time 1, Time 2 and Time 3 (Table 3.2.3.1); overall the variance improved in Wards 2, 3, 22 and 23 in Time 2 compared to Time 1. Time 2 saw an upward trend in the hours available in Wards 1, 2 and 3, while Ward 22 and 23 had a decrease in the hours available; however, this decrease did not result in a negative

variance. Ward 31[14] also had a decrease in hours available, however this decrease did result in a greater negative variance at Time 2. However, at Time 3 this pattern has changed with the variance increasing negatively for all wards except Ward 22. Irrespective of time period, the night shift generally has the best possible variance for all six pilot wards.

[14] *Please note, data from Ward 31 had not reached the required 95% validation in time period 2; therefore, results from this time period need to be treated with caution.

Table 3.2.3.1: Shift variance for Time 1 and Time 2

	Time 1				Time 2				Time 3			
	No. Patients	Hours available	Hours required	Variance	No. Patients	Hours available	Hours required	Variance	No. Patients	Hours available	Hours required	Variance
Ward 1												
Day	35.64	46.19	66.42	-20.22	35.98	53.23	79.54	-26.31	36.10	52.91	86.35	-33.44
Evening	35.11	35.69	49.86	-14.18	35.2	44.38	63.33	-18.95	35.57	47.25	68.46	-21.20
Night	34.58	30.46	28.72	1.74	34.61	31.08	39.04	-7.96	35.05	37.88	43.81	-5.92
Total	35.11	112.33	145	-32.66	35.26	128.7	181.91	-53.22	35.57	138.04	198.61	-60.57
Ward 2												
Day	34.2	61.93	81.4	-19.46	35.58	68.56	73.41	-4.85	35.71	68.26	73.42	-5.16
Evening	35.11	47.67	67.22	-19.55	36.7	55.68	59.73	-4.05	36.87	53.47	59.34	-5.87
Night	33.82	38.36	51.5	-13.14	35.21	39.72	37.86	1.87	35.41	37.78	38.45	-0.68
Total	34.38	147.96	200.11	-52.16	35.83	163.96	171	-7.04	36.00	159.52	171.22	-11.70
Ward 3												
Day	23.09	49.28	58.81	-9.53	23.27	48.5	51.95	-3.46	23.44	46.25	53.74	-7.49
Evening	23.96	45.38	51.01	-5.62	24.53	42.14	44.65	-2.51	24.77	43.20	45.91	-2.71
Night	23.01	39.58	38.11	1.48	23.14	35.48	28.5	6.98	23.22	35.54	29.45	6.09
Total	23.35	134.25	147.93	-13.68	23.65	126.12	125.11	1.01	23.81	124.99	129.10	-4.11
Ward 22												
Day	25.98	72.16	70.45	1.71	25.41	68.4	64.1	4.3	25.30	75.52	70.03	5.49
Evening	25.93	53.86	57.46	-3.6	25.5	46.39	51.81	-5.41	25.77	48.33	54.36	-6.04
Night	25.69	43.83	40.2	3.63	25.14	39.09	35.79	3.3	25.12	55.74	40.36	15.38
Total	25.87	169.86	168.12	1.74	25.35	153.89	151.7	2.19	25.40	179.59	164.74	14.84
Ward 23												
Day	20.24	56.76	55.13	1.62	19.55	57.53	53.25	4.28	19.81	57.38	60.27	-2.82
Evening	20.38	46.52	46.04	0.48	19.78	42.3	42.43	-0.13	20.12	42.60	49.93	-7.15
Night	19.9	37.47	31.97	5.51	19.4	36.27	29.86	6.41	19.77	46.70	38.18	8.32
Total	20.17	140.75	133.14	7.61	19.58	136.1	125.53	10.56	19.90	146.68	148.38	-1.70
Ward 31												
Day	25.96	49.41	50.57	-1.16	25.31	54.58	62.06	-7.48	26.64	59.49	71.86	-12.37
Evening	26.53	35.11	41.3	-6.19	25.84	42.33	52.14	-9.81	27.27	48.62	59.81	-11.19
Night	25.58	26.18	23.25	2.93	25.21	30.67	33.22	-2.55	26.53	37.47	39.66	-2.19
Total	26.02	110.7	115.11	-4.42	25.45	127.59	147.42	-19.84	26.81	145.58	171.32	-25.75

3.2.4 Skill Mix

The *Framework* outlined recommendations for skill-mix[15] (that is, proportion of NHPPD provided by RNs and HCA), with the recommended ratio as 80% RN to 20% HCA based on the total ward establishment. Skill-mix was measured by examining the proportion of RNs and HCAs rostered on each of the pilot wards (see Table 3.2.4.1). This shows that the wards exceeded, are close to or have reached the *Framework's* recommended 80:20 split.

The *Trendcare* system also measures the clinically available skill-mix, which can vary on a shift-by-shift basis. Hospital 1, Ward 1 had a noticeable reduction in skill-mix, reducing from a ratio of 73%:27% in Time 1 to 59%:41% in Time 2. This has improved at Time 3 increasing to 65%:35%. Wards 2 and 3 both improved their RN:HCA ratio from Time 1 with Ward 2 increasing from a ratio of approximately 61%:39% to 71%:29% and Ward 3 increasing from 57%:43% to 70%:30%; in both wards RN capacity increased by approximately 10% and 13% respectively. Time 3 has seen a further RN capacity increase of 4% and 3% respectively in Wards 2 and 3, and thus both wards are approaching the 80:20 skill-mix recommendation. In Hospital 2, the ratios for Ward 22 and 23 remained relatively stable, which was expected, as there was no adjustment of staffing in these wards at Time 2. There has been a 10% increase in the RN capacity for Ward 22 while Ward 23 remained relatively stable. In Hospital 3, the ratio for Ward 31 decreased for Time 2; however, this was planned as this ward had a very rich skill-mix in Time 1 (91%:9%) reducing to a desired level of 78%:22% in Time 2. However, Ward 31 has seen a further decrease in skill-mix at Time 3 to 68%:32% which may be connected to the increase in one-to-one specialling (see below) as HCAs are the predominant care givers in one-to-one care. Overall, the majority of wards have adjusted their staffing complement to meet the recommendation that skill-mix in medical and surgical settings should be 80% RN to 20% HCA.

[15] All ratios reported are RN to HCA

Table 3.2.4.1: Skill-mix based on ward establishment (Rostered)

	Time 1				Time 2				Time 3			
	CNM WTE	RN WTE	HCA WTE	Skill-mix	CNM WTE	RN WTE	HCA WTE	Skill-mix	CNM WTE	RN WTE	HCA WTE	Skill-mix
Ward 1	1	21	4	85:15	1	28	5	85:15	1	27	9	76:24
Ward 2	1	25	10	72:28	1	34	10	78:22	1	26.7	8.06	77:23
Ward 3	1	21	3	88:12	1	24	7	78:22	1	20.48	4.78	82:18
Ward 22	1	21.8	7.4	75:25	1	23.5	6.5	79:21	1	24	7	78:22
Ward 23	1	20.5	7	75:25	1	20.5	8	73:27	1	21.5	5	82:18
Ward 31	1	22	3	88:12	1	23	7	77:23	1	22	7	77:23

Table 3.2.4.: Skill mix ratio for each shift across the wards for Time 1 and Time 2 (TrendCare)

	Time 1				**Time 2**				**Time 3**			
	Total hours	RN hours	HCA hours	Ratio	Total hours	RN hours	HCA hours	Ratio	Total hours	RN hours	HCA hours	Ratio
Ward 1												
Day	46.19	30.55	15.64	66:34	53.23	30.53	22.71	57:43	52.91	33.99	18.92	64:36
Evening	35.69	27.19	8.5	76:24	44.38	25.05	19.33	56:44	47.25	29.44	17.82	62:38
Night	30.46	24	6.46	79:21	31.08	20.72	10.36	67:33	37.88	25.77	12.11	68:32
Total	112.33	81.74	30.59	73:27	128.7	76.3	52.39	59:41	138.04	89.20	48.84	65:35
Ward 2												
Day	61.93	37.48	24.46	61:39	68.56	49.49	19.06	72:28	68.26	49.55	18.71	73:27
Evening	47.67	29.88	17.79	63:37	55.68	39.45	16.23	71:29	53.47	40.17	13.30	75:25
Night	38.36	23.62	14.73	62:38	39.72	27.99	11.73	70:30	37.78	29.74	8.04	79:21
Total	147.96	90.98	56.98	61:39	163.96	116.94	47.02	71:29	159.52	119.46	40.06	75:25
Ward 3												
Day	49.28	29.23	20.06	59:41	48.5	33.19	15.31	68:32	46.25	33.43	12.81	72:28
Evening	45.38	25.64	19.75	56:44	42.14	30.23	11.92	72:28	43.20	31.58	11.63	73:27
Night	39.58	22.25	17.33	56:44	35.48	25.21	10.27	71:29	35.54	26.57	8.97	75:25
Total	134.25	77.12	57.13	57:43	126.12	88.63	37.5	70:30	124.99	91.58	33.41	73:27
Ward 22												
Day	72.16	45.85	26.31	64:36	68.4	47.07	21.32	69:31	75.52	51.41	24.11	68:32
Evening	53.86	30.06	23.8	56:44	46.39	29.07	17.33	63:37	48.33	30.66	17.67	63:37
Night	43.83	24	19.83	55:45	39.09	24.5	14.59	63:37	55.74	35.95	19.79	64:36
Total	169.86	99.91	69.94	59:41	153.89	100.64	53.24	56:35	179.59	118.02	61.56	66:34
Ward 23												
Day	56.76	38.79	17.97	68:32	57.53	39.57	17.96	69:31	57.38	39.19	18.19	68:32
Evening	46.52	27.14	19.39	58:42	42.3	26.69	15.61	63:37	42.60	24.65	17.96	58:42
Night	37.47	16	21.47	43:57	36.27	16.42	19.84	45:55	46.70	19.25	27.45	41:59
Total	140.75	81.92	58.83	58:42	136.1	82.68	53.41	61:39	146.68	83.09	63.59	57:43
Ward 31												
Day	49.41	43.26	6.14	88:12	54.58	41.89	12.7	77:23	59.49	42.05	17.49	71:29
Evening	35.11	32.07	3.04	91:09	42.33	32.09	10.24	76:24	48.62	32.05	16.65	66:34
Night	26.18	25.81	0.37	99:01	30.67	25.47	5.2	83:17	37.47	25.13	12.50	67:33
Total	110.7	101.14	9.56	91:09	127.59	99.44	28.14	78:22	145.58	99.22	46.64	68:32

In comparing the two measures (shift and rosters), it is of note that the clinical skill-mix is currently being affected by the number of hours being provided to clinical supervision of new staff. At present 0.24 of clinical supervision is being provided to new staff which accounts for 5.46% of the total nursing hours; this accounts, to an extent, for the mismatch between the two measures. As the workforce further stabilises and new staff become integrated, it is expected that the variation in skill-mix between the measurements at rostered and shift-level will reduce over time.

3.2.5 Agency Use

In many wards, there was a substantial reduction in the use of agency staff as a consequence of the implementation of the recommendations in the *Framework*. In all wards in Hospital 1 that received amended staffing as a result of the introduction of NHPPD, there was a reduction in the proportion of nursing hours provided by agency staff. In Hospital 1, there were substantial reductions with agency hours decreasing from 4.30% of total HPPD to 0.23% and stabilising at 1.02% in Ward 1, 11.6% of total HPPD to 0.61% and remaining low at 1.10% in Ward 2 and 28.5% of total HPPD to 3.68% in Ward 3, remaining stable at 2.51%. In Hospital 3, Ward 31, there was a relatively small increase in agency hours from 2.2% (Time 1) of total HPPD to 5.1% (Time 2); however, this has further increased to 15.3% (Time 3). This was likely due to the change in the patient profile of the ward with increasing patient acuity and dependency, which required an increase in one-to-one specialling (see Table 3.2.9); this specialling was predominantly provided by HCAs. In Hospital 2[16] (wards 22 and 23), agency usage remained relatively high but has decreased by 3.13% for Ward 22 and remained constant for Ward 23.

[16] An enhanced care programme has been put in place in Hospital 2 to address the level of one-to-one specialling required.

Table 3.2.5.1: Hours and percentage of hours provided by agency for Time 1 and Time 2.

	Time 1			Time 2			Time 3		
Ward	Agency hours	Total hours	Percentage of hours	Agency hours	Total hours	Percentage of hours	Agency hours	Total hours	Percentage of hours
Ward 1									
RN	2.9	81.74	3.55	0.18	76.3	0.23	1.09	89.20	1.22
HCA	1.93	30.59	6.31	0.11	52.39	0.22	0.32	48.84	0.65
Total	4.83	112.33	4.3	0.29	128.7	0.23	1.40	138.04	1.02
Ward 2									
RN	1.82	90.98	2	0.24	116.94	0.21	0.06	119.46	0.05
HCA	15.33	56.98	26.91	0.76	15.67	4.87	1.69	40.06	4.22
Total	17.16	147.96	11.6	1	163.96	0.61	1.75	159.52	1.10
Ward 3									
RN	1.98	77.12	2.56	1.19	88.63	1.34	0.30	91.58	0.32
HCA	36.35	57.13	63.62	3.46	37.5	9.22	2.85	33.41	8.52
Total	38.33	134.25	28.55	4.64	126.12	3.68	3.14	124.99	2.51
Ward 22									
RN	7.06	99.91	7.07	8.36	100.64	8.3	9.73	118.02	8.25
HCA	32.85	69.94	46.97	17.29	53.24	32.47	26.85	61.56	43.62
Total	39.91	169.86	23.5	25.64	153.89	16.66	36.59	179.59	20.37
Ward 23									
RN	1.86	81.92	2.27	3.03	82.68	3.67	3.93	83.09	4.73
HCA	29.88	58.83	50.8	16.45	53.41	30.79	29.55	63.59	46.47
Total	31.74	140.75	22.55	19.48	136.1	14.31	33.48	146.68	22.82
Ward 31									
RN	1.58	100.25	1.57	0.94	99.44	0.95	2.37	99.22	2.39
HCA	0.83	9.56	8.72	5.55	28.14	19.72	19.90	46.64	42.66
Total	2.41	110.7	2.18	6.49	127.59	5.09	22.27	145.58	15.30

3.2.6 One-to-one Specialling

Table 3.2.6.1 below outlines the hours and proportion of hours allocated to one-to-one specialling between Time 1 and Time 2. In particular, wards 2 and 3 in Hospital 1 reported a substantial decrease in the amount of hours spent on one-to-one specialling. In Ward 2 there was a percentage decrease of 87.5% at Time 2 which has remained at Time 3. In Ward 3 a percentage decrease of 74.3% at Time 3, which at Time 3 is a 60.5% decrease compared to Time 1. The proportion of hours spent on one-to-one specialling in Ward 1 remained relatively stable over the three time periods; however, it should be noted that this was from a relatively low base to begin with and is similar or below the other pilot wards in Hospital 1 at Time 2. One-to-one specialling increased from 0.8% in time 1 to 17.45% and further to 36.72% in Ward 31. The increase in Ward 31 has led to the increase in agency hours on this ward (see table 3.2.5.1 above) and the increase in negative variance in hours of care (see Table 3.2.5.1 above) as additional one-to-one specialling requires more hours of care; this occurred as a result of the change in the patient profile on this ward. The two remaining wards, 22 and 23, had relatively high levels of one-to-one specialling in Time 1: 31.47% and 23.72% respectively. While Ward 22 had a decrease to 25.25% in Time 2 and 19.18% in Time 3, the proportion remains quite high, and Ward 23 had a relatively similar proportion of 24.12% in Time 2, increasing to 30.60% in Time 3. It is evident that the provision of a staffing uplift has led to a reduction in one-to-one specialling in Hospital 1; that is, wards that are better staffed, regardless of patient acuity and dependency, require fewer hours dedicated to one-to-one specialling as staff have increased time available for patient surveillance.

Table 3.2.6.1: The total hours and proportion of hours spent on 1:1 specialling in Time 1 and Time 2.

	Time 1					Time 2					Time 3				
Ward	Shifts	Patients	Total 1:1 hours	Total hours	% Total Hours	Shifts	Patients	Total 1:1 hours	Total hours	% Total Hours	Shifts	Patients	Total 1:1 hours	Total hours	% Total Hours
1	0.91	0.29	4.31	112.33	3.84	1.08	0.37	4.8	128.7	3.73	1.36	0.30	6.23	138.04	4.51
2	1.07	0.84	35.62	147.96	24.08	0.95	0.3	4.92	163.96	3	1.35	0.42	6.43	159.52	4.03
3	2.48	0.25	41.96	134.25	31.26	1.73	0.04	10.13	126.12	8.03	4.09	0.60	15.42	124.99	12.34
22	6.1	0.45	53.45	169.86	31.47	4.99	0.32	38.86	153.89	25.25	4.97	0.39	34.45	179.59	19.18
23	4.45	0.52	33.38	140.75	23.72	3.99	0.31	32.83	136.1	24.12	8.09	0.38	44.89	146.68	30.60
31	0.18	0.11	0.89	110.7	0.8	2.89	0.18	22.27	127.59	17.45	6.48	0.14	53.45	145.58	36.72

3.2.7 Overtime

The section shows the percentage of paid overtime carried out in each of the wards in Time 1 and Time 2. In Ward 3 there was no overtime in Time 1 and Time 2, with a low proportion at Time 3 (0.60%). Wards 1 and 2 had a reduction of 1.02% and 0.28% respectively from Time 1 to Time 3. Wards 22 and 23 had slight increases of 1.07% and 1.19% respectively. Ward 31 had an increase in overtime of 0.71% at Time 3. Overall levels of staff overtime across all time-periods were relatively low.

Table 3.2.7.1: Total hours and proportion of overtime hours.

	Time 1			**Time 2**			**Time 3**		
	Total overtime	Total hours	% overtime	Total overtime	Total hours	% overtime	Total overtime	Total hours	% overtime
Ward 1	1.51	112.33	1.35	0.3	128.7	0.23	0.45	138.04	0.33
Ward 2	0.41	147.96	0.28	0.12	163.96	0.07		159.52	0.00
Ward 3	0	134.25	0	0	126.12	0	0.75	124.99	0.60
Ward 22	1.14	169.86	0.67	0.83	153.89	0.54	3.12	179.59	1.74
Ward 23	3.76	140.75	2.67	1.26	136.1	0.93	5.66	146.68	3.86
Ward 31	1.71	110.7	1.55	2.73	127.59	2.14	3.29	145.58	2.26

3.2.8 Absenteeism

Absenteeism, in particular sickness absence, may be an indicator of increased workloads or a poor working environment. Overall, absenteeism (family, maternity, compassionate leave and sickness absence) decreased in wards 1, 2, 3, 22 and 31, over the three time periods with only Ward 23 showing an increase at Time 2 and Ward 31 showing an increase at Time 3. In Hospital 1, Ward 1's sick leave decreased from 7.99% in Time 1 to 4.23% in Time 2, a decrease of 3.23%; this increased to 5.21% at Time 3. Ward 2 increased sick leave from 4.79% (T1) to 6.13% (T2) to 7.77% (T3) whereas Ward 3, had a slight increase (Time 1 = 2.71% Vs. Time 2 = 2.90% Vs. Time 3 = 3.44%). In Hospital 2, Ward 22 had a relatively small reduction in sick leave (Time 1 = 5.22% Vs. Time 2 = 4.58% Vs. Time 3 = 2.54%) whereas Ward 23 had an increase both in overall absenteeism and in sick leave, with sick leave rising from a relatively low 0.81% to 4.76% to 9.00%. Finally, while overall absenteeism decreased in Ward 31, sick leave increased between Time 1 (2.21%), Time 2 (4.74%) and Time 3 (5.26%). Overall, sickness absence in the pilot wards was generally at or below the national average of 4.9%[17].

[17] HSE (2019) HSE Absence rate by Staff category – 2018: Accessed on 27th June 2019 at https://www.hse.ie/eng/staff/resources/our-workforce/workforce-reporting/national-absence-rate-report-april-20191.pdf

Table 3.2.8.1 Absenteeism

	Time 1			Time 2			Time 3		
	Hours absent	Total Hours	% absent	Hours absent	Total Hours	% absent	Hours absent	Total Hours	% absent
Ward 1									
Family							0.36		0.26
Maternity				0.62		0.48	4.98		3.61
Compassionate				0.04		0.03			0.00
Sick	8.97		7.99	5.48		4.26	7.20		5.21
Total Leave	8.97	112.33	7.99	6.13	128.7	4.76	12.54	138.04	9.08
Ward 2									
Family	3.56		2.4	2.37		1.45	0.33		0.20
Maternity	9.36		6.33	7.8		4.76	5.01		3.14
Compassionate				0.11		0.06			0.00
Prenatal	0.62		0.42	0.66		0.4	0.10		0.06
Sick	7.08		4.79	10.04		6.13	12.40		7.77
Total Leave	20.62	147.96	13.94	20.98	163.96	12.79	17.83	159.52	11.18
Ward 3									
Family				1.31		1.04	0.20		0.16
Maternity							3.90		3.12
Administrative				0.09		0.07	0.01		0.01
Bereavement				0.05		0.04			0.00
Sick	3.64		2.71	2.76		2.19	4.30		3.44
Total Leave	3.64	134.25	2.71	4.21	126.12	3.34	8.42	124.99	6.73
Ward 22									
Family	4.58		2.7	2.87		1.86	0.84		0.47
Maternity	8.9		5.24	3.73		2.42	3.10		1.73
Compassionate						0	0.14		0.08
Paternity						0	0.14		0.08
Sick	8.87		5.22	7.04		4.58	4.56		2.54
Total Leave	22.36	169.86	13.16	13.64	153.89	8.86	8.77	179.59	4.89
Ward 23									
Family				0.3		0.22	1.15		0.78
Maternity	3.34		2.37	5.72		4.2	2.93		2.00
Compassionate				0.03		0.02			0.00
Prenatal				0.05		0.03	0.01		0.01
Sick	1.14		0.81	6.47		4.76	13.21		9.00
Total Leave	4.49	140.75	3.19	12.57	136.1	9.24	17.30	146.68	11.79
Ward 31									
Family				0.16		0.13			0.00
Maternity	5.37		4.85			0	3.62		2.49
Compassionate	0.52		0.47			0			0.00
Bereavement	0.35		0.31			0			0.00
Prenatal				0.29		0.23			0.00
Sick	2.47		2.21	6		4.71	7.66		5.26
Total Leave	8.71	110.7	7.87	6.46	127.59	5.06	11.28	145.58	7.75

3.2.9 Bed Occupancy

As can be seen in Table 3.2.9.1 below, each of the pilot wards reported high rates of bed occupancy, ranging from 89.73% to 101.11% in Time 1. Of the six wards, three (1, 2 and 23) were functioning at over 100% bed occupancy in Time 1. Both wards, 1 and 2, remained above 100%, with increases of 0.42% and 4.24% respectively, and remain at these levels at Time 3. However, Ward 23 dropped to below 100% in Time 2 and 3. Ward 22 had an increase of 1.23% in Time 2 and a further increase of 0.67% at Time 3 while Ward 31 had a 1.97% decrease in Time 2 but increased to 92.47% at Time 3. It is of note that staffing does not impact on bed occupancy; however, high bed occupancy is an indicator of higher nursing workloads. All wards were above the OECD bed occupancy average of 85%[18].

Table 3.2.9.1: Average bed occupancy per day for Time 1 and Time 2

	Time 1			**Time 2**			**Time 3**		
Ward	No. Beds	No. Patients	Percent occupancy	No. Beds	No. Patients	Percent occupancy	No. Beds	No. Patients	Percent occupancy
1	35	35.11	100.32	35	35.26	100.74	35	35.57	101.64
2	34	34.38	101.11	34	35.82	105.35	34	36.00	105.87
3	24	23.34	97.31	24	23.65	98.54	24	23.81	99.21
22	26	25.87	99.5	26	25.35	97.5	26	25.40	97.68
23	20	20.17	100.85	20	19.58	97.9	20	19.90	99.50
31	29	26.02	89.73	29	25.45	87.76	29	26.81	92.47

3.2.10 Conclusion

Overall, the variance in HPPD and hours worked during the various shifts are stabilising in Time 3 of the study following the implementation of the recommendations of the *Framework* being put in place; however, adjustments in staffing are still required and a number of wards face challenges as the levels of patient acuity and dependency change. The results also show that the amount of time the CNM2 is spending in a supervisory role has increased in Time 3; this is in line with the recommendations of the *Framework*. In many cases, there is now the potential for CNM2s to undertake 100% of their role as supervisory. Rostered skill-mix, that is the core complement of staff, demonstrated that skill-mix is close to or at the 80% RN to 20% HCA ratio recommended in the *Framework*. Clinical skill-mix, while variable, generally increased over the timeframe of the study; it is envisaged that, as new staff integrate into the wards, the skill-mix on a shift-by-shift basis will match that outlined in the roster; that is hours currently allocated to the supervision of new staff, which are impacting on the skill-mix will become available for clinical care.

Overall, comparisons of the data in Time 1, Time 2 and Time 3 of the study indicate that the staffing levels in the wards are stabilising which may be related to the positive outcomes observed such as an increase in staffing numbers in those wards where a negative variance between NHPPD required and available was identified in Time 1

[18] OECD (2017) Health at a Glance: OECD Indicators. OECD. Geneva.

(i.e. before the uplift), a richer skill mix (higher proportion of RNs providing care), an increase in the proportion of time allocated to the CNM2 as supervisory, and a reduction in agency use.

3.3 Hospital In-patient Enquiry System

3.3.1 Nursing Sensitive Patient Outcome Measures

Needleman *et al.* (2002) conducted a review of published and unpublished literature to identify nurse sensitive patient outcomes in hospitals. The list was further refined through consulting with experts in the field and 14 outcomes sensitive to nurse staffing and coded on hospital discharge database were identified. These included:

- Length of stay (LOS)
- Metabolic derangement
- Urinary tract infection (UTI)
- Hospital-acquired pneumonia
- Hospital-acquired sepsis
- Pulmonary failure
- Pressure ulcers
- Deep venous thrombosis (DVT)
- Upper gastrointestinal (GI) bleeding
- Shock or cardiac arrest
- Central nervous system (CNS) complications
- Wound infection
- Failure to rescue (death with: sepsis; pneumonia; upper gastrointestinal bleeding; shock or cardiac arrest; deep venous thrombosis)
- Mortality

The Hospital Inpatient Enquiry (HIPE) system is Ireland's current method for collecting data on in-patients discharged from acute hospitals and includes details of mortality, morbidity, LOS and diagnoses within the hospital setting (O'Loughlin et al. 2005). From initial examination, the nurse sensitive outcomes outlined above can be identified from the HIPE data collected as part of this research.

3.3.2 Patient Demographics

This section outlines the patient profile collected across the duration of the study. The rationale is to demonstrate the variation in patient profiles among the three sites as well as identifying the key variables that were used in case-mix applied to the HIPE data. As will be seen from the data, the cohort of patients cared for in the three sites have varying lengths of stay and admission profiles. The demographic data reflects the profile of the hospitals, moving from higher to lower complexity (Level 4 – Hospital 1; Level 3 –Hospital 2; Level 2 – Hospital 3).

The table below shows the period that the HIPE data that was collected in each time-point (Time 1 – prior to the implementation of the recommendations in the *Framework* and Time 2 – following the implementation of the recommendations in the *Framework*). Note that some patients admitted during Time 1 may have continued their stay during Time 2 and for the purposes of this analysis they will be included in the time point in which they were admitted. As such, there may be a slight overestimation of NSOs in Time 1 and a slight underestimation in Time 2.

Table 3.3.2.1: HIPE data reporting timeframes for Time 1 and Time 2.

		Available dates Time 1	Available dates Time 2
Hospital 1	Ward 1	15/07/2016 – 09/01/2017	10/01/2017 – 31/03/2019
	Ward 2	15/07/2016 – 09/01/2017	10/01/2017 – 31/03/2019
	Ward 3	15/07/2016 – 09/01/2017	10/01/2017 – 31/03/2019
Hospital 2	Ward 22	31/10/2016 – 09/01/2017	10/01/2017 – 31/03/2019
	Ward 23	31/10/2016 – 09/01/2017	10/01/2017 – 31/03/2019
Hospital 3	Ward 31	15/07/2016 – 09/01/2017	10/01/2017 – 31/03/2019

During Time 1 of the study, a total of 2,285 patients were admitted to one of the six wards: Hospital 1 (n = 1,569), Hospital 2 (n = 439), and Hospital 3 (n =276). Within Hospital 1, Ward 1 had the greatest number of admissions followed by Wards 2 and 3, while Ward 22, in Hospital 2 had a greater number than Ward 23. There was only one ward in Hospital 3 and so no comparisons were made. Time 2 of the study had a total of 10,451 patient admissions (Hospital 1, n =6946; Hospital 2, n = 2664; Hospital 3, n = 841). This is a larger sample size than Time 1 due to the relatively shorter timeframe in Time 1. However, the data regarding number of admissions to each of the wards follows the same pattern as that in Time 1.

In Time 1, of the 2285 patients admitted, 1176 (51.5%) were male. In Hospital 1 there were slightly more males than females, while Hospitals 2 and 3 had slightly more females; however, overall the gender split is relatively equal. In individual wards, Wards 1 and 23 had more males (~60%) while each of the other wards had slightly more females but were more equal (50-58%). In Time 2, the gender split was similar with 49% males overall. Hospital 1 had more males that females (51.5%) while Hospitals 2 and 3 had more females (56.56% and 60.3%). Ward 1 had more males (56.5%) while Ward 3 had an equal gender split (50.1%) and the four remaining wards (2, 22, 23 and 31) had between 53.9% and 60.3% females.

In both Time 1 and Time 2 of the study, the majority admissions to hospital were emergency: ~83%. Hospital 1 had the lowest emergency admissions: 79% (Time 1) and 78% (Time 2), while emergency admissions accounted for over 90% in both time points for hospitals 2 and 3. Emergency admissions had a range of 63-98% during Time 1 in the wards in Hospital 1, comparable to the range of 62-98% in Time 2. Wards 22 and 23 of Hospital 2 had similarly high percentages of emergency admissions between Time 1 and Time 2 (both >90%) and Ward 31 also had high percentages of emergency admissions for Time 1 and Time 2: 91% and 93% respectively. Therefore, the trends in admission for both time points of the study were relatively similar.

The mean overall age of patients during Time 1 was 62.83 years, similarly the means age in Time 2 was 61.76 years. The youngest profile was seen in Hospital 1 at both Phases (Time 1, mean = 58.82; Time 2, mean = 58.13), followed by Hospital 2 (Time 1, mean = 69.15; Time 2, mean = 66.16) and the oldest profile in Hospital 3 (Time 1,

mean = 75.54; Time 2, mean = 77.78). Within the Hospital 1, the ages ranged from the youngest in Ward 3 (Time 1, mean = 52.71; Time 2, mean = 51.47) to the oldest in Ward 2 (Time 1, mean = 65.02; Time 2, mean = 62.88). Within Hospital 2, the mean ages of patients admitted to Ward 22 and 23 in Time 1 were – 68.42 and 70.77 respectively; however, there was a difference in Time 2, 63.46 and 72.76. The patients in Ward 31 had relatively similar ages between Time 1 and 2: 75.54 and 77.78 years respectively.

The overall mean length of stay (LOS) for the 2285 patients in Time 1 was 10.69 days compared to 10.50 days in Time 2. Both time points show the pattern whereby the longest LOS is seen in Hospital 3 (Time 1, mean = 14.56 days; Time 2, mean = 20.23 days), followed by Hospital 1 (Time 1, mean = 10.53 days; Time 2, mean = 10.02 days) with Hospital 2 having the shortest LOS (Time 1, mean = 8.81 days; Time 2, mean = 8.68 days). Within Hospital 1, patients in Ward 1 had the shortest LOS (Time 1, mean = 8.26, Time 2, mean = 8.81) followed by Ward 3 (Time 1, mean = 11.6, Time 2, mean = 9.9) and Ward 2 had the longest LOS (Time 1, mean = 13.34, Time 2, mean = 11.63). The patients on Ward 23 in Hospital 2 had a mean LOS of 12.13 days in Time 1 and 11.7 days in Time 2, while patients in Ward 22 had mean LOS of 7.30 days and 7.45 days for Time 1 and Time 2 respectively.

Table 3.3.2.2: Demographic profile of patients admitted to each of the pilot wards during Time 1

	Hospital 1				**Hospital 2**			**Hospital 3**	**Overall total**
	Ward 1	Ward 2	Ward 3	Total	Ward 22	Ward 23	Total	Ward 31	n = 2285
	n = 749	n = 476	n = 343	n = 1569	n = 302	n = 137	n = 439	n = 276	
Gender, n (%)									
Male	451 (60.2)	210 (44.1)	160 (46.5)	821 (52.30)	143 (47.4)	74 (54.0)	106 (48.8)	138 (49.8)	1,176 (51.5)
Female	298 (39.8)	266 (55.9)	184 (53.5)	748 (47.70)	159 (52.6)	63 (46.0)	111 (51.2)	139 (50.2)	1,109 (48.5)
Admission type, n (%)									
Elective	191 (25.5)	8 (1.7)	126 (36.6)	325 (20.7)	14 (4.6)	9 (6.6)	23 (5.2)	25 (9.0)	373 (16.3)
Emergency	558 (74.5)	468 (98.3)	218 (63.4)	1,244 (79.3)	288 (95.4)	128 (93.4)	416 (94.8)	252 (91.0)	1,912 (83.7)
Age									
Mean (SD)	57.68 (19.22)	65.02 (18.89)	52.71 (16.76)	58.82 (19.14)	68.42 (18.83)	70.77 (15.36)	69.15 (17.83)	75.54 (13.11)	62.83 (19.28)
Median (IQR)	59.00 (31.00)	71.00 (24.00)	53.00 (25.00)	61.00 (30.00)	72.00 (22.00)	74.00 (19.00)	73.00 (21.00)	79.00 (17.00)	67.00 (29.00)
Length of stay									
Mean (SD)	8.26 (13.95)	13.34 (16.81)	11.60 (24.18)	10.53 (17.65)	7.30 (8.07)	12.13 (14.13)	8.81 (10.57)	14.56 (32.36)	10.69 (19.09)
Median (IQR)	4.00 (7.00)	9.00 (10.00)	7.00 (8.00)	6.00 (9.00)	5.00 (7.00)	7.00 (9.00)	6.00 (27.00)	6.00 (11.00)	6.00 (9.00)

Table 3.3.2.3: Demographic profile of patients admitted to each of the pilot wards during Time 2

	Hospital 1				Hospital 2			Hospital 3	Overall total
	Ward 1	Ward 2	Ward 3	Total	Ward 22	Ward 23	Total	Ward 31	n = 10451
	n = 2842	n = 2292	n = 1812	n = 6946	n = 1891	n = 773	n = 2664	n = 841	
Gender, n (%)									
Male	1,593 (56.1)	1,010 (44.1)	928 (51.2)	3,531 (50.8)	901 (47.6)	385 (49.8)	1,286 (48.3)	383 (45.5)	5,200 (49.8)
Female	1,249 (43.9)	1,282 (55.9)	884 (48.8)	3,415 (49.2)	990 (52.4)	388 (50.2)	1,378 (51.7)	458 (54.5)	5,251 (50.2)
Admission type, n (%)									
Elective	797 (28.0)	30 (1.3)	726 (40.1)	1,553 (22.4)	50 (2.6)	30 (3.9)	80 (3.0)	101 (12.0)	1,734 (16.6)
Emergency	2,045 (72.0)	2,262 (98.7)	1,086 (59.9)	5,393 (77.6)	1,839 (97.4)	742 (96.1)	2,581 (97.0)	740 (88.0)	8,714 (83.4)
Age									
Mean (SD)	58.54 (19.07)	62.88 (19.38)	51.47 (16.89)	58.13 (19.13)	63.46 (19.02)	72.76 (15.62)	66.16 (18.58)	77.78 (12.38)	61.76 (19.44)
Median (IQR)	61.00 (30.00)	68.00 (26.00)	52.00 (27.00)	61.00 (31.00)	66.00 (29.00)	76.00 (20.00)	70.00 (27.00)	80.00 (14.00)	65.00 (30.00)
Length of stay									
Mean (SD)	8.81 (14.06)	11.63 (13.98)	9.90 (17.78)	10.02 (15.14)	7.45 (11.21)	11.70 (13.81)	8.68 (12.17)	20.23 (33.40)	10.50 (16.98)
Median (IQR)	5.00 (8.00)	8.00 (10.00)	6.00 (8.00)	6.00 (9.00)	4.00 (6.00)	7.00 (11.00)	5.00 (8.00)	8.00 (19.00)	6.00 (9.00)

3.3.3 Nursing Sensitive Patient Outcome Measures

As highlighted, nurses play a central role in ensuring patient safety and in-patient surveillance. Previous research has demonstrated a relationship between nurse staffing, skill-mix and nursing sensitive patient outcome measures including mortality, failure to rescue, urinary tract infections, pneumonia, thromboembolism, metabolic derangement, sepsis, ulcer/gastritis/upper gastrointestinal bleed shock/cardiac arrest, and average length of stay. These nursing sensitive outcome measures are central to the evaluation and, as seen in previous research, can be used to measure an association between nurse staffing and patient outcomes.

3.3.3.1 Hospital 1

In total, 39 patients (2.5%) died during their stay in the pilot wards in Hospital 1 and 51.3% (20/39) of these were over the age of 80 years in Time 1. Time 2 saw a drop in the proportion of deaths (140/6946; 2.02%) in Hospital 1 and 68 of these patients (48.6%) were over the age of 80 years. Of the 39 deaths that occurred in Hospital 1 during Time 1, 23.0% occurred in Ward 1, 12.82% in Ward 3 and the remaining (64.10%) in Ward 2. In total, ten patients were identified that could be associated with the failure to rescue criteria in Time 1. These included four cases of pneumonia, five cases of sepsis and one case of upper GI bleeding. During Time 2, 20.7% of the deaths occurred in Ward 1, while the remaining 72.86% were in Ward 2 and only 4.4% occurred in Ward 3 during Time 2. Of these deaths, 46 case may be considered for the failure to rescue criteria with 16 cases of sepsis, 25 cases of pneumonia, five cases of DVT, five cases of shock/cardiac arrest, five cases of upper GI bleeding and 37 of these had multiple criteria as the cause for inclusion. However, it should be noted that for both time points (Time 1 and Time 2) further work is required on the association between nurse staffing and failure to rescue; in effect, this would require a much larger sample size over a longer period of time. The research team will continue to collect this data over the three years of the study.

Excluding mortality, 183 patients (11.70%) in Hospital 1 had a diagnosis related to a nurse sensitive outcome (NSO) in Time 1, while this increased at Time 2 to 13.5%. Time 2 saw a relatively small increase in NSOs in Wards 1 (1.8%) 2 (0.8%) and 3 (1.6%). Of all the patients identified in the data with NSOs, 35 (2.2%) of these had multiple NSOs in Time 1 and 219 (3.2%) had multiple NSOs in Time 2. Table 3.3.4 includes the breakdown of NSOs in the three wards.

Overall, the most frequent NSO in Hospital 1 during Time 1 was metabolic derangement at 4.30% followed by pneumonia at 2.50%. Each of the other NSOs remained at or below 1.7% with no patients developing reported wound infections. For Time 2, metabolic derangement remained the most frequent NSO at 5.7%. The second most frequent NSO in Time 2 was pneumonia which increased to 3.3%. Overall mortality rates in the three wards fell from 2.5% in Time 1 to 2.0% in Time 2. The remaining NSOs slightly increased at Time 2 or remained relatively equal to the rates identified in Time 1.

Table 3.3.3.1: Breakdown of nurse sensitive patient outcomes in Hospital 1 for Time 1 and Time 2

	Time 1				Time 2			
	Ward 1 n = 749 n (%)	Ward 2 n = 476 n (%)	Ward 3 n = 343 n (%)	Hospital 1 n = 1569 n (%)	Ward 1 n = 2842 n (%)	Ward 2 n = 2292 n (%)	Ward 3 n = 1812 n (%)	Hospital 1 n = 6946 n (%)
Any NSO (excl. mortality)	51 (6.8)	106 (22.3)	26 (7.6)	183 (11.7)	243 (8.6)	530 (23.1)	167 (9.2)	940 (13.5)
Metabolic derangement	17 (2.3)	38 (8.0)	12 (3.5)	67 (4.3)	111 (3.9)	204 (8.9)	83 (4.6)	398 (5.7)
Urinary tract infection	4 (0.5)	18 (3.8)	6 (1.7)	28 (1.8)	26 (0.9)	72 (3.1)	19 (1.0)	117 (1.7)
Pneumonia	10 (1.3)	21 (4.4)	9 (2.6)	40 (2.5)	41 (1.4)	138 (6.0)	52 (2.9)	231 (3.3)
Sepsis	8 (1.1)	18 (3.8)	1 (0.3)	27 (1.7)	46 (1.6)	77 (3.4)	8 (0.4)	131 (1.9)
Pulmonary failure	6 (0.8)	14 (2.9)	1 (0.3)	21 (1.3)	9 (0.3)	71 (3.1)	5 (0.3)	85 (1.2)
Pressure ulcers	4 (0.5)	2 (0.4)	0 (0.0)	6 (0.4)	14 (0.5)	29 (1.3)	11 (0.6)	54 (0.8)
Deep vein thrombosis	3 (0.4)	3 (0.6)	4 (1.2)	10 (0.6)	17 (0.6)	20 (0.9)	21 (1.2)	58 (0.8)
Upper GI bleeding	3 (0.4)	3 (0.6)	0 (0.0)	6 (0.4)	24 (0.8)	15 (0.7)	1 (0.1)	40 (0.6)
Shock/ cardiac arrest	1 (0.1)	4 (0.8)	0 (0.0)	5 (0.3)	8 (0.3)	8 (0.3)	0 (0.0)	16 (0.2)
CNS complications	9 (1.2)	4 (0.8)	0 (0.0)	13 (0.8)	23 (0.8)	43 (1.9)	17 (0.9)	83 (1.2)
Wound infection	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	1 (0.0)
Failure to rescue	2 (0.3)	6 (1.3)	2 (0.6)	10 (0.6)	12 (0.4)	33 (1.4)	1 (0.1)	46 (0.7)
Mortality	9 (1.2)	25 (5.3)	5 (1.5)	39 (2.5)	29 (1.0)	102 (4.5)	9 (0.5)	140 (2.0)

3.3.3.2 Hospital 2

In total, 19 patients (4.33%) died during their hospital stay in Time 1, with 42.1% occurring in Ward 22. However, this is in a small sample; therefore mortality rates need to be treated with caution and further statistical analysis is required, including the calculation of standardised mortality rates. Of note, 11 of the 19 patients (57.9%) were over 80 years of age. In Time 2 there were 178 deaths (6.7%), with 45.5% of these over the age of 80 years. Of these, 51.1% occurred in Ward 22 while, 48.8% occurred in Ward 23. Of the 19 deaths in Time 1, four of these may have reached the criteria for failure to rescue, with four related to pneumonia, two to shock/cardiac arrest, and two of these patients having multiple criteria for failure to rescue. During Time 2 there were 62 cases which may have reached the failure to rescue criteria: 43 due to pneumonia, 12 as sepsis, two upper GI bleeding, three DVT, six related to shock or cardiac arrest, and 17 of those having multiple criteria. Again, these results need to be treated with caution until further analysis is conducted.

Of the 439 patients in Time 1, 140 (31.9%) had an adverse outcome(s) in hospital excluding those whom had died during their stay: 62.85% (88/140) occurred on Ward 22 and 37.15% (52/140) occurred on Ward 23. The proportion of NSOs in Time 2 was lower that Time 1 although with a decrease of 8.4%. The majority of these occurred on Ward 22 (63.57) compared to Ward 23 (36.42%). Of all the patients identified with NSOs, 41 (9.3%) had more than one NSO in Time 1 and 179 (6.7%) had more than one in Time 2 (Table 3.3.5: Breakdown of nurse sensitive patient outcomes for patients admitted to Hospital 2 for Time 1 and Time 2).

The most frequent NSO in Time 1 was metabolic derangement (11.8%) followed by pneumonia (8.9%) and urinary tract infections (8.9%). These NSOs were also the three most frequent in Time 2, with metabolic derangement, urinary tract infections and pneumonia decreasing slightly by 1.8%, 2.4% and 2.4% respectively. Pressure Ulcers increased in Time 2 by 0.2% while each of the remaining NSOs remained the same or decreased in Time 2. The addition of data at a later stage will determine whether or not this pattern remains.

Table 3.3.3.2: Breakdown of nurse sensitive patient outcomes in Hospital 2 for Time 1 and Time 2

	Time 1			Time 2		
	Ward 22 n = 302 n (%)	Ward 23 n = 137 n (%)	Hospital 2 n = 439 n (%)	Ward 22 n = 1891 n (%)	Ward 23 n = 773 n (%)	Hospital 2 n = 2664 n (%)
Any NSO (excl. mortality)	88 (29.1)	52 (38.0)	140 (31.9)	398 (21.0)	228 (29.5)	626 (23.5)
Metabolic derangement	35 (11.6)	17 (12.4)	52 (11.8)	171 (9.0)	96 (12.4)	267 (10.0)
Urinary tract infection	25 (8.3)	14 (10.2)	39 (8.9)	103 (5.4)	69 (8.9)	172 (6.5)
Pneumonia	21 (7.0)	18 (13.1)	39 (8.9)	105 (5.6)	69 (8.9)	174 (6.5)
Sepsis	11 (3.6)	4 (2.9)	15 (3.4)	39 (2.1)	14 (1.8)	53 (2.0)
Pulmonary failure	3 (1.0)	3 (2.2)	6 (1.4)	8 (0.4)	8 (1.0)	16 (0.6)
Pressure ulcers	9 (3.0)	3 (2.2)	12 (2.7)	48 (2.5)	29 (3.8)	77 (2.9)
Deep vein thrombosis	2 (0.7)	1 (0.7)	3 (0.7)	8 (0.4)	3 (0.4)	11 (0.4)
Upper GI bleeding	4 (1.3)	4 (2.9)	8 (1.8)	20 (1.1)	10 (1.3)	30 (1.1)
Shock/ cardiac arrest	1 (0.3)	1 (0.7)	2 (0.5)	7 (0.4)	1 (0.1)	8 (0.3)
CNS complications	9 (3.0)	5 (3.6)	14 (3.2)	30 (1.6)	11 (1.4)	41 (1.5)
Wound infection	0 (0.0)	0 (0.0)	0 (0.0)	2 (0.1)	0 (0.0)	2 (0.1)
Failure to rescue	1 (0.3)	3 (2.2)	4 (0.9)	37 (2.0)	25 (3.2)	62 (2.3)
Mortality	8 (2.6)	11 (8.0)	19 (4.3)	91 (4.8)	87 (11.3)	178 (6.7)

3.3.3.3 Hospital 3

Of the 276 patients admitted to the ward in Hospital 3 during Time 1, five (1.81%) died during their stay, all aged over 80 years; while in Time 2, 16 patients (1.9%) died during their hospital stay and of note 12 of the 16 patients were over the age of 80 years. In Time 1, two patients may have reached the criteria for failure to rescue, while one patient may have in Time 2. For Time 1, the additional diagnoses were pneumonia, while the additional diagnosis was sepsis in Time 2.

During Time 1, 32 of the 276 patients (11.6%) admitted to the ward had a nurse sensitive outcome excluding death in comparison to 179/841 (21.3%) during Time 2. Of the 32 patients in Time 1 with NSOs eight patients (2.9%) had multiple NSOs identified and 24 (2.9%) patients in Time 2 had multiple NSOs. Table 3.3.6 details the breakdown of NSOs for the ward in Hospital 3.

The most common NSO in Time 1 was UTI (5.4%), which increased by 1.6% in Time 2. Metabolic derangement (2.9%) and pneumonia (2.9%) were the second most frequent NSOs in Time 1. Metabolic derangement increased to 9.2% in Time 2 and was the most commonly reported NSO in Time 2, while pneumonia also increased to 3.2%. Sepsis, DVT and Upper GI Bleeding had slight increases from Time 1 to Time 2, 0.2%, 0.1% and 0.1% respectively. There were no instances of pressure ulcers in Time 1 but 0.5% in Time 2. CNS complications increased from Time 1 (1.8%) to Time 2 (2.3%). The remaining NSOs remained relatively similar between the two time-points. Again, additional data will allow for further examination of the pattern between Time 1 and Time 2.

Table 3.3.3.3: Breakdown of nurse related patient outcomes for patients admitted to pilot ward in Hospital 3 1 for Time 1 and Time 2

	Time 1 Ward 31; Hospital 3 n = 276 n (%)	Time 2 Ward 31; Hospital 3 n = 841 n (%)
Any NSO (excl. mortality)	32 (11.6)	179 (21.3)
Metabolic derangement	8 (2.9)	77 (9.2)
Urinary tract infection	15 (5.4)	59 (7.0)
Pneumonia	8 (2.9)	27 (3.2)
Sepsis	3 (1.1)	11 (1.3)
Pulmonary failure	0 (0.0)	1 (0.1)
Pressure ulcers	0 (0.0)	4 (0.5)
Deep vein thrombosis	1 (0.4)	4 (0.5)
Upper GI bleeding	1 (0.4)	4 (0.5)
Shock/ cardiac arrest	0 (0.0)	0 (0.0)
CNS complications	5 (1.8)	19 (2.3)
Wound infection	0 (0.0)	0 (0.0)
Failure to rescue	2 (0.7)	1 (0.1)
Mortality	5 (1.8)	16 (1.9)

3.3.4 Segmented Time-series Analysis

We used a segmented (or interrupted) time series analysis to estimate whether the probability of an NSO occurring changed after 09/01/2017. Data across all patients were aggregated by admission date to give a total NSO count for each day of the observation period (2016-07-15 to 2019-03-21; 979 total days). Using these data, we used Poisson regression to model the influence of time on NSO count. Time was represented using linear splines with a single break at day 178 (corresponding to 09/01/2017). Model coefficients are reported with 95% confidence intervals, and model predicted values are plotted with the raw data and a corresponding LOESS best fit line. Autocorrelation was assessed by examination of a correlogram of the model's residuals.

Based on the Poisson regression, the estimated NSO count on day 1 (obtained by exponentiating the respective regression coefficient) was 1.68 (95% CI 1.386 to 2.044). Over the first time period, from day 1 to day 178, the NSO count increased by 0.15% (95% CI 0.022 to 0.28) per day. This was in contrast to the second time period, from day 178 on, when the NSO count decreased by 0.003% per day. The model estimated increase and subsequent decrease in NSO counts across the two respective periods (before and after the introduction of the Framework) are displayed in Figure 3.3.1.

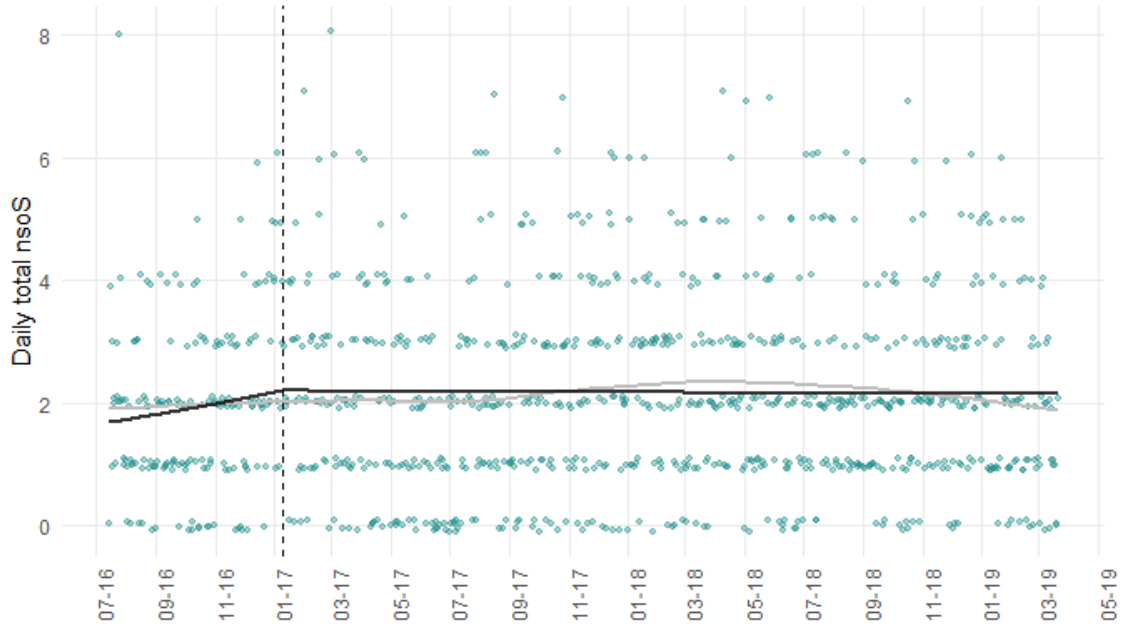

Figure 3.3.1: Segmented time series Poisson regression results.

The points reflect the total NSO count (y-axis) for each day of observation(x-axis). The dashed line marks 09/01/2017, when the Framework was introduced. The black line follows the predicted NSO counts from the segmented time series Poisson regression, while the grey line shows the LOESS (smoothed) fit to the data.

3.3.4.1 Model Assumptions

There was no evidence of overdispertion (NSO count mean = 2.13, sd = 2.42; F-test p = 0.27), and estimates from a negative binomial regression (not reported) were in line with those of the Poisson regression reported here. There was also no evidence of autocorrelation in the residuals over time (figure 3.3.2).

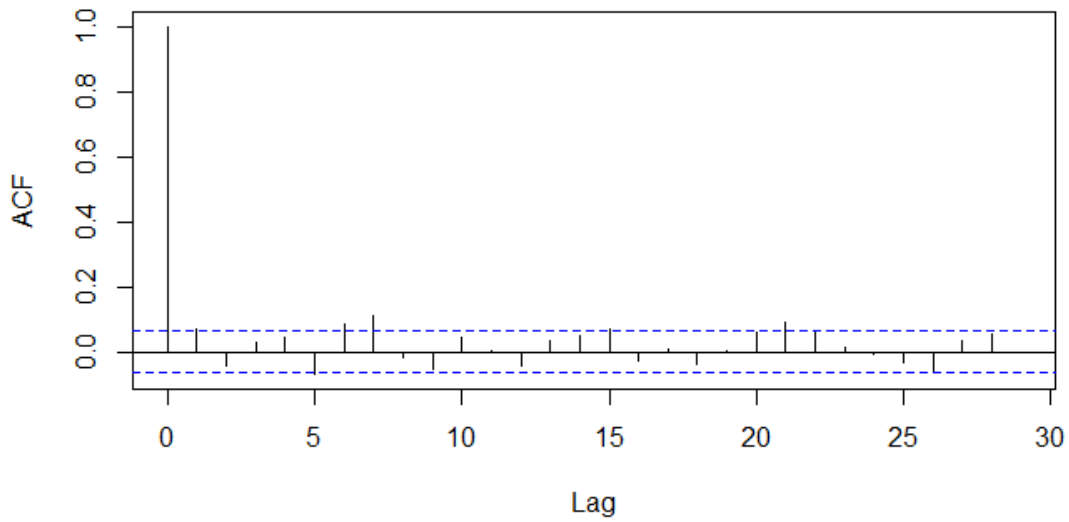

Figure 3.3.2: Correlogram to assess autocorrelation

3.3.4.2 Ward adjustment

We also looked at ward specific models, which showed a substantial amount of heterogeneity in the NSO rate over time. Wards are ordered by the mean number of total NSOs over the observation period. The dashed vertical line indicates the date of the staffing uplift.

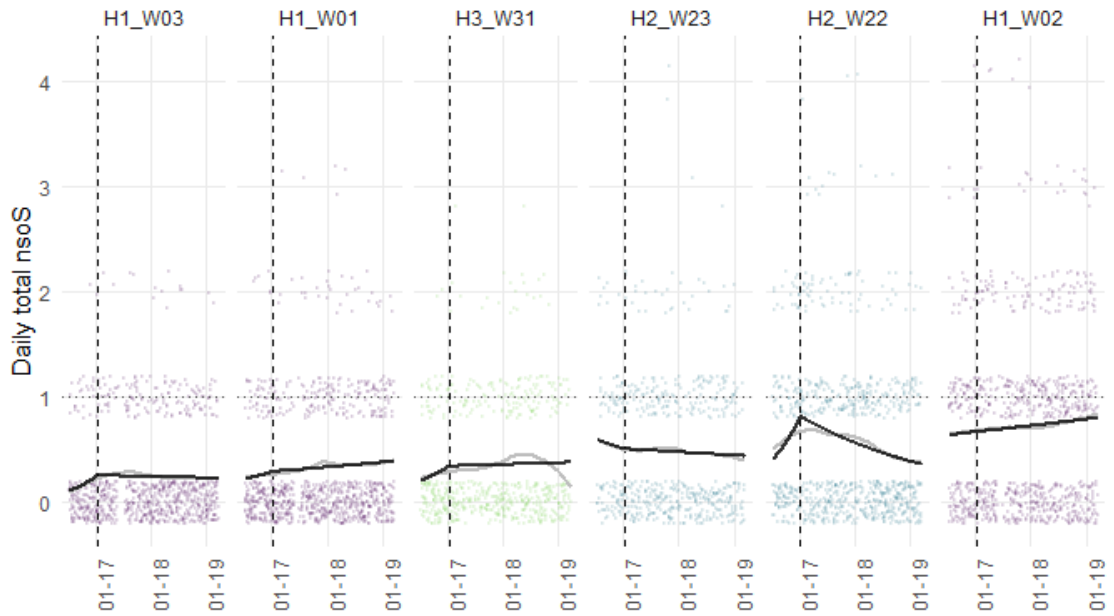

Figure 3.3.3: Pilot ward daily NSO over the study duration

3.3.4.3 Mortality as the outcome

We then repeated the above analysis, substituting deaths as the outcome. Based on the Poisson regression, the estimated death count on day 1 was 0.31 (95% CI 0.2 to 0.496). Over the first time period, from day 1 to day 178, the death count increased by 0.1% (95% CI -0.199 to 0.404) per day. During the second time period, from day 178 on, the death count decreased by -0.023% per day. The model estimated death counts across the two respective periods (before and after the introduction of the Framework) are displayed in Figure 3.3.4.

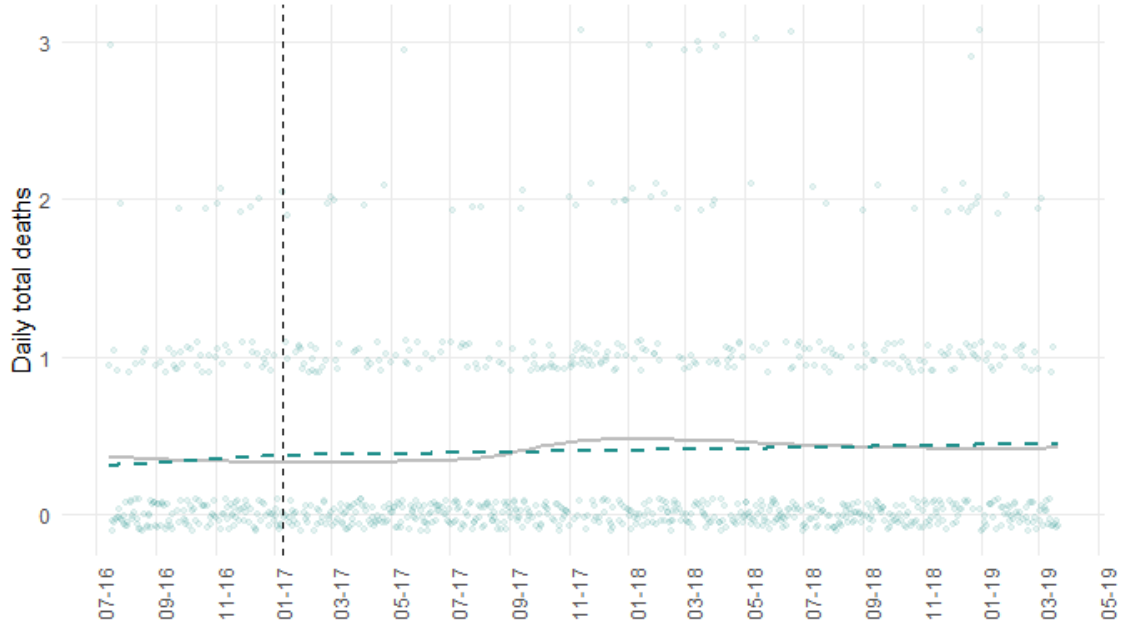

Figure 3.3.4: Pilot ward daily mortality over the study duration

The points reflect the total death count (y-axis) for each day of observation(x-axis). The vertical line marks 09/01/2017, when the Framework was introduced. The dashed line follows the predicted death counts from the segmented time series Poisson regression, while the grey line shows the LOESS (smoothed) fit to the data.

3.3.5 Patient-level NSO Risk

We also used logistic regression models to estimate the associations between admission date and NSO occurrence at the patient level. The expected non-linear relationship between time and NSO occurrence (indicated by the results above) was modelled using restricted cubic splines (5 knots). The key results were the unadjusted and covariate adjusted non-linear associations between day of admission and the log odds of an NSO, which are shown in the plots below. The adjusted covariates were age, sex, length of stay, patient death, and ward.

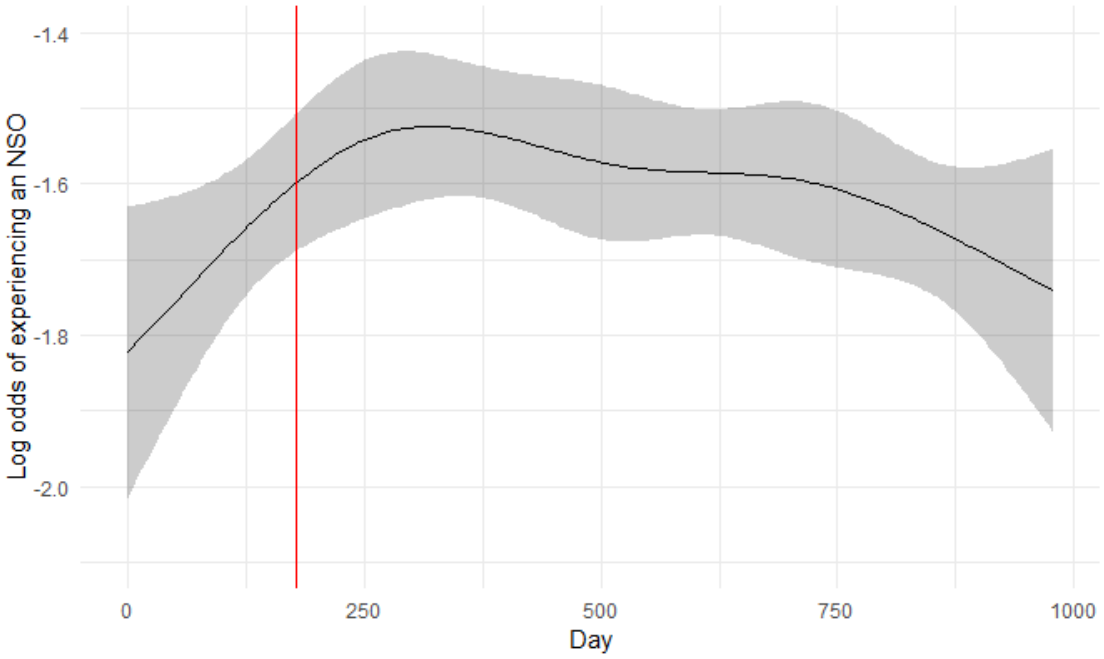

Figure 3.3.4. Unadjusted relationship between day of admission and log odds of an NSO.

Like the segmented time series analysis, we can see that the log odds of an NSO increases until January 2017 (day 170), after which the log odds of an NSO starts to decline considerably (Figure 3.3.5). The nature of this relationship is not apparent however after covariate adjustment (Figure 3.3.6).

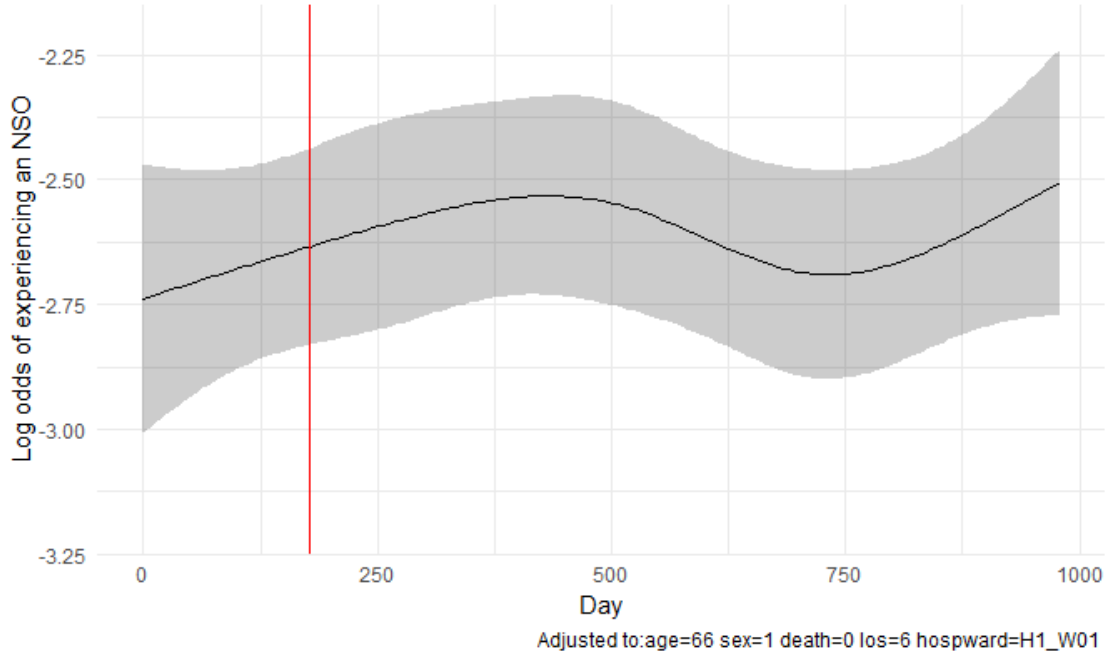

Figure 3.3.4. Adjusted relationship between admission day and log odds of an NSO.

3.3.6 Conclusion

It is apparent that nursing sensitive outcome measures can be identified in the HIPE data and this is a useful resource for measuring these outcomes. However, as the three hospitals vary greatly in profile (level, teaching status, location, patient demographics and staffing), the HIPE data cannot be used to make comparison between hospitals and should only be used for comparisons within wards. The time series analysis shows that the count of NSO increased per day by 0.15% in Time 1 but decreased by 0.003% in Time 2, showing stabilisation. Additionally, the regression shows that the odds of developing an NSO began to decline in Time 2, but this was no longer apparent after adjusting for case-mix. However, without additional data and over a longer timeframe it is difficult to say whether this trend is due to the implementation of the *Framework* or a naturally occurring pattern due to seasonal variations for example. Therefore, while the data looks promising, it should, at this time, still be treated with caution.

3.4 Cross-sectional staff survey – pilot wards

Staff across the six study wards, including clinical nurse managers, staff nurses and healthcare assistants, were asked to complete a survey in Time 1, Time 2 and Time 3 of the study[19]. Data was also collected at a transitional time-point between Time 1 and Time 2. This is referred to as “Transition” throughout this section of the report and was undertaken at the time-point as the adjustments to staffing were being made in the pilot wards. The demographic profile of the respondents is outlined in Table 3.4.1. This

[19] Time 1 was prior to the introduction of the recommendations in the Framework; Time 2 and Time 3 were following the introduction of the recommendations in the Framework

describes all staff that responded in all four time-points of data collection. The majority of staff were RNs and had completed degree level education. The majority were working in full-time posts, were female and had been working on average for approximately 12.6 years as a nurse. Respondents had an average of 6.5 years of experience working on their current ward. Staff also provided information on the type of shift last worked. This data is presented in Tables 3.4.2, 3.4.3 and 3.4.4 for Time 1, Transition, Time 2, Time 3 and Time 4 time-points.

Table: 3.4.1: Profile of respondents combined across all data collection time periods (all sites).

Characteristic	Hospital 1 Ward 1 (n = 49)	Hospital 1 Ward 2 (n = 74)	Hospital 1 Ward 3 (n = 70)	Hospital 1 Total (n = 193)	Hospital 2 Ward 22 (n = 50)	Hospital 2 Ward 23 (n = 47)	Hospital 2 Total (n = 97)	Hospital 3 Ward 31 (n = 88)	Overall (n = 378)
Job Title, n (%)									
CNM	11 (22.4)	5 (6.8)	3 (4.3)	19 (9.8)	5 (10.0)	6 (12.8)	11 (11.3)	5 (5.7)	35 (9.3)
RN	34 (69.4)	56 (75.7)	54 (77.1)	144 (74.6)	32 (64.0)	32 (68.1)	64 (66.0)	69 (78.4)	277 (73.3)
HCA	4 (8.2)	13 (17.6)	13 (18.6)	30 (15.5)	13 (26.0)	9 (19.1)	22 (22.7)	14 (15.9)	66 (17.5)
Nursing Qualifications, n (%)									
RN only									
Registered nurse – hospital cert.	3 (7.9)	5 (8.9)	2 (4.0)	10 (6.9)	0 (0.0)	1 (3.3)	1 (1.6)	2 (3.4)	13 (4.9)
Registered nurse – diploma	3 (7.9)	8 (14.3)	5 (10.0)	16 (11.1)	7 (21.9)	5 (16.7)	12 (19.4)	4 (6.8)	32 (12.1)
Registered nurse – degree	30 (78.9)	34 (60.7)	29 (58.0)	93 (64.6)	24 (75.0)	18 (60.0)	42 (67.7)	41 (69.5)	176 (66.4)
Post-graduate certificate	0 (0.0)	1 (1.8)	2 (4.0)	3 (2.1)	0 (0.0)	3 (10.0)	3 (4.8)	2 (3.4)	8 (3.0)
Post-graduate diploma	2 (5.3)	8 (14.3)	4 (8.0)	14 (9.7)	1 (3.1)	3 (10.0)	4 (6.5)	3 (5.1)	21 (7.9)
Masters in Nursing	0 (0.0)	0 (0.0)	8 (16.0)	8 (5.6)	0 (0.0)	0 (0.0)	0 (0.0)	7 (11.9)	15 (5.7)
Educational Qualification, n (%)									
No Formal Education	2 (5.1)	0 (0.0)	5 (9.3)	7 (4.4)	2 (5.1)	1 (2.8)	3 (4.0)	1 (1.6)	11 (3.7)
Junior Cert./Intermediate Cert.	0 (0.0)	2 (3.0)	1 (1.9)	3 (1.9)	0 (0.0)	1 (2.8)	1 (1.3)	0 (0.0)	4 (1.3)
Leaving Certificate/ equivalent	10 (25.6)	18 (27.3)	14 (25.9)	42 (26.4)	10 (25.6)	12 (33.3)	22 (29.3)	8 (12.5)	72 (24.2)
Vocational/Technical	3 (7.7)	8 (12.1)	2 (3.7)	13 (8.2)	5 (12.8)	6 (16.7)	11 (14.7)	6 (9.4)	30 (10.1)
Certificate (Third-level)	2 (5.1)	2 (3.0)	6 (11.1)	10 (6.3)	1 (2.6)	3 (8.3)	4 (5.3)	2 (3.1)	16 (5.4)
Diploma (Third-level)	3 (7.7)	9 (13.6)	6 (11.1)	18 (11.3)	6 (15.4)	4 (11.1)	10 (13.3)	5 (7.8)	33 (11.1)
Bachelor's Degree	19 (48.7)	26 (39.4)	16 (29.6)	61 (38.4)	15 (38.5)	9 (25.0)	24 (32.0)	40 (62.5)	125 (41.9)
Master's Degree	0 (0.0)	1 (1.5)	4 (7.4)	5 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.1)	7 (2.3)
Doctoral Degree (e.g. PhD)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Working Contract, n (%)									
Full-time	40 (97.6)	63 (92.6)	51 (83.6)	154 (90.6)	39 (92.9)	37 (97.4)	76 (95.0)	70 (100.0)	300 (93.8)
Part-time	0 (0.0)	4 (5.9)	9 (14.8)	13 (7.6)	3 (7.1)	0 (0.0)	3 (3.8)	0 (0.0)	16 (5.0)
Agency	0 (0.0)	0 (0.0)	1 (1.6)	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)
Other	1 (2.4)	1 (1.5)	0 (0.0)	2 (1.2)	0 (0.0)	1 (2.6)	1 (1.3)	0 (0.0)	3 (0.9)
Gender, n (%)									
Female	37 (90.2)	59 (86.8)	52 (86.7)	148 (87.6)	41 (97.6)	35 (92.1)	76 (95.0)	61 (85.9)	285 (89.1)
Male	4 (9.8)	9 (13.2)	8 (13.3)	21 (12.4)	1 (2.4)	3 (7.9)	4 (5.0)	10 (14.1)	35 (10.9)
Years as a nurse/HCA									
mean (SD)									
As Nurse/HCA	10.41 (10.38)	10.05 (7.78)	10.52 (9.06)	10.30 (8.84)	12.41 (8.79)	11.71 (9.46)	12.08 (9.06)	18.98 (8.57)	12.62 (9.46)
Current Hospital	8.01 (7.34)	5.63 (6.59)	5.66 (7.00)	6.20 (6.93)	6.63 (5.96)	5.27 (3.89)	5.99 (5.10)	11.00 (6.74)	7.17 (6.77)
Current Ward	7.39 (7.11)	5.19 (6.27)	5.29 (6.78)	5.75 (6.67)	5.31 (4.88)	4.31 (2.80)	4.84 (4.04)	10.52 (6.83)	6.54 (6.50)
Agency	0.09 (0.35)	0.03 (0.12)	0.00 (0.00)	0.04 (0.21)	0.32 (0.69)	1.28 (2.92)	0.75 (2.06)	1.15 (3.28)	0.51 (1.94)

Table: 3.4.2: Profile of respondents' shift type for Hospital 1

	Time 1				Transition				Time 2				Time 3			
	Ward 1 (n = 19)	Ward 2 (n = 15)	Ward 3 (n = 15)	Total (n = 49)	Ward 1 (n = 10)	Ward 2 (n = 8)	Ward 3 (n = 16)	Total (n = 34)	Ward 1 (n = 9)	Ward 2 (n = 30)	Ward 3 (n = 26)	Total (n = 65)	Ward 1 (n = 8)	Ward 2 (n = 19)	Ward 3 (n = 13)	Total (n = 32)
Day Shift (8 hours)	0 (0)	0 (0)	0 (0)	0 (0)	1 (10.0)	0 (0)	1 (6.3)	2 (5.9)	1 (12.5)	1 (3.3)	1 (3.8)	3 (4.7)	2 (25.0)	0 (0.0)	1 (7.7)	3 (7.7)
Day Shift (12 Hours)	15 (78.9)	10 (66.7)	10 (66.7)	35 (72.9)	9 (90.0)	7 (87.5)	14 (87.5)	30 (88.2)	6 (75.0)	24 (80.0)	16 (61.5)	46 (71.9)	5 (62.5)	14 (77.8)	7 (53.8)	26 (66.7)
Night shift (12 hours)	3 (15.8)	4 (26.7)	3 (20.0)	10 (20.8)	0 (0)	0 (0)	1 (6.3)	1 (2.9)	1 (12.5)	5 (16.7)	8 (30.8)	14 (21.9)	1 (12.5)	4 (22.2)	4 (30.8)	9 (23.1)
Other	1 (5.3)	1 (6.7)	1 (6.7)	3 (6.3)	0 (0)	1 (12.5)	0 (0)	1 (2.9)	0 (0.0)	0 (0.0)	1 (3.8)	1 (1.6)	0 (0.0)	0 (0.0)	1 (7.7)	1 (2.6)

Table: 3.4.3: Profile of respondents' last shift worked for Hospital 2

	Time 1			Transition			Time 2			Time 3		
	Ward 22 (n = 16)	Ward 23 (n = 14)	Total (n = 30)	Ward 22 (n = 11)	Ward 23 (n = 11)	Total (n = 22)	Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)	Ward 22 (n = 7)	Ward 23 (n = 7)	Total (n=14)
Day Shift (8 hours)	1 (6.3)	1 (7.1)	2 (6.7)	1 (9.1)	0 (0)	1 (4.5)	1 (6.3)	1 (7.1)	2 (6.7)	1 (14.3)	0 (0.0)	1 (7.7)
Day Shift (12 Hours)	12 (75.0)	9 (64.3)	21 (70.0)	8 (72.7)	9 (90.0)	17 (81.0)	11 (68.8)	8 (57.1)	19 (63.3)	5 (71.4)	4 (66.7)	9 (69.2)
Night shift (12 hours)	3 (18.8)	4 (28.6)	7 (23.3)	2 (18.2)	1 (10.0)	3 (14.3)	4 (25.0)	5 (37.5)	9 (30.0)	1 (14.3)	2 (33.3)	3 (23.1)
Other	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Table: 3.4.4: Profile of respondents' last shift worked for Hospital 3

Last shift worked, n (%)	**Time 1**	**Transition**	**Time 2**	**Time 3**
	Ward 31 (n = 22)	Ward 31 (n = 23)	Ward 31 (n = 20)	Ward 31 (n= 23)
Day Shift (8 hours)	1 (4.8)	2 (8.7)	1 (5.6)	1 (4.5)
Day Shift (12 Hours)	17 (81.0)	19 (82.6)	9 (50.0)	11 (50.0)
Night shift (12 hours)	3 (14.3)	2 (8.7)	8 (44.4)	10 (45.5)
Other	0 (0)	0 (0)	0 (0.0)	0 (0.0)

Table: 3.4.5: Profile of respondents' shift type overall

Overall

Last shift worked, n (%)	**Time 1** (n = 101)	**Transition** (n = 79)	**Time 2** (n = 116)	**Time 3** (n = 77)
Day Shift (8 hours)	3 (3.0)	5 (6.4)	6 (5.4)	5 (6.8)
Day Shift (12 Hours)	73 (73.7)	66 (84.6)	74 (66.1)	46 (62.2)
Night shift (12 hours)	20 (20.2)	6 (7.7)	31 (27.7)	22 (29.7)
Other	3 (3.0)	1 (1.3)	1 (0.9)	1 (1.4)

3.4.1 Nursing Staff-to-Patient Ratios

The nursing staff-to-patient ratio was derived from a single item that asked respondents to report on the numbers of staff giving direct patient care (specifically 'RNs' and 'other nursing care staff') and the numbers of patients on the ward on the last shift they worked. This measure has been widely used in previous cross-sectional studies of nurse staffing. Administrative data from *TrendCare* for the time period of the study was used to establish the validity of ratios reported in surveys for both day and night shifts.

The mean number of patients per nursing staff (including RNs and HCAs) is presented below in Tables 3.4.1.1 and 3.4.1.2 and 3.4.1.2 respectively. Given potential differences between day and night shift ratios, ratios for the day shift only are also reported in Table 3.4.1.1 and 3.4.1.2 and 3.4.1.2; it was not possible to examine the night shift alone due to the relatively small sample sizes. In Time 1, the highest number of patients per staff was recorded in Ward 1 while the lowest staff-to-patient ratios were reported in Hospital 2. The figures suggest a lower number of patients per staff member in the transition period and Time 2, particularly in wards with the highest ratios in Time 1. This has remained consistent for Time 3, with the exception of Ward 31 which now has a ratio equivalent to Time 1. Differences of at least one patient per staff on day shifts are reported on Wards 1, 2, and 3 from Time 1 to Time 2 and to Time 3, and Ward 31 between Time 1 and Transition, although this difference was less pronounced at Time 2 and Time 3. Hospital 2 had a slight decrease in nurse to patient ratios after Time 1 but this has returned to baseline at Time 3; this hospital did not require an alteration in its staffing complement.

In the Transition and Time 2, staff also provided data on the number of RNs and HCAs on their most recent shift, along with the patients they were individually responsible for. Therefore, it was possible to calculate the number of patients per registered RN. While this data is not available for Time 1, it is clear that there has been a slight increase in the number of patients per RN from the Transition phase to Times 2 and 3. This data is presented for all shifts and as well as day shifts only in Table 3.4.1.4.

Table: 3.4.1.1: Nurse to patient ratios for Hospital 1

	Time 1				Transition				Time 2				Time 3			
	Ward 1 (n = 19)	Ward 2 (n = 15)	Ward 3 (n = 15)	Total (n = 49)	Ward 1 (n = 10)	Ward 2 (n = 8)	Ward 3 (n = 16)	Total (n = 34)	Ward 1 (n = 9)	Ward 2 (n = 30)	Ward 3 (n = 26)	Total (n = 65)	Ward 1 (n = 8)	Ward 2 (n = 19)	Ward 3 (n = 13)	Total (n = 32)
Number of patients per total nursing staff (RN + HCA only)	7.32 (2.23)	5.51 (1.33)	5.47 (1.34)	6.18 (1.91)	4.53 (0.79)	3.93 (0.61)	3.49 (0.99)	3.89 (0.94)	6.35 (2.12)	4.47 (1.36)	4.00 (1.22)	4.54 (1.60)	4.79 (1.03)	5.07 (1.64)	4.36 (1.71)	4.77 (1.56)
Number of patients per total nursing staff (incl. student interns)	-	-	-	-	-	-	-	-	5.32 (1.38)	4.20 (1.57)	3.67 (1.36)	4.15 (1.54)	4.33 (1.14)	4.44 (1.68)	3.68 (1.25)	4.17 (1.45)
Number of patients per total nursing staff for day shift	6.80 (2.00)	5.19 (1.37)	4.97 (0.78)	5.76 (1.71)	4.53 (0.79)	3.93 (0.61)	3.31 (0.74)	3.82 (0.88)	5.64 (0.82)	3.94 (0.73)	3.47 (0.33)	4.54 (1.60)	4.47 (0.56)	4.34 (0.82)	4.11 (1.02)	4.31 (0.81)
Patients per RN on all shifts (RN responses only)	-	-	-	-	6.46 (1.38)	5.40 (1.07)	5.31 (1.62)	5.65 (1.46)	8.38 (1.63)	6.04 (1.80)	5.03 (1.29)	6.01 (1.93)	5.84 (0.82)	6.85 (1.90)	5.22 (1.71)	6.09 (1.77)
Patients per RN on day shift only	-	-	-	-	6.34 (1.21)	5.40 (1.07)	4.93 (1.43)	5.46 (1.38)	8.03 (1.06)	5.37 (1.25)	4.59 (0.44)	5.56 (1.55)	5.84 (0.82)	6.23 (0.90)	5.24 (0.85)	5.86 (0.93)

Table: 3.4.1.2: Nurse patient ratio for Hospital 2

	Time 1			Transition			Time 2			Time 3		
Ratios, mean (SD)	Ward 22 (n = 16)	Ward 23 (n = 14)	Total (n = 30)	Ward 22 (n = 11)	Ward 23 (n = 11)	Total n = 22	Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)	Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)
Number of patients per total nursing staff (RN + HCA only)	4.62 (1.90)	3.84 (0.57)	4.28 (1.50)	4.48 (1.63)	3.53 (0.57)	4.01 (1.29)	4.09 (1.20)	4.10 (0.76)	4.10 (1.00)	4.04 (0.42)	4.18 (0.86)	4.11 (0.63)
Number of patients per total nursing staff (incl. student interns)	-	-	-	-	-	-	4.33 (1.11)	3.65 (1.00)	3.98 (1.09)	3.82 (0.83)	3.12 (0.84)	3.53 (0.87)
Number of patients per total nursing staff for day shift (RN+HCA only)	4.00 (1.08)	3.69 (0.38)	3.86 (0.84)	3.87 (0.65)	3.38 (0.28)	3.62 (0.55)	3.75 (1.10)	3.60 (0.40)	3.68 (0.85)	3.99 (0.44)	3.71 (0.57)	3.88 (0.49)
Patients per RN on all shifts	-	-	-	6.15 (1.52)	4.69 (2.15)	5.12 (1.95)	5.91 (0.97)	5.41 (2.33)	5.65 (1.79)	5.89 (0.95)	5.28 (1.29)	5.56 (1.14)
Patients per RN on day shift only	-	-	-	5.62 (1.23)	4.06 (0.42)	4.84 (1.20)	5.69 (1.11)	4.31 (0.58)	4.96 (1.10)	5.73 (1.03)	4.50 (0.58)	5.12 (1.01)

Table: 3.4.1.3: Nurse patient ratio for Hospital 3

Ratios, mean (SD)	**Time 1** Ward 31 (n = 22)	**Transition** Ward 31 (n = 23)	**Time 2** Ward 31 (n = 20)	**Time 3** Ward 31 (n= 23)
Number of patients per total nursing staff (RN + HCA only)	5.07 (1.34)	4.23 (1.63)	4.84 (2.87)	5.59 (2.48)
Number of patients per total nursing staff (incl. student interns)	-	-	4.87 (2.96)	5.00 (2.57)
Number of patients per total nursing staff for day shift	4.78 (4.83)	3.75 (0.53)	3.37 (0.94)	4.36 (2.15)
Patients per RN on all shifts (RN responses only)	-	5.39 (1.44)	6.47 (2.95)	6.77 (2.58)
Patients per RN on day shift only	-	5.02 (0.60)	4.67 (1.59)	5.30 (1.99)

Table: 3.4.1.4: Nurse patient ratio overall

Ratios, mean (SD)	**Time 1** (n = 101)	**Transition** (n = 79)	**Time 2** (n = 116)	**Time 3** (n = 77)
Number of patients per total nursing staff (RN + HCA only)	5.32 (1.86)	4.02 (1.26)	4.47 (1.75)	4.89 (1.82)
Number of patients per total nursing staff (incl. student interns)	-	-	4.22 (1.76)	4.18 (1.63)
Number of patients per total nursing staff for day shift	4.89 (1.51)	3.75 (0.71)	3.85 (0.94)	4.24 (1.21)
Patients per RN on all shifts	-	5.52 (1.57)	5.99 (2.07)	6.19 (1.96)
Patients per RN on day shift only	-	5.19 (1.18)	5.31 (1.46)	5.59 (1.29)

3.4.2. Nursing Work Index

The Practice Environment Scale of the Nursing Work Index was used to evaluate qualities of the work environment. It includes five subscales: Staffing and Resource Adequacy; Collegial Nurse–Doctor Relations; Nurse Manager Ability, Leadership, and Support of Nurses; Nurse Participation in Hospital Affairs; and Nursing Foundations for Quality of Care. The items were scored on a scale of 1 to 4 ranging from 1 = strongly disagree to 4 = strongly agree. Higher scores are indicative of positive ratings of the environment. This section of the surveys are only completed by registered nurses and thus the responses below are only included from this cohort. The mean of each subscale is reported below at hospital and ward level for each time-point in Tables 3.4.2.1, 3.4.2.2, 3.4.2.3, 3.4.2.4.

Overall, the highest ratings were given for Nursing Foundations for Quality Care and Collegial Nurse-Doctor Relations in all phases of research. The lowest ratings were reported for the Staffing and Resource Adequacy subscale in Time 1. This was particularly the case for Wards 1, 2, 3 and 22. Ratings of Staffing and Resource Adequacy increased from Time 1 to Transition and Time 1 to Time 2, especially in wards 1, 2 and 3 in Hospital 1; these received uplifts in staff over the course of the study. However, at Time 3 only one ward in Hospital 1, Ward 1, retained a score for Staffing and Resource Adequacy similar to that of Time 2. Ward 2 and 3 decreased to scores similar to that of baseline level at Time 1. Ward 31, which also received a change to their staffing, reported the lowest score for Staffing and Resource adequacy at Time 2; this increased at Time 3 but remained below the score at Time 1.

Overall, Nurse Manager Ability, Leadership and Support increased from Time 1 to Time 2 and Time 1 to Time 3. At ward level, all wards except 31 increased on this scale from Time 1 to Time 2; however wards 1, 22, 23 and 31 had an increase from Time 1 to Time 3.

Nurse Participation in Hospital Affairs increased from Time 1 across each of the time-points, remaining stable at Time 2 and 3. At Ward level, Wards 1, 2, 22 and 23 increased on this subscale from Time 1 to Time 2 and again to Time 3. Ward 3 increased at Time 2 but fell below baseline at Time 3, while Ward 31 decreased from Time 1 to 2 but increased at Time 3 above that of Time 1.

The scores for Nursing Foundations for Quality of Care in Times 2 and 3 were above those at Time 1, however the increase at Time 3 was not as substantial at Time 2. Wards 2, 3, 22 and 23 increased from Time 1 to Times 2 and 3, while Ward 1 only increased at Time 2 and Ward 31 decreased following Time 1.

Table: 3.4.2.1: Nursing Work Index for Hospital 1

	Time 1				**Transition**				**Time 2**				**Time 3**			
RNs Only	Ward 1 (n = 19)	Ward 2 (n = 15)	Ward 3 (n = 15)	Total (n = 49)	Ward 1 (n = 10)	Ward 2 (n = 8)	Ward 3 (n = 16)	Total (n = 34)	Ward 1 (n = 9)	Ward 2 (n = 30)	Ward 3 (n = 26)	Total (n = 65)	Ward 1 (n = 8)	Ward 2 (n = 19)	Ward 3 (n = 13)	Total (n = 32)
Staffing and Resource Adequacy	1.57 (0.58)	1.70 (0.43)	1.88 (0.38)	1.70 (0.50)	2.39 (0.52)	2.66 (0.46)	2.90 (0.41)	2.71 (0.52)	2.31 (0.76)	2.78 (0.59)	2.86 (0.51)	2.72 (0.62)	2.04 (1.01)	1.64 (0.47)	1.80 (0.77)	1.78 (0.71)
Collegial Nurse-Doctor Relations	2.85 (0.23)	2.64 (0.43)	2.75 (0.49)	2.76 (0.35)	2.83 (0.47)	2.83 (0.25)	3.08 (0.57)	2.94 (0.47)	3.15 (0.34)	2.97 (0.39)	2.98 (0.51)	3.01 (0.43)	2.86 (0.63)	2.83 (0.34)	2.70 (0.73)	2.80 (0.54)
Nurse Manager Ability, Leadership and Support	2.73 (0.44)	2.73 (0.41)	2.52 (0.56)	2.67 (0.47)	2.78 (0.29)	2.73 (0.30)	3.07 (0.57)	2.88 (0.45)	2.76 (0.30)	2.86 (0.53)	2.77 (0.62)	2.80 (0.53)	2.89 (0.40)	2.64 (0.66)	2.54 (0.65)	2.66 (0.60)
Nurse Participation in Hospital Affairs	2.28 (0.44)	2.43 (0.52)	2.56 (0.51)	2.40 (0.48)	2.43 (0.51)	2.50 (0.38)	3.03 (0.54)	2.71 (0.56)	2.48 (0.50)	2.71 (0.38)	2.91 (0.43)	2.75 (0.44)	2.32 (0.63)	2.69 (0.57)	2.37 (0.58)	2.51 (0.59)
Nursing Foundations for Quality of Care	2.72 (0.45)	2.81 (0.14)	2.83 (0.25)	2.77 (0.33)	2.76 (0.32)	2.94 (0.13)	3.08 (0.36)	2.95 (0.32)	2.77 (0.38)	3.00 (0.42)	3.02 (0.50)	2.97 (0.45)	2.43 (0.70)	2.96 (0.48)	2.78 (0.55)	2.78 (0.58)

Table: 3.4.2.2: Nursing Work Index for Hospital 2

	Time 1			**Transition**			**Time 2**			**Time 3**		
NWI, mean (sd)	Ward 22 (n = 16)	Ward 23 (n = 14)	Total (n = 30)	Ward 22 (n = 11)	Ward 23 (n = 11)	Total (n = 22)	Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)	Ward 22 (n = 7)	Ward 23 (n = 7)	Total (n = 14)
Staffing and Resource Adequacy	1.38 (0.34)	1.98 (0.63)	1.68 (0.58)	1.44 (0.32)	1.69 (0.46)	1.56 (0.40)	1.89 (0.67)	2.11 (0.70)	2.00 (0.68)	1.79 (0.40)	1.82 (0.64)	1.81 (0.52)
Collegial Nurse-Doctor Relations	2.10 (0.50)	2.87 (0.48)	2.48 (0.62)	2.34 (0.63)	3.00 (0.40)	2.64 (0.64)	2.70 (0.46)	2.76 (0.45)	2.73 (0.44)	2.87 (0.18)	2.76 (0.46)	2.81 (0.36)
Nurse Manager Ability, Leadership and Support	2.52 (0.38)	2.50 (0.29)	2.51 (0.33)	2.37 (0.27)	2.38 (0.60)	2.37 (0.46)	2.31 (0.59)	2.65 (0.41)	2.48 (0.53)	2.93 (0.24)	2.91 (0.16)	2.92 (0.19)
Nurse Participation in Hospital Affairs	1.94 (0.40)	2.22 (0.51)	2.08 (0.47)	1.98 (0.51)	2.42 (0.71)	2.21 (0.65)	2.30 (0.54)	2.57 (0.46)	2.44 (0.51)	2.63 (0.37)	2.63 (0.50)	2.63 (0.42)
Nursing Foundations for Quality of Care	2.50 (0.36)	2.75 (0.40)	2.63 (0.39)	2.41 (0.62)	2.81 (0.53)	2.61 (0.59)	2.55 (0.59)	2.97 (0.27)	2.76 (0.50)	2.98 (0.15)	2.85 (0.43)	2.91 (0.34)

Table: 3.4.2.3: Nursing Work Index, for Hospital 3

	Time 1 Ward 31 (n = 22)	**Transition** Ward 31 (n = 23)	**Time 2** Ward 31 (n = 20)	**Time 3** Ward 31 (n= 23)
Staffing and Resource Adequacy	2.25 (0.49)	2.26 (0.50)	1.95 (0.77)	2.09 (0.61)
Collegial Nurse-Doctor Relations	3.08 (0.25)	2.98 (0.38)	2.94 (0.33)	2.98 (0.21)
Nurse Manager Ability, Leadership and Support	2.40 (0.42)	2.08 (0.74)	2.30 (0.68)	2.66 (0.51)
Nurse Participation in Hospital Affairs	2.69 (0.23)	2.25 (0.62)	2.39 (0.61)	2.75 (0.29)
Nursing Foundations for Quality of Care	2.96 (0.10)	2.73 (0.43)	2.77 (0.31)	2.88 (0.34)

Table: 3.4.2.4: Nursing Work Index Overall

	Time 1 (n = 101)	**Transition** (n = 79)	**Time 2** (n = 116)	**Time 3** (n = 77)
Staffing and Resource Adequacy	1.78 (0.55)	2.28 (0.67)	2.40 (0.75)	1.88 (0.65)
Collegial Nurse-Doctor Relations	2.74 (0.47)	2.88 (0.50)	2.93 (0.43)	2.85 (0.43)
Nurse Manager Ability, Leadership and Support	2.58 (0.43)	2.51 (0.65)	2.63 (0.59)	2.72 (0.52)
Nurse Participation in Hospital Affairs	2.36 (0.49)	2.44 (0.64)	2.61 (0.51)	2.61 (0.49)
Nursing Foundations for Quality of Care	2.76 (0.34)	2.80 (0.45)	2.88 (0.45)	2.83 (0.47)

3.4.3 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. Responses to these items at the four time-points are detailed in Tables 3.4.3.1, 3.4.3.2, 3.4.3.3, 3.4.3.4. In Time 1, 34.7% of staff felt they had less time than usual to deliver care on the last shift while in Time 2, this reduced to 25.4%. At Time 3, the number of staff who felt they had less time than usual to deliver care on their last shift increased to 39.5%.

The majority of staff reported that they required additional time to provide patient care in all phases, with the majority of staff in Time 1 and Time 2 reporting that they required an additional 15 to 30 minutes while in Time 3, the majority of staff (29.7%) reported that they needed greater than 60 minutes of additional time to provide patient care. An increase of 11.2% of staff reporting they did not require any additional time to provide patient care was observed between Time 1 and Time 2. While this decreased by 5% between Time 2 and 3, an overall increase of 6.3% of staff reporting they did not require any additional time to provide patient care was retained between Baseline (Time 1) and Time 3.

A single item measured staffs' perception of the quality of care delivered on their most recent shift. Responses to this item are detailed in Tables 3.4.3.1, 3.4.3.2, 3.4.3.3, 3.4.3.4. In Time 1, 62.9% reported that the care delivered on their ward was 'good' or 'excellent' with a similar 66.1% reporting the same in Time 2. Staff's perception of the quality of care increased slightly at Time 3 with 70% of staff indicating that the care delivered was 'good' or 'excellent.' While quality of care ratings remained stable at Time 3 at the overall level, differences can be observed at ward level. There was an increase in staff reporting the quality of care as excellent from time 1 to Times 2 and 3 in Wards 1, 2 and 31. Ward 3 increased at Time 2 but decreased below baseline at Time 3, similarly with Wards 22 and 23, however, Wards 22 and 23 sustained a high proportion of staff reporting quality of care as good: 100% and 83.3% respectively.

Additional items measured the quality of care in Time 2 and Time 3 only. A single item measured staffs' perception of the overall grade of patient safety delivered on their most recent shift. Responses to this item at the two time points are detailed in Tables 3.4.3.1, 3.4.3.2, 3.4.3.3, 3.4.3.4. The majority of staff in Time 2 (74.2%) and Time 3 (82.9%) reported the grade of patient safety delivered on their ward was 'acceptable' or 'very good.'

A single item measured staff perception of the quality of care delivered on their ward over the last six months at Time 2 and Time 3. Responses to this item at the two time points are detailed in Tables 3.4.3.1, 3.4.3.2, 3.4.3.3, 3.4.3.4. The majority of staff at Time 2 (53.1%) and Time 3 (51.3%) reported that the quality of care delivered on their ward over the past six months had 'remained the same.' There was an overall increase of 14% in the number of staff reporting that the quality of care delivered on their ward had 'deteriorated' between Time 2 and Time 3. Continued research is needed to monitor whether these positive outcomes relating to staff perception of the quality of care delivered on their wards will be sustained in order to increase the validity of these results.

Table: 3.4.3.1: Quality of care for Hospital 1

Quality of care, n(%)	Time 1				Transition				Time 2				Time 3			
	Ward 1 (n = 19)	Ward 2 (n = 15)	Ward 3 (n = 15)	Total (n = 49)	Ward 1 (n = 10)	Ward 2 (n = 8)	Ward 3 (n = 16)	Total (n = 34)	Ward 1 (n = 9)	Ward 2 (n = 30)	Ward 3 (n = 26)	Total (n = 65)	Ward 1 (n = 8)	Ward 2 (n = 19)	Ward 3 (n = 13)	Total (n = 32)
Time to deliver care																
Less time than usual	8 (42.1)	3 (20.0)	7 (50.0)	18 (37.5)	3 (30.0)	1 (12.5)	2 (14.3)	6 (18.8)	4 (44.4)	2 (7.1)	7 (26.9)	13 (20.6)	1.00 (12.50)	11.00 (57.90)	5.00 (38.50)	17.00 (42.50)
About the same amount of time	9 (47.4)	10 (66.7)	6 (42.9)	25 (52.1)	6 (60.0)	4 (50.0)	9 (64.3)	19 (59.4)	5 (55.6)	20 (71.4)	14 (53.8)	39 (61.9)	6.00 (75.00)	7.00 (36.80)	7.00 (53.80)	20.00 (50.00)
More time than usual	2 (10.5)	2 (13.3)	1 (7.1)	5 (10.4)	1 (10.0)	3 (37.5)	3 (21.4)	7 (21.9)	0 (0.0)	6 (21.4)	5 (19.2)	11 (17.5)	1.00 (12.50)	1.00 (5.30)	1.00 (7.70)	3.00 (7.50)
Additional time needed																
No more time needed	1 (5.3)	1 (6.7)	0 (0)	2 (4.3)	0 (0)	1 (12.5)	3 (21.4)	4 (12.5)	0 (0.0)	5 (17.9)	7 (28.0)	12 (19.4)	2 (25.00)	1 (5.60)	2 (15.40)	5 (12.80)
Less than 15 minutes	0 (0)	1 (6.7)	1 (8.3)	2 (4.3)	1 (10.0)	2 (25.0)	3 (21.4)	6 (18.8)	1 (11.1)	3 (10.7)	2 (8.0)	6 (9.7)	0 (0.00)	2 (11.10)	0 (0.00)	2 (5.10)
15 to 30 minutes	4 (21.1)	1 (6.7)	5 (41.7)	10 (21.7)	3 (30.0)	1 (12.5)	3 (21.4)	7 (21.9)	2 (22.2)	10 (35.7)	9 (35.0)	21 (33.9)	2 (25.00)	3 (16.70)	3 (23.10)	8 (20.50)
31 to 45 minutes	2 (10.5)	3 (20.0)	0 (0)	5 (10.9)	2 (20.0)	1 (12.5)	1 (7.1)	4 (12.5)	1 (11.1)	2 (7.1)	1 (4.0)	4 (6.5)	1 (12.50)	3 (16.70)	1 (7.70)	5 (12.80)
46 to 60 minutes	3 (15.8)	2 (13.3)	3 (25.0)	8 (17.4)	2 (20.0)	1 (12.5)	4 (28.6)	7 (21.9)	1 (11.1)	6 (21.4)	4 (16.0)	11 (17.7)	0 (0.00)	3 (16.70)	5 (38.50)	8 (20.50)
Greater than 60 minutes	9 (47.4)	7 (46.7)	3 (25.0)	19 (41.3)	2 (20.0)	2 (25.0)	0 (0)	4 (12.5)	4 (44.4)	2 (7.1)	2 (8.0)	8 (12.9)	3 (37.50)	6 (33.30)	2 (15.40)	11 (28.20)
Quality of care																
Poor	2 (11.1)	0 (0)	1 (6.7)	3 (6.3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.0)	1 (3.3)	0 (0.0)	1 (1.6)	1 (12.5)	2 (10.5)	1 (7.7)	4 (10.0)
Fair	7 (38.9)	6 (40.0)	3 (20.0)	16 (33.3)	1 (11.1)	1 (12.5)	2 (14.3)	4 (12.9)	2 (25.0)	8 (26.7)	7 (26.9)	17 (26.6)	0 (0.0)	7 (36.8)	7 (53.8)	14 (35.0)
Good	9 (50.0)	8 (53.3)	9 (60.0)	26 (54.2)	6 (66.7)	7 (87.5)	10 (71.4)	23 (74.2)	5 (62.5)	14 (46.7)	11 (42.3)	30 (46.9)	5 (62.5)	7 (36.8)	5 (38.5)	17 (42.5)
Excellent	0 (0)	1 (6.7)	2 (13.3)	3 (6.3)	2 (22.2)	0 (0)	2 (14.3)	4 (12.9)	1 (12.5)	7 (23.3)	8 (30.8)	16 (25.0)	2 (25.0)	3 (15.8)	0 (0.0)	5 (12.5)
Grade of patient safety																
Failing	-	-	-	-	-	-	-	-	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (12.50)	1 (5.30)	1 (7.70)	3 (7.50)
Poor	-	-	-	-	-	-	-	-	1 (11.1)	1 (3.3)	1 (3.8)	3 (4.6)	0 (0.00)	3 (15.80)	0 (0.00)	3 (7.50)
Acceptable	-	-	-	-	-	-	-	-	3 (33.3)	15 (50.0)	6 (23.1)	24 (36.9)	5 (62.50)	9 (47.40)	8 (61.50)	22 (55.00)
Very good	-	-	-	-	-	-	-	-	4 (44.4)	10 (33.3)	14 (53.8)	28 (43.1)	2 (25.00)	5 (26.30)	4 (30.80)	11 (27.50)
Excellent	-	-	-	-	-	-	-	-	1 (11.1)	4 (13.3)	5 (19.2)	10 (15.4)	0 (0.00)	1 (5.30)	0 (0.00)	1 (2.50)
Quality of care, last 6 months																
Deteriorated	-	-	-	-	-	-	-	-	1 (12.5)	2 (6.9)	4 (15.4)	7 (11.1)	4 (50.0)	9 (47.4)	8 (61.5)	21 (52.5)
Remained the same	-	-	-	-	-	-	-	-	3 (37.5)	10 (34.5)	15 (57.7)	28 (44.4)	3 (37.5)	9 (47.4)	4 (30.8)	16 (40.0)
Improved	-	-	-	-	-	-	-	-	4 (50.0)	17 (58.6)	7 (26.9)	28 (44.4)	1 (12.5)	1 (5.3)	1 (7.7)	3 (7.5)

Table: 3.4.3.2: Quality of care for Hospital 2

Quality of care, n (%)	Time 1			Transition			Time 2			Time 3		
	Ward 22 (n = 16)	Ward 23 (n = 14)	Total (n = 30)	Ward 22 (n = 11)	Ward 23 (n = 11)	Total (n = 22)	Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)	Ward 22 (n = 7)	Ward 23 (n = 7)	Total (n = 14)
Time to deliver care												
Less time than usual	10 (62.5)	4 (30.8)	14 (48.3)	3 (27.3)	2 (20.0)	5 (23.8)	3 (18.8)	2 (13.3)	5 (16.1)	3.00 (42.90)	3.00 (50.00)	6.00 (46.20)
About the same amount of time	5 (31.3)	8 (61.5)	13 (44.8)	4 (36.4)	7 (70.0)	11 (52.4)	8 (50.0)	11 (73.3)	19 (61.3)	3.00 (42.90)	1.00 (16.70)	4.00 (30.80)
More time than usual	1 (6.3)	1 (7.7)	2 (6.9)	4 (36.4)	1 (10.0)	5 (23.8)	5 (31.3)	2 (13.3)	7 (22.6)	1.00 (14.30)	2.00 (33.30)	3.00 (23.10)
Additional time needed												
No more time needed	0 (0)	0 (0)	0 (0)	0 (0)	1 (11.1)	1 (5.0)	0 (0.0)	1 (7.1)	4 (13.3)	0 (0.00)	1 (16.70)	1 (7.70)
Less than 15 minutes	0 (0)	0 (0)	0 (0)	1 (9.1)	0 (0)	1 (5.0)	1 (11.1)	2 (14.3)	3 (10.0)	2 (28.60)	0 (0.00)	2 (15.40)
15 to 30 minutes	5 (31.3)	3 (23.1)	8 (27.6)	2 (18.2)	2 (22.2)	4 (20.0)	2 (22.2)	7 (50.0)	11 (36.7)	0 (0.00)	0 (0.00)	0 (0.00)
31 to 45 minutes	2 (12.5)	4 (30.8)	6 (20.7)	3 (27.3)	3 (33.3)	6 (30.0)	1 (11.1)	0 (0.0)	3 (10.0)	1 (14.30)	0 (0.00)	1 (7.70)
46 to 60 minutes	2 (12.5)	2 (15.4)	4 (13.8)	1 (9.1)	1 (11.1)	2 (10.0)	1 (11.1)	1 (7.1)	2 (6.7)	2 (28.60)	0 (0.00)	2 (15.40)
Greater than 60 minutes	7 (43.8)	4 (30.8)	11 (37.9)	4 (36.4)	2 (22.2)	6 (30.0)	4 (44.4)	5 (26.3)	7 (23.3)	2 (28.60)	5 (83.30)	7 (53.80)
Quality of care												
Poor	3 (18.8)	0 (0)	3 (10.3)	2 (18.2)	0 (0)	2 (9.5)	0 (0.0)	1 (6.7)	1 (3.2)	0 (0.0)	0 (0.0)	0 (0.0)
Fair	5 (31.3)	2 (15.4)	7 (24.1)	4 (36.4)	4 (40.0)	8 (38.1)	5 (31.3)	1 (6.7)	6 (19.4)	0 (0.0)	1 (16.7)	1 (7.7)
Good	7 (43.8)	10 (76.9)	17 (58.6)	4 (36.4)	4 (40.0)	8 (38.1)	6 (37.5)	11 (73.3)	17 (54.8)	7 (100.0)	5 (83.3)	12 (92.3)
Excellent	1 (6.3)	1 (7.7)	2 (6.9)	1 (9.1)	2 (20.0)	3 (14.3)	5 (31.3)	2 (13.3)	7 (22.6)	0 (0.0)	0 (0.0)	0 (0.0)
Grade of patient safety												
Failing	-	-	-	-	-	-	2 (12.5)	0 (0.0)	2 (6.5)	1 (14.30)	0 (0.00)	1 (7.70)
Poor	-	-	-	-	-	-	3 (18.8)	2 (13.3)	5 (16.1)	0 (0.00)	0 (0.00)	0 (0.00)
Acceptable	-	-	-	-	-	-	8 (50.0)	2 (13.3)	10 (32.3)	1 (14.30)	2 (33.30)	3 (23.10)
Very good	-	-	-	-	-	-	3 (18.8)	7 (46.7)	10 (32.3)	5 (71.40)	3 (50.00)	8 (61.50)
Excellent	-	-	-	-	-	-	0 (0.0)	4 (26.7)	4 (12.9)	0 (0.00)	1 (16.70)	1 (7.70)
Quality of care, last 6 months												
Deteriorated	-	-	-	-	-	-	7 (43.8)	2 (13.3)	9 (29.0)	1 (14.3)	3 (50.0)	4 (30.8)
Remained the same	-	-	-	-	-	-	9 (56.3)	11 (73.3)	20 (64.5)	5 (71.4)	2 (33.3)	7 (53.8)
Improved	-	-	-	-	-	-	0 (0.0)	2 (13.3)	2 (6.5)	1 (14.3)	1 (16.7)	2 (15.4)

Table: 3.4.3.3: Quality of care for Hospital 3

Quality of care, n (%)	**Time 1** Ward 31 (n = 22)	**Transition** Ward 31 (n = 23)	**Time 2** Ward 31 (n = 20)	**Time 3** Ward 31 (n = 23)
Time to deliver care				
Less time than usual	2 (9.5)	6 (26.1)	11 (55.0)	7.00 (30.40)
About the same amount of time	9 (42.9)	9 (39.1)	4 (20.0)	14.00 (60.90)
More time than usual	10 (47.6)	8 (34.8)	5 (25.0)	2.00 (8.70)
Additional time needed				
No more time needed	1 (5.0)	0 (0)	0 (0.0)	1 (4.50)
Less than 15 minutes	0 (0)	0 (0)	1 (5.3)	2 (9.10)
15 to 30 minutes	11 (55.0)	13 (59.1)	8 (42.1)	10 (45.50)
31 to 45 minutes	4 (20.0)	4 (18.2)	4 (21.1)	3 (13.60)
46 to 60 minutes	2 (10.0)	3 (13.6)	1 (5.3)	2 (9.10)
Greater than 60 minutes	2 (10.0)	2 (9.1)	5 (26.3)	4 (18.20)
Quality of care				
Poor	0 (0)	2 (8.7)	1 (5.0)	0 (0.0)
Fair	7 (31.8)	10 (43.5)	13 (65.0)	4 (17.4)
Good	14 (63.6)	11 (47.8)	5 (25.0)	13 (56.5)
Excellent	1 (4.5)	0 (0)	1 (5.0)	6 (26.1)
Grade of patient safety				
Failing	-	-	2 (10.0)	0 (0.00)
Poor	-	-	4 (20.0)	2 (8.70)
Acceptable	-	-	12 (60.0)	12 (52.20)
Very good	-	-	2 (10.0)	7 (30.40)
Excellent	-	-	0 (0.0)	2 (8.70)
Quality of care, last 6 months				
Deteriorated	-	-	7 (36.8)	1 (4.3)
Remained the same	-	-	12 (63.2)	16 (69.6)
Improved	-	-	0 (0.0)	6 (26.1)

Table: 3.4.3.4: Quality of care overall total for Hospitals 1, 2 and 3

Quality of care, n (%)	**Time 1** (n = 101)	**Transition** (n = 79)	**Time 2** (n = 116)	**Time 3** (n = 77)
Time to deliver care				
Less time than usual	34 (34.7)	17 (22.4)	29 (25.4)	30.00 (39.50)
About the same amount of time	47 (48.0)	39 (51.3)	62 (54.4)	38.00 (50.00)
More time than usual	17 (17.3)	20 (26.3)	23 (20.2)	8.00 (10.50)
Additional time needed				
No more time needed	3 (3.2)	5 (6.8)	16 (14.4)	7 (9.50)
Less than 15 minutes	2 (2.1)	7 (9.5)	10 (9.0)	6 (8.10)
15 to 30 minutes	29 (30.5)	24 (32.4)	40 (36.0)	18 (24.30)
31 to 45 minutes	15 (15.8)	14 (18.9)	11 (9.9)	9 (12.20)
46 to 60 minutes	14 (14.7)	12 (16.2)	14 (12.6)	12 (16.20)
Greater than 60 minutes	32 (33.7)	12 (16.2)	20 (18.0)	22 (29.70)
Quality of care				
Poor	6 (6.1)	4 (5.3)	3 (2.6)	4 (5.3)
Fair	30 (30.3)	22 (29.3)	36 (31.3)	19 (25.0)
Good	57 (57.6)	42 (56.0)	52 (45.2)	42 (55.3)
Excellent	6 (6.1)	7 (9.3)	24 (20.9)	11 (14.5)
Grade of patient safety				
Failing	-	-	4 (3.4)	4 (5.30)
Poor	-	-	12 (10.3)	5 (6.60)
Acceptable	-	-	46 (39.7)	37 (48.70)
Very good	-	-	40 (34.5)	26 (34.20)
Excellent	-	-	14 (12.1)	4 (5.30)
Quality of care, last 6 months				
Deteriorated	-	-	23 (20.4)	26 (34.2)
Remained the same	-	-	60 (53.1)	39 (51.3)
Improved	-	-	30 (26.5)	11 (14.5)

3.4.4 Care Left Undone and Delayed

The descriptive statistics of care left undone (CLU) 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.

Across all phases of the research, the items of care most frequently reported as undone were comfort/talk with patients, the education of patients, patient surveillance and nursing documentation. The items least frequently left undone were pain management and recording vital signs. The mean number of items of care undone and the number of shifts where at least one item of care was left undone is reported in Tables 3.4.4.1, 3.4.4.2, 3.4.4.3 and 3.4.4.4, at both hospital and ward level. In Time 1, 75.6% of nurses reported that at least one necessary item of care was left undone due to lack of time on their last shift while 61.9% reported the same in the Transition phase, which further dropped to 31.8% in Time 2. A small increase was recorded in Time 3 with 39.3% of respondents reporting that at least one necessary item of care was left undone but this remained below the baseline at Time 1. Overall, an average of 2.51 care activities were left undone per shift in Time 1 while 1.94 activities, on average, were left undone at Transition, 0.75 undone at Time 2 and 1.08 undone at Time 3. Figures indicate a downward trend in the mean number of care activities being left undone across Wards 1, 2, 3, 22 and 23, between Times 1 and 2, and Times 1 and 3. However, a slight increase in the number of care activities left undone was observed at Time 3 across Wards 1, 2, 3, 22 and 23 in comparison to Time 2. While Ward 31 saw a slight increase at Time 2 compared to Time 1, an overall decrease in the number of activities left undone per shift was observed at Time 3 in comparison to both Time 1 and Time 2.

The most common items of care delayed were providing physical support (washing, mobilising, toileting) to patients, observation of vital signs, adequate patient surveillance, updating documentation, educating patients and families and administering medications. Pain management and planning of care were the least frequently delayed care tasks. The mean number of items of care delayed and the number of shifts where at least one item of care was delayed is reported in Tables 3.4.4.1, 3.4.4.2, 3.4.4.3 and 3.4.4.4, at hospital and ward level.

In Time 1, 93.3% of staff reported at least one care task was delayed on their last shift while, 88.9%, 84.1% and 95% reported the same at Transition, Time 2 and Time 3 respectively. Overall, an average of 5.43 activities per shift were reported as delayed in Time 1 while 4.17 were reported as delayed at Transition which had a slight increase to 4.92 at Time 2 and further increasing to 6.56 at Time 3. Further research is needed to ascertain why previous reductions in the number of care activities delayed per shift have not been retained at Time 3 and why the number of tasks delayed per shift is at a higher level at Time 3 in comparison to previous phases of research. One explanation may be that following the implementation, staff have more time to complete tasks (CLUEs reducing) however, not enough time to complete the tasks without delay.

A single item also assessed if staff meal breaks had been missed or delayed due to lack of time. In Time 1, 50.0% of RNs reported missed meal breaks, while 48.9% reported delayed meal breaks. There was a substantial decrease in the proportion of staff reporting missed meal breaks at Time 2 (22.7%) while delayed meal breaks remained similar (47.7%) at Time 2. The decrease in the proportion of staff reporting missed meal breaks fell further at Time 3 (15.3%) while the reported delayed meal breaks remained similar (45.8%).

Table: 3.4.4.1: Care left undone and care delayed for Hospital 1

Only for RNs CLUEs	Time 1				Transition				Time 2				Time 3			
	Ward 1 (n = 19)	Ward 2 (n = 15)	Ward 3 (n = 15)	Total (n = 49)	Ward 1 (n = 10)	Ward 2 (n = 8)	Ward 3 (n = 16)	Total (n = 34)	Ward 1 (n = 9)	Ward 2 (n = 30)	Ward 3 (n = 26)	Total (n = 65)	Ward 1 (n = 8)	Ward 2 (n = 19)	Ward 3 (n = 13)	Total (n = 32)
Number of activities undone, mean (SD)	2.94 (2.39)	2.80 (1.74)	1.92 (2.39)	2.61 (2.17)	4.75 (3.15)	2.00 (2.56)	1.00 (1.35)	2.36 (2.75)	0.89 (1.54)	0.24 (0.62)	0.35 (0.75)	0.40 (0.90)	1.29 (1.38)	1.07 (1.28)	1.70 (2.06)	1.31 (1.55)
Shifts with at least one item undone, n (%)	15 (83.3)	13 (86.7)	9 (69.2)	37 (80.4)	7 (87.5)	6 (75.0)	6 (50.0)	19 (67.9)	3 (33.3)	3 (14.3)	4 (20.0)	10 (20.0)	5 (71.4)	7 (46.7)	5 (50.0)	17 (53.1)
Number of activities delayed, mean (SD)	6.06 (4.09)	3.67 (2.58)	4.76 (3.06)	4.98 (3.47)	5.00 (4.11)	3.63 (3.46)	1.50 (1.78)	3.11 (3.33)	4.78 (2.05)	3.29 (3.30)	3.20 (4.01)	3.52 (3.42)	4.57 (4.24)	6.40 (3.98)	5.60 (4.65)	5.75 (4.17)
Shifts with at least one item delayed, n (%)	1 (100.0)	12 (80.0)	12 (92.3)	42 (91.3)	7 (87.5)	7 (87.5)	8 (66.7)	22 (78.6)	9 (100.0)	16 (76.2)	12 (60.0)	37 (74.0)	6 (85.7)	15 (100.0)	10 (100.0)	31 (96.9)
Meal break missed, n (%)	14 (77.8)	9 (60.0)	3 (23.1)	26 (56.5)	7 (87.5)	2 (25.0)	4 (33.3)	13 (46.4)	2 (22.2)	2 (9.5)	4 (20.0)	8 (16.0)	1 (14.3)	2 (14.3)	1 (11.1)	4 (13.3)
Meal break delayed, n (%)	11 (61.1)	5 (33.3)	8 (8.9)	24 (52.2)	3 (37.5)	2 (25.0)	3 (25.0)	8 (28.6)	4 (44.4)	4 (20.0)	10 (50.0)	22 (44.0)	1 (14.3)	4 (28.6)	7 (77.8)	12 (40.0)
Meal break missed & delayed, n (%)	-	-	-	-	-	-	-	-	-	-	-	-	1 (14.3)	3 (21.4)	0 (0.0)	4 (13.3)

Table: 3.4.4.2: Care left undone and care delayed for Hospital 2

Only for RNs CLUEs	Time 1			Transition			Time 2			Time 3		
	Ward 22 (n = 16)	Ward 23 (n = 14)	Total (n = 30)	Ward 22 (n = 11)	Ward 23 (n = 11)	Total (n = 22)	Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)	Ward 22 (n = 7)	Ward 23 (n = 7)	Total (n = 14)
Number of activities undone, mean (SD)	3.50 (2.50)	2.00 (2.22)	2.75 (2.44)	1.88 (2.30)	2.38 (1.92)	2.13 (2.06)	0.36 (0.50)	0.91 (1.38)	0.64 (0.90)	0.60 (1.34)	1.67 (1.86)	1.18 (1.66)
Shifts with at least one item undone, n (%)	11 (91.7)	6 (50.0)	17 (70.8)	4 (50.0)	6 (75.0)	10 (62.5)	4 (36.4)	4 (36.4)	8 (28.6)	1 (20.0)	3 (50.0)	4 (36.4)
Number of activities delayed, mean (SD)	6.92 (3.70)	4.91 (3.45)	5.83 (3.19)	5.63 (2.92)	3.75 (2.87)	4.69 (2.96)	7.27 (4.84)	4.27 (3.20)	5.77 (4.29)	8.20 (5.36)	7.67 (4.93)	7.91 (4.87)
Shifts with at least one item delayed, n (%)	11 (91.7)	12 (100.0)	23 (95.8)	8 (100.0)	7 (87.5)	15 (93.8)	11 (100.0)	10 (90.9)	21 (95.5)	5 (100.0)	5 (83.3)	10 (90.9)
Meal break missed, n (%)	9 (75.0)	7 (58.3)	16 (66.7)	7 (87.5)	7 (87.5)	14 (87.5)	6 (54.5)	5 (45.5)	11 (50.0)	1 (20.0)	4 (66.7)	5 (45.5)
Meal break delayed, n (%)	5 (41.7)	9 (75.0)	14 (58.3)	3 (37.5)	6 (75.0)	9 (56.3)	4 (36.4)	2 (18.2)	6 (27.3)	2 (40.0)	1 (16.7)	3 (27.3)
Meal break missed & delayed, n (%)	-	-	-	-	-	-	-	-	-	2 (40.0)	1 (16.7)	3 (27.3)

Table: 3.4.4.3: Care left undone and care delayed for Hospital 3

CLUEs	Time 1 Ward 31 (n = 22)	Transition Ward 31 (n = 23)	Time 2 Ward 31 (n = 20)	Time 3 Ward 31 (n = 23)
Number of activities undone, mean (SD)	2.00 (1.92)	1.16 (1.71)	2.19 (2.64)	0.61 (1.42)
Shifts with at least one item undone, n (%)	14 (70.0)	10 (52.6)	10 (35.7)	3 (16.7)
Number of activities delayed, mean (SD)	6.15 (3.98)	5.32 (3.00)	8.13 (3.16)	7.17 (4.59)
Shifts with at least one item delayed, n (%)	19 (95.0)	19 (100.0)	16 (100.0)	17 (94.4)
Meal break missed, n (%)	3 (15.0)	1 (5.3)	1 (6.3)	0 (0.0)
Meal break delayed, n (%)	6 (30.0)	6 (31.6)	14 (87.5)	12 (66.7)
Meal break missed & delayed, n (%)				0 (0.0)

Table: 3.4.4.4: Care left undone and care delayed overall total

CLUEs	Time 1 (n = 101)	Transition (n = 79)	Time 2 (n = 116)	Time 3 (n = 77)
Number of activities undone, mean (SD)	2.51 (2.18)	1.94 (2.33)	0.75 (1.54)	1.08 (1.54)
Shifts with at least one item undone, n (%)	68 (75.6)	39 (61.9)	28 (31.8)	24 (39.3)
Number of activities delayed, mean (SD)	5.43 (3.51)	4.17 (3.25)	4.92 (3.99)	6.56 (4.44)
Shifts with at least one item delayed, n (%)	84 (93.3)	56 (88.9)	74 (84.1)	58 (95.1)
Meal break missed, n (%)	45 (50.0)	28 (44.4)	20 (22.7)	9 (15.3)
Meal break delayed, n (%)	44 (48.9)	23 (36.5)	42 (47.7)	27 (45.8)
Meal break missed & delayed, n (%)				7 (11.9)

3.4.5 Job Satisfaction and Intention to Leave

The respondents' level of job satisfaction by ward, ranging from very dissatisfied to very satisfied, in all time-points of the research is outlined in Tables 3.4.5.1, 3.4.5.2, 3.4.5.3, 3.4.5.4. In Time 1, the highest levels of job dissatisfaction were reported in Wards 1, 22 and 23. Approximately one quarter of respondents in the remaining wards reported some level of job dissatisfaction while staff in Hospital 3 reported the highest levels of job satisfaction. In Time 2, there was an increase in the number of staff expressing levels of job satisfaction in Wards 1, 2, 3, and 23. However, only Ward 23 sustained this increase at Time 3. In Ward 31 there were more instances of job dissatisfaction in Time 2 compared to Time 1, however job satisfaction increased at Time 3 (following implementation) but is not equivalent to that Time 1 (prior to implementation).

Overall, the level of job satisfaction was higher at Transition and Time 2 time-points (i.e. following the introduction of the recommendations in the *Framework*) when compared to Time 1; however, this has decreased to similar to that of the baseline at Time 3. For example, in Hospital 1, which received the majority of the staffing uplifts, overall levels of job satisfaction increased from 56.3% in Time 1 to 86.1% in Time 2 but has decreased to 43.6%; Hospital 2 increased from 23.3% of staff satisfied in their current job in Time 1 to 46.7% in Time 2 and has further increased to 58.3% at Time 3; however, Hospital 3 recorded a drop in levels of job satisfaction from 90.0% in Time 1 to 50.0% in Time 2; however, it has increased in Time 3 to 73.9%[20].

The respondents' intention to leave is reported for all Phases in Tables 3.4.5.1, 3.4.5.2, 3.4.5.3, 3.4.5.4. In Time 1, a large proportion of staff in Ward 1 (Hospital 1) and Wards 22 and 23 (Hospital 2) reported that they would 'probably' or 'definitely' leave their current employment. However, overall, the prevalence of intention to leave was lower at Transition and Time 2 when compared to Time 1. However, at Time 3 this had increased to the highest of all time-points. At Time 3, intention to leave is highest on Ward 3 (84.6%), Ward 1 (75.0%) and Ward 2 (52.6%). An additional question at Time 3 asked respondents to state their reason for selecting probably/definitely will leave. Of those, that made this selection at Time 3 and gave a reason for leaving: 73% stated that this was due to job dissatisfaction; Ward 1 (100.0%), Ward 2 (80.0%), Ward 3 (90.9%).

Additional items measuring staff levels of job satisfaction were measured at Time 2 and Time 3. A single item measure asked staff to indicate how satisfied they were in their role as either a nurse or a HCA on a 4-point scale ranging from 'very dissatisfied' to 'very satisfied'. Overall, the majority of staff at Time 2 (81.9%) and Time 3 (72%) indicated that they were 'satisfied' or 'very satisfied' in their role.

A single-item measure asked staff to rate how likely they would be to recommend their ward to a colleague on four-point scale ranging from 'definitely no' to 'definitely yes'. The majority of staff at both Time 2 (62%) and Time 3 (56.8%) reported that they 'probably' or 'definitely' would recommend the ward to a colleague.

[20] This ward underwent a number of changes during the timeframe of the research, including a change in ward leadership and a change in patient profile; in particular, the change in patient profile required an increase in one-to-one specialling.

A single-item measure asked staff to rate how likely they would be to recommend their ward to a family member or friend on four-point scale ranging from ‘definitely no’ to ‘definitely yes’. 81.8% of staff at Time 2 said they ‘probably’ or ‘definitely’ would recommend the ward to a family member or friend while 66.6% of staff at Time 3 indicated the same.

Table: 3.4.5.1: Job satisfaction and intention to leave for Hospital 1

Job Satisfaction and Intention to leave/stay	**Time 1**				**Transition**				**Time 2**				**Time 3**			
n (%)	Ward 1 (n = 19)	Ward 2 (n = 15)	Ward 3 (n = 15)	Total (n = 49)	Ward 1 (n = 10)	Ward 2 (n = 8)	Ward 3 (n = 16)	Total (n = 34)	Ward 1 (n = 9)	Ward 2 (n = 30)	Ward 3 (n = 26)	Total (n = 65)	Ward 1 (n = 8)	Ward 2 (n = 19)	Ward 3 (n = 13)	Total (n = 32)
Satisfaction with current job																
Very dissatisfied	2 (10.5)	0 (0)	0 (0)	2 (4.2)	1 (10.0)	0 (0)	1 (6.7)	2 (6.1)	1 (11.1)	0 (0.0)	0 (0.0)	1 (1.5)	2 (25.0)	4 (21.1)	2 (16.7)	8 (20.5)
Dissatisfied	11 (57.9)	4 (26.7)	4 (26.7)	19 (39.6)	1 (10.0)	1 (12.5)	1 (6.7)	3 (9.1)	0 (0.0)	4 (13.3)	4 (15.4)	8 (12.3)	4 (50.0)	7 (36.8)	3 (25.0)	14 (35.9)
Satisfied	6 (31.6)	10 (66.7)	10 (71.4)	26 (54.2)	6 (60.0)	7 (87.5)	10 (66.7)	23 (69.7)	7 (77.8)	22 (73.3)	18 (69.2)	47 (72.3)	1 (12.5)	6 (31.6)	7 (58.3)	14 (35.9)
Very satisfied	0 (0)	1 (6.7)	0 (0)	1 (2.1)	2 (20.0)	0 (0)	3 (20.0)	5 (15.2)	1 (11.1)	4 (13.3)	4 (15.4)	9 (13.8)	1 (12.5)	2 (10.5)	0 (0.0)	3 (7.7)
Satisfaction with being a nurse/HCA																
Very dissatisfied	-	-	-	-	-	-	-	-	1 (11.1)	0 (0.0)	0 (0.0)	1 (1.5)	1 (12.5)	1 (5.3)	2 (15.4)	4 (10.0)
Dissatisfied	-	-	-	-	-	-	-	-	2 (22.2)	4 (13.3)	3 (11.5)	9 (13.8)	2 (25.0)	2 (10.5)	5 (38.5)	9 (22.5)
Satisfied	-	-	-	-	-	-	-	-	4 (44.4)	19 (63.3)	10 (38.5)	33 (50.8)	3 (37.5)	14 (73.7)	4 (30.8)	21 (52.5)
Very satisfied	-	-	-	-	-	-	-	-	2 (22.2)	7 (23.3)	13 (50.0)	22 (33.8)	2 (25.0)	2 (10.5)	2 (15.4)	6 (15.0)
Recommend ward to colleague																
Definitely no	-	-	-	-	-	-	-	-	0 (0.0)	1 (3.3)	3 (11.5)	4 (6.2)	1 (12.5)	4 (22.2)	3 (23.1)	8 (20.5)
Probably no	-	-	-	-	-	-	-	-	1 (11.1)	6 (20.0)	5 (19.2)	12 (18.5)	1 (12.5)	7 (38.9)	4 (30.8)	12 (30.8)
Probably yes	-	-	-	-	-	-	-	-	7 (77.8)	16 (53.3)	11 (42.3)	34 (52.3)	4 (50.0)	4 (22.2)	5 (38.5)	13 (33.3)
Definitely yes	-	-	-	-	-	-	-	-	1 (11.1)	7 (23.3)	7 (26.9)	15 (23.1)	2 (25.0)	3 (16.7)	1 (7.7)	6 (15.4)
Recommend ward to family/friends																
Definitely no	-	-	-	-	-	-	-	-	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (12.5)	3 (15.8)	2 (15.4)	6 (15.0)
Probably no	-	-	-	-	-	-	-	-	1 (11.1)	4 (13.3)	3 (12.0)	8 (12.5)	2 (25.0)	4 (21.1)	3 (23.1)	9 (22.5)
Probably yes	-	-	-	-	-	-	-	-	6 (66.7)	13 (43.3)	10 (40.0)	29 (45.3)	3 (37.5)	5 (26.3)	7 (53.8)	15 (37.5)
Definitely yes	-	-	-	-	-	-	-	-	2 (22.2)	13 (43.3)	12 (48.0)	27 (42.2)	2 (25.0)	7 (36.8)	1 (7.7)	10 (25.0)
Feelings about future																
Definitely will leave	3 (15.8)	1 (6.7)	4 (26.7)	8 (16.7)	1 (10.0)	1 (14.3)	3 (21.4)	5 (16.1)	4 (44.4)	4 (13.8)	1 (3.8)	9 (14.1)	3 (37.5)	5 (26.3)	7 (53.8)	15 (37.5)
Probably will leave	10 (52.6)	5 (33.3)	2 (13.3)	17 (35.4)	3 (30.0)	3 (42.9)	5 (35.7)	11 (35.5)	1 (11.1)	10 (34.5)	9 (34.6)	20 (31.3)	3 (37.5)	5 (26.3)	4 (30.8)	12 (30.0)
Probably will not leave	5 (26.3)	8 (53.3)	6 (40.0)	19 (39.6)	3 (30.0)	3 (42.9)	3 (21.4)	9 (29.0)	4 (44.4)	10 (34.5)	13 (50.0)	27 (42.2)	0 (0.0)	7 (36.8)	1 (7.7)	8 (20.0)
Definitely will not leave	1 (5.3)	1 (6.7)	2 (13.3)	4 (8.3)	3 (30.0)	0 (0)	3 (21.4)	6 (19.4)	0 (0.0)	5 (17.24)	3 (11.5)	8 (12.5)	2 (25.0)	2 (10.5)	1 (7.7)	5 (12.5)
Reason is job dissatisfaction	-	-	-	-	-	-	-	-	3 (60.0)	6 (42.9)	6 (60.0)	15 (51.7)	6 (100.0)	8 (80.0)	10 (90.9)	24 (88.9)

Table: 3.4.5.2: Job satisfaction and intention to leave for Hospital 2

Job Satisfaction and Intention to leave	Time 1			Transition			Time 2			Time 3		
	Ward 22 (n = 16)	Ward 23 (n = 14)	Total (n = 30)	Ward 22 (n = 11)	Ward 23 (n = 11)	Total (n = 22)	Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)	Ward 22 (n = 7)	Ward 23 (n = 7)	Total (n = 14)
Satisfaction with current job												
Very dissatisfied	7 (43.8)	4 (28.6)	11 (36.7)	1 (9.1)	1 (10.0)	2 (9.5)	4 (26.7)	0 (0.0)	4 (13.3)	0 (0.0)	1 (16.7)	1 (8.3)
Dissatisfied	7 (43.8)	5 (35.7)	12 (40.0)	8 (72.7)	5 (50.0)	13 (61.9)	6 (40.0)	6 (40.0)	12 (40.0)	2 (33.3)	2 (33.3)	4 (33.3)
Satisfied	2 (12.5)	5 (35.7)	7 (23.3)	2 (18.2)	4 (40.0)	6 (28.6)	5 (33.3)	7 (46.7)	12 (40.0)	3 (50.0)	3 (50.0)	6 (50.0)
Very satisfied	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0.0)	2 (13.3)	2 (6.7)	1 (16.7)	0 (0.0)	1 (8.3)
Satisfaction with being a nurse												
Very dissatisfied	-	-	-	-	-	-	1 (6.3)	1 (6.7)	2 (6.5)	0 (0.0)	1 (16.7)	1 (8.3)
Dissatisfied	-	-	-	-	-	-	3 (18.8)	3 (20.0)	6 (19.4)	4 (66.7)	0 (0.0)	4 (33.3)
Satisfied	-	-	-	-	-	-	4 (25.0)	8 (53.3)	12 (38.7)	2 (33.3)	3 (50.0)	5 (41.7)
Very satisfied	-	-	-	-	-	-	8 (50.0)	3 (20.0)	11 (35.5)	0 (0.0)	2 (33.3)	2 (16.7)
Recommend ward to colleague												
Definitely no	-	-	-	-	-	-	5 (31.3)	1 (6.7)	6 (19.4)	0 (0.0)	0 (0.0)	0 (0.0)
Probably no	-	-	-	-	-	-	6 (37.5)	4 (26.7)	10 (32.3)	2 (33.3)	2 (33.3)	4 (33.3)
Probably yes	-	-	-	-	-	-	5 (31.3)	4 (40.0)	11 (35.5)	3 (50.0)	4 (66.7)	7 (58.3)
Definitely yes	-	-	-	-	-	-	0 (0.0)	4 (26.7)	4 (12.9)	1 (16.7)	0 (0.0)	1 (8.3)
Recommend ward to family/friends												
Definitely no	-	-	-	-	-	-	3 (18.8)	0 (0.0)	3 (9.7)	0 (0.0)	0 (0.0)	0 (0.0)
Probably no	-	-	-	-	-	-	4 (25.0)	0 (0.0)	4 (12.9)	1 (16.7)	2 (33.3)	3 (25.0)
Probably yes	-	-	-	-	-	-	8 (50.0)	7 (46.7)	15 (48.4)	4 (66.7)	2 (33.3)	6 (50.0)
Definitely yes	-	-	-	-	-	-	1 (6.3)	8 (53.3)	9 (29.0)	1 (16.7)	2 (33.3)	3 (25.0)
Feelings about future												
Definitely will leave	4 (25.0)	1 (7.1)	5 (16.7)	3 (27.3)	1 (11.1)	4 (20.0)	3 (18.3)	1 (6.7)	4 (12.9)	0 (0.0)	1 (20.0)	1 (9.1)
Probably will leave	9 (56.3)	7 (50.0)	16 (53.3)	6 (54.5)	1 (11.1)	7 (35.0)	7 (43.8)	5 (33.3)	12 (38.7)	4 (66.7)	1 (20.0)	5 (45.5)
Probably will not leave	3 (18.8)	4 (28.6)	7 (23.3)	2 (18.2)	6 (66.7)	8 (40.0)	5 (31.3)	8 (53.3)	13 (41.9)	2 (33.3)	2 (40.0)	4 (36.4)
Definitely will not leave	0 (0)	2 (14.3)	2 (6.7)	0 (0)	1 (11.1)	1 (5.0)	1 (6.3)	1 (6.7)	2 (6.5)	0 (0.0)	1 (20.0)	1 (9.1)
Reason is job dissatisfaction							6 (60.0)	3 (50.0)	9 (56.3)	0 (0.0)	1 (100.0)	1 (25.0)

Table: 3.4.5.3: Job satisfaction and intention to leave for Hospital 3

Job Satisfaction and Intention to leave	**Time 1** Ward 31 (n = 22)	**Transition** Ward 31 (n = 23)	**Time 2** Ward 31 (n = 20)	**Time 3** Ward 31 (n = 23)
Satisfaction with current job				
Very dissatisfied	0 (0)	1 (4.5)	2 (10.0)	1 (4.3)
Dissatisfied	2 (10.0)	5 (22.7)	8 (40.0)	5 (21.7)
Satisfied	17 (85.0)	14 (63.6)	9 (45.0)	15 (65.2)
Very satisfied	1 (5.0)	2 (9.1)	1 (5.0)	2 (8.7)
Satisfaction with being a nurse				
Very dissatisfied	-	-	1 (5.0)	0 (0.0)
Dissatisfied	-	-	2 (10.0)	3 (13.0)
Satisfied	-	-	13 (65.0)	10 (43.5)
Very satisfied	-	-	4 (20.0)	10 (43.5)
Recommend ward to colleague				
Definitely no	-	-	3 (15.0)	2 (8.7)
Probably no	-	-	9 (45.0)	6 (26.1)
Probably yes	-	-	7 (35.0)	11 (47.8)
Definitely yes	-	-	1 (5.0)	4 (17.4)
Recommend ward to family/friends				
Definitely no	-	-	1 (5.0)	0 (0.0)
Probably no	-	-	5 (25.0)	7 (30.4)
Probably yes	-	-	10 (50.0)	10 (43.5)
Definitely yes	-	-	4 (20.0)	6 (26.1)
Feelings about future in hospital				
Definitely will leave	0 (0)	0 (0)	0 (0.0)	1 (4.3)
Probably will leave	5 (25.0)	6 (28.6)	8 (42.1)	5 (21.7)
Probably will not leave	7 (35.0)	10 (47.6)	8 (42.1)	12 (52.2)
Definitely will not leave	8 (40.0)	5 (23.8)	3 (15.8)	5 (21.7)
Reason is job dissatisfaction	-	-	4 (50.0)	2 (33.3)

Table: 3.4.5.4: Job satisfaction and intention to leave overall total

Job Satisfaction and Intention to leave	Time 1 (n = 101)	Transition (n = 79)	Time 2 (n = 116)	Time 3 (n = 77)
Satisfaction with current job				
Very dissatisfied	13 (13.3)	5 (6.6)	7 (6.1)	10 (13.5)
Dissatisfied	33 (33.7)	21 (27.6)	28 (24.3)	23 (31.1)
Satisfied	50 (51.0)	43 (56.6)	68 (59.1)	35 (47.3)
Very satisfied	2 (2.0)	7 (9.2)	12 (10.4)	6 (8.1)
Satisfaction with being a nurse				
Very dissatisfied	-	-	4 (3.4)	5 (6.7)
Dissatisfied	-	-	17 (14.7)	16 (21.3)
Satisfied	-	-	58 (50.0)	36 (48.0)
Very satisfied	-	-	37 (31.9)	18 (24.0)
Recommend ward to colleague				
Definitely no	-	-	13 (11.2)	10 (13.5)
Probably no	-	-	31 (26.7)	22 (29.7)
Probably yes	-	-	52 (44.8)	31 (41.9)
Definitely yes	-	-	20 (17.2)	11 (14.9)
Recommend ward to family/friends				
Definitely no	-	-	4 (3.5)	6 (8.0)
Probably no	-	-	17 (14.8)	19 (25.3)
Probably yes	-	-	54 (47.0)	31 (41.3)
Definitely yes	-	-	40 (34.8)	19 (25.3)
Feelings about future in hospital				
Definitely will leave	13 (13.3)	9 (12.5)	13 (11.4)	17 (23.0)
Probably will leave	38 (38.8)	24 (33.3)	40 (35.1)	22 (29.7)
Probably will not leave	33 (33.7)	27 (37.5)	48 (42.1)	24 (32.4)
Definitely will not leave	14 (14.3)	12 (16.7)	13 (11.4)	11 (14.9)
Reason is job dissatisfaction	-	-	28 (52.8)	27 (73.0)

3.4.6 Burnout[21]

The human services version of the Maslach Burnout Inventory (HS-MBI) (Maslach & Jackson 1996) was used to measure burnout. This is a 22-item survey with a 7-point scale (scores range from 0 to 6, see table 3.4.6.1 below). Individual items on the HS-MBI are used to create three subscales measuring three areas associated with burnout: emotional exhaustion, depersonalisation and personal accomplishment. The score on the subscale can then be compared to the overall scale to determine the level of burnout. This survey was added at Time 2 and as such comparisons cannot be made to previous time points, however, comparisons can be made with Time 3 scores. Higher scores on the emotional exhaustion and depersonalisation subscales indicate negative outcomes; higher scores on the personal accomplishment subscale indicate better outcomes.

Overall, staff scored relatively low on emotional exhaustion at both Time 2 and Time 3. However, total emotional exhaustion scores have increased at Time 3 in comparison to Time 2. The highest levels of emotional exhaustion were reported in Hospital 1. Staff on all three wards in Hospital 1 reported increased levels of emotional exhaustion at Time 3 in comparison to Time 2; at Time 2 staff in Hospital 1 reported being emotionally exhausted approximately once a month whereas at Time 3 staff reported feeling emotionally exhausted a few times a month to once a week.

Overall, staff scored relatively low on the depersonalisation subscale at both time points (few times a year – once a month). Increases in depersonalisation scores at Time 3 in comparison to Time 2 were recorded in all wards in Hospital 1 and Hospital 3 while depersonalisation scores decreased in Hospital 2.

Overall scores of personal accomplishment remained similar and relatively high across both time-points (once a week – few times a week). However, it should be noted that staff in Hospital 1, where the highest scores for emotional exhaustion and depersonalisation were recorded, reported decreased feelings of personal accomplishment at Time 3 in comparison to Time 2.

Table: 3.4.6.1: 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

[21] Further research is on-going in relation to staff burnout and comparative data over time will be available in subsequent phases of the research

Table: 3.4.7.2: Maslach burnout inventory scores for Hospital 1

	Time 1	Transition	Time 2				Time 3			
			Ward 1 (n = 9)	Ward 2 (n = 30)	Ward 3 (n = 26)	Total (n = 65)	Ward 1 (n = 8)	Ward 2 (n = 19)	Ward 3 (n = 13)	Total (n = 32)
Emotional Exhaustion	-	-	2.88 (1.47)	2.37 (1.31)	2.22 (1.29)	2.38 (1.32)	3.78 (2.03)	3.13 (1.37)	3.78 (1.23)	3.45 (1.47)
Depersonalisation	-	-	1.81 (1.05)	1.19 (1.03)	1.21 (1.04)	1.29 (1.04)	2.50 (0.86)	1.42 (0.95)	2.30 (1.51)	1.91 (1.21)
Personal Accomplishment	-	-	3.86 (1.24)	4.45 (0.75)	4.44 (0.81)	4.37 (0.87)	4.14 (1.11)	4.34 (0.98)	3.86 (0.81)	4.15 (0.96)

Table: 3.4.7.3: Maslach burnout inventory scores for Hospital 2

MBI	Time 1	Transition	Time 2			Time 3		
			Ward 22 (n = 16)	Ward 23 (n = 15)	Total (n = 31)	Ward 22 (n = 7)	Ward 23 (n = 7)	Total (n = 14)
Emotional Exhaustion	-	-	3.44 (1.26)	2.96 (1.67)	3.21 (1.46)	3.38 (1.14)	3.30 (1.74)	3.34 (1.38)
Depersonalisation	-	-	1.46 (1.37)	1.58 (1.38)	1.52 (1.35)	1.32 (1.07)	1.40 (1.52)	1.36 (1.24)
Personal Accomplishment	-	-	4.13 (1.19)	4.77 (0.78)	4.45 (1.05)	4.90 (0.93)	4.25 (1.26)	4.57 (1.11)

Table: 3.4.7.4: Maslach burnout inventory scores for Hospital 3

MBI	Time 1	Transition	Time 2 Ward 31 (n = 20)	Time 3 Ward 31 (n = 23)
Emotional Exhaustion	-	-	2.77 (1.27)	2.71 (1.40)
Depersonalisation	-	-	0.92 (0.98)	1.08 (1.47)
Personal Accomplishment	-	-	4.11 (0.98)	4.42 (0.65)

Table: 3.4.7.5: Maslach burnout inventory scores overall

MBI	Time 1	Transition	Time 2 (n = 116)	Time 3 (n = 77)
Emotional Exhaustion	-	-	2.67 (1.39)	3.20 (1.45)
Depersonalisation	-	-	1.29 (1.13)	1.57 (1.33)
Personal Accomplishment	-	-	4.34 (0.93)	4.30 (0.91)

3.4.7 Conclusion

Overall, 296 surveys were completed by staff across the three time periods. The majority of respondents were RNs with degree level education and had worked for an average of 12 years as a nurse or HCA.

Across all phases of data collection, it has been possible to gain insight into factors affecting nursing work on the study wards. There are a number of trends in the data when the time periods are compared. The number of patients per nursing staff member was observed to be reducing at Transition and this trend continued in Time 2 and 3. Measures of the nursing work environment also showed more favourable results at transition and Time 2 for a number of wards when compared to Time 1 and remained relatively consistent at Time 3. Of particular relevance was an increase in ratings of Staffing and Resource Adequacy in Time 2, however this had decreased slightly at Time 3 but remained above the scores reported at Time 1. There were also improvements in staff perceptions of collegiality between doctors and nurses, nurse manager ability, leadership and support, nurse participation in hospital affairs and the ability to apply nursing foundations for the quality of care in two of the three sites; these reflected the stabilisation of staffing in these areas.

The perception that staff felt they had less time to deliver care fell from Time 1 to Times 2 and 3 with a subsequent increase in staff reporting they did not require any additional time to provide patient care in Times 2 and 3 when compared to Time 1. Staff perceptions of the quality of care delivered, overall in the six wards remained stable between the two time periods; however, wards with a positive variation in staffing at Time 2 reported a substantial increase in respondents rating the quality of care delivered as either good or excellent. In particular, 44% of respondents in Hospital 1, which received the greatest uplift, reported that the quality of care had improved in the previous six months, while this decreased slightly at Time 3.

Across all phases of the research, the items of care most frequently reported as undone were comfort/talk with patients and educating patients and/or family. The items least frequently left undone were pain management and undertaking treatments/procedures. In Time 1, 75.6% of nurses reported that at least one necessary item of care was left undone due to lack of time on their last shift; this dropped to 31.8% in Time 2 and 39.3% in Time 3. Similarly, the mean number of items left undone also dropped substantially over the time period with an average of 2.51 care activities reported left undone per shift in Time 1 falling to 0.75 undone at Time 2 and remaining at 1.08 at Time 3.

Across all phases, the most common items of care delayed were recording/updating documentation, comfort/talk with patients, physical support, vital signs observation, adequate patient surveillance and administering medications. Pain management was the least frequently delayed task. In comparison to care left undone, care delayed showed less of a decline; however, overall, the trend was downwards. In Time 1, 93.3% of staff reported at least one care task was delayed on their last shift whereas 84.1% reported one or more tasks delayed in Time 2, which increased to 95.1% at Time 3. The mean number of care items delayed per shift also fell in Time 2 (4.92) compared to Time 1 (5.43) but increased at Time 3 (6.56). Missed meal breaks for

staff also fell proportionally, with 50% or RNs reporting a missed meal break in Time 1, this reduced to 22.7% in Time 2 and further reduced to 15.3% at Time 3.

Job satisfaction and intention to leave remained relatively similar at the overall level but demonstrate some differences at ward level. Both varied across wards, with high prevalence of dissatisfaction and intention to leave reported in Wards 1, 22 and 23 in Time 1. Intention to leave showed a more complex picture with variation across wards and sites. However, overall, the prevalence of intention to leave was lower at Transition and Time 2 time-points (i.e. following the introduction of the recommendations in the *Framework*) when compared to Time 1 but remained the same as Time 1 at Time 3, with a large proportion stating job dissatisfaction as the reason for intending to leave.

This phase of the research also measured burnout; however, as this measure was not included in the original pilot, comparisons are not available with the initial baseline stage. Overall, staff scored relatively low on emotional exhaustion and depersonalisation and relatively high on personal accomplishment. Higher scores on the emotional exhaustion and depersonalisation subscales indicate negative outcomes; higher scores on the personal accomplishment subscale indicate better outcomes. At Time 3, these either increased or remained relatively similar.

3.5 Economic Analysis[22]

The economic effect of the *intervention, i.e. the uplift,* is measured using two outcomes:

- cost of the uplift
- agency staff usage

Standard techniques are employed to estimate the cost of the additional staff using Department of Health salary scales. Whereby, the median value on the salary scale is used and adjusted for PRSI and pension (see Table 3.6.1).

With regards to agency staff usage both RNs and HCAs are considered. Here the monthly averages before and after the intervention are compared. These changes are then valued in monetary terms. Agency staff are valued using average hourly cost of agency (RNs and HCAs respectively) per ward (see Table 3.6.2). These costs were collected from the individual hospitals.

[22] This economic analysis was undertaken as part of the initial pilot project.

Table 3.5.1: Agency Costs as per Department of Health[23]

Basis of Calculation	Basic	Premia (20%)	Earnings	PRSI (10.75%)	Annual Cost
Nurse (Staff)	34,666[1]	6,933	41,599	4,472	46,071
Care Staff (Band 3)	30,107[1]	6,021	36,128	3,884	40,012

Source: Department of Health (2017)
[1]Mid-Point of DOH Salary Scale

Table 3.5.2: Average hourly RN and HCA agency costs

	RNs Average Hourly Cost €	HCAs Average Hourly Cost €
Ward A	53.67	31.70
Ward B	44.64	29.96
Ward C	48.79	32.17
Ward D	39.58	24.05
Ward E	39.58	24.05
Ward F	37.97	29.63

3.5.1 Cost of Uplift

Table 3.6.3 details the *uplift* in FTEs for RN and HCA. Four wards received an *uplift* with mixture of RN and HCAs in two, one ward received RN uplift only and the fourth received additional HCA only. Applying the annual costs provided by DOH (Table 3.6.1 - €46,071 for RNs and €40,012 for HCAs) the annual and monthly cost of the uplift is estimated for each ward and presented on Table 3.6.3. The uplift in Ward A (4.5 RNs and 4.5 HCAs) cost €387,374 annually. For Ward B, the uplift (12.3 RNs) cost €566,673 annually. In addition, the DOH reported that when calculating the 80/20-skill mix it became apparent that Ward B had more HCAs than required. Therefore, 0.4 of their substantive HCAs was converted to RN representing a net cost of €2,424 annually (€202 monthly). So the total uplift for Ward B cost €569,097 annually. The uplift in Ward C (7.4 RNs and 4.1 HCAs) cost €504,975 annually. Ward F had an uplift of 3.5 HCAs only, costing €140,042 annually. Wards D and E did not receive an uplift.

Therefore, the total cost of implementing the uplift was €1,601,487 across all wards annually. The DOH indicated that 61% of the uplift would be funded with direct investment by DOH; €954,893 (€79,574 monthly). The remainder of the uplift (7 RNs and 8.1 HCA) would be funded through converting agency to FTEs. Using salary costs provided this amounts to €646,594 annually (€53,883 monthly), representing 41% of the total investment required (Table 3.6.3). Furthermore, by the end of April 2017 only 71% of the uplift was in place, of which 54% was DOH funded, costing €51,598 per month (Table 3.6.4).

3.5.2 Agency Costs

The effect on agency hours, following the implementation of *the uplift*, was varied across the wards (see Table 3.6.5). With regards to RNs, average monthly agency utilisation decreased in three wards, ranging from -20% to -100%. In the remaining three wards RN agency hours increased by 10% respectively. With regards to HCA

[23] These scales were used at the time of the uplift.

agency hours, five wards decreased HCA hours (ranging from -6% to -95%). In the remaining ward HCA agency hours increased by 27%.

To estimate the cost savings associated with these changes, the hours saved (or gained) are multiplied by the average cost per hour for agency RNs and HCAs respectively (see Table 3.6.2 for costs employed per ward). With regards to RN agency there was a monthly net saving (€1,774) across the wards. While, the monthly net saving associated with reduction in HCA agency hours across the wards was €35,102. The combined net savings on agency following the implementation of the *uplift* is €36,877 on average per month. This saving represents 0.14% of total agency costs across the hospitals enrolled in the pilot for 2016[24]. Furthermore, using same techniques, the change in agency usage and associated costs for the entire implementation and transition period can be examined (see Table 3.6.6). The result indicates reductions in RN (€2,747) and HCA (€104,073) agency spend which combined is €106,820. This represents 0.4% of total agency costs across the hospitals enrolled in the pilot for 2016[25].

3.5.3 Net Monthly Cost of Uplift

Table 3.6.7 presents the monthly net cost of the uplift to DOH when agency savings are considered. In the four wards that received an *uplift*, the cost of the uplift in place (€51,598 [26]) was greater than the agency savings realised (€36,877). Thus in implementing the uplift there is a net monthly[27] cost (€14,722) to the DOH across the 6 wards.

[24] HPO estimates indicate that in 2016 total agency spend for the hospitals enrolled in the pilot was €27,234,259.
[25] HPO estimates indicate that in 2016 total agency spend for the hospitals enrolled in the pilot was €27,234,259.
[26] DOH funded and in place by end April 2017..
[27] As agency costs were not available for a full year annual costs can only be extrapolated from this monthly data.

Table 3.5.3: Expected Uplift Costs

	TOTAL APPROVED FOR UPLIFT				UPLIFT TO BE FUNDED BY DOH				UPLIFT TO BE FUNDED BY CONVERTING AGENCY			
	RNs	**HCAs**	**TOTAL**	**€**[2]	**RNs**	**HCAs**	**TOTAL**	**€**[2]	**RNs**	**HCAs**	**TOTAL**	**€**[2]
Ward A	4.5	4.5	9	387,374	4.5	2.5	7	307,350	0	2	2	80,024
Ward B	12.7	-0.4	12.3	569,097	8.4[1]	-0.4[1]	8	370,992	4.3	0	4.3	198,105
Ward C	7.4	4.1	11.5	504,975	4.7	0	4.7	216,534	2.7	4.1	6.8	288,441
Ward D			0	-			0	-			0	-
Ward E			0	-			0	-				-
Ward F	0	3.5	3.5	140,042	0	1.5	1.5	60,018	0	2	2	80,024
Total			**36.3**	**1,601,487**	**17.6**	**3.6**	**21.2**	**954,893**	**7**	**8.1**	**15.1**	**646,594**
Monthly				*133,457*			*79,574*					*53,883*

[1] Ward B had 0.4 more HCAs than required (as per 80/20-skill mix). Therefore, 0.4 of their substantive HCA's was converted to RN.
[2] As per Table 3.5.1

Table 3.6.4: Actual Cost of Uplift to Date

	TOTAL APPROVED FOR UPLIFT				UPLIFT TO BE FUNDED BY DOH				UPLIFT TO BE FUNDED BY CONVERTING AGENCY			
	RNs	**HCAs**	**TOTAL**	**€**[1]	**RNs**	**HCAs**	**TOTAL**	**€**[1]	**RNs**	**HCAs**	**TOTAL**	**€**[1]
Ward A	4	4	8	344,332	4	2	6	264,308		2	2	80,024
Ward B	6		6	276,426	4		4	184,284	2		2	92,142
Ward C	5.4	4	9.4	408,831	3.4		3.4	156,641	2	4	6	252,190
Ward D				-				-				-
Ward E				-				-				-
Ward F	-1	3.5	2.5	93,971	-1	1.5	0.5	13,947		2	2	80,024
Total	**14.4**	**11.5**	**25.9**	1,123,560	**10.4**	**3.5**	**13.9**	**619,180**	**4**	**8**	**12**	**504,380**
Monthly				*93,630*				*51,598*				*151,314*

[1] As per Table 3.5.1

Table 3.5.5: Agency Hours estimated costs and savings for monthly average

	RNs -Average Hours per Month						HCA - Average Hours per Month						TOTAL
	Phase 1	Phase 2	Change Hours	% Change	Average Cost/ hr[1]	Cost	Phase 1	Phase 2	Change Hours	% Change	Average Cost/hr[1]	Cost	
Ward A	36.03	0.00	-36.03	-100%	53.67	-1,934.09	57.33	2.95	-54.38	-95%	31.70	-1,723.99	-3,658.09
Ward B	23.53	18.29	-5.25	-22%	44.64	-234.32	240.98	55.71	-185.26	-77%	29.96	-5,550.85	-5,785.16
Ward C	78.97	87.00	8.03	10%	48.79	391.98	936.55	239.71	-696.84	-74%	32.17	-22,416.56	-22,024.58
Ward D	245.43	270.29	24.85	10%	39.58	983.60	769.67	721.79	-47.89	-6%	24.05	-1,151.71	-168.11
Ward E	70.43	50.86	-19.58	-28%	39.58	-774.88	786.09	593.95	-192.13	-24%	24.05	-4,620.84	-5,395.72
Ward F	27.59	22.14	-5.44	-20%	37.97	-206.68	44.66	56.86	12.20	27%	29.63	361.54	154.86
Total						-1,774.40						-35,102.40	-36,876.80

[1] As per Table 3.5.2

Table 3.5.6: Agency Hours estimated costs and savings for Phase 1 and Phase 2 (pre and post uplift)

	Duration (Weeks)		RN					HCA					TOTAL
	Phase 1	Phase 2	Phase 1	Phase 2	Change Hours	% Change	Cost[1]	Phase 1	Phase 2	Change Hours	% Change	Cost[1]	
Ward A	6	6	130.5		-130.5	-100%	-5,825.83	86.83		-86.83	-100%	-2,601.59	-8,427.43
Ward B	6	6	82	8	-74	-90%	-3,971.83	690	59	-631	-91%	-20,005.82	-23,977.65
Ward C	11	11	158	249.5	91.5	58%	4,464.04	2908	647	-2261	-78%	-72,734.10	-68,270.06
Ward D	6	6	296.5	376.25	79.75	27%	3,156.51	1,379.75	1,012.5	-367.25	-27%	-8,832.36	-5,675.86
Ward E	6	6	78	78	0	0%	0	1,255	1,275.83	20.83	2%	500.96	500.96
Ward F	6	6	71	56	-15	-21%	-569.55	37.5	24	-13.5	-36%	-400.01	-969.56
Total							-2,746.67					-104,072.92	-106,819.59

Estimated using average hourly rates as per Table 3.5.2

Table 3.5.7: Total economic cost and savings: Represents direct cost to DOH only.

	Agency Costs	Cost of Uplift in place to DOH[1] / Month	Total Direct Investment Required by DOH / Month
Ward A	-3,658.09	22,025.67	18,367.58
Ward B	-5,785.16	15,357.00	9,571.84
Ward C	-22,024.58	13,053.45	-8,971.13
Ward D	-168.11	-	-168.11
Ward E	-5,395.72	-	-5,395.72
Ward F	154.86	1,162.25	1,317.11
Total	-36,876.80	51,598.37	14,721.57

Section 4
Results from the Extension Wards

4.1 Introduction

This section outlines the data from the extension wards to date. These wards were added to the phase of the programme of research into safe nurse staffing and skill-mix. To distinguish them from the six original baseline wards, the additional 29 wards for the purpose of this report will be referred to as extension wards. The results are outlined in a number of sections and present a comprehensive picture of the variables associated with nurse staffing; as in the pilot wards, both secondary and cross-sectional data were collected. Secondary data, collected from administrative systems, included the calculation of Nursing Hours per Patient Day (NHPPD) (required, actual and variance), shift variance, skill mix, agency use, one-to-one specialling, overtime and absenteeism (collected from TrendCare) and nurse sensitive outcomes (collected from HIPE data). HIPE data was also collected over a longitudinal period and has been included in analyses. Cross-sectional data was collected from nursing staff working on the extension wards. Nursing staff provided data on nursing work, job satisfaction, intention to leave and burnout as well as care left undone events. An economic evaluation is included focussing on agency use and the cost of staff changes. Of the additional 19 extension wards, 10 received changes to their staffing (Hospital 1 - Wards 7, 10, 12, 13, 14, 16, 17, 20; Hospital 3 - Wards 32, 34); no changes were made to Hospital 2. These are highlighted in blue throughout the tables in this section to allow for ease of identification.

4.2 TrendCare System Administrative Data

Data from the *TrendCare* administrative system was collected for the new wards that were added to the research study. While data was collected for 18 additional wards in Hospital 1, nine of these did not reach the 95% actualisation required for validity of the data. Therefore, these wards (4, 5, 6, 8, 11, 15, 18, 19, 21) may not have accurate results for Time 1. The data collection period and number of beds in each ward are outlined in Table 1.2.1 below.

Table 4.2.1: Data collection period for extension wards

Hospital	Ward	Data collection periods Time 1	Time 2	Beds
1				
	4	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	5	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	6	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	7	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	8	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	19
	9	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	14
	10	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	11	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	12	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	13	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	35
	14	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	29
	15	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	33
	16	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	22
	17	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	37
	18	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	24
	19	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	14
	20	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	34
	21	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	16
2				
	24	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	20
	25	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	18
	26	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	24
	27	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	23
	28	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	18
	29	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	18
	30	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	21
	30	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	20
3				
	32	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	29
	33	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	12
	34	15/08/2017 – 01/10/2017	01/11/2018 – 30/04/2019	37
Total				762

4.2.1 Nursing Hours per Patient Day

Table 4.2.1.1 gives the required, available and variance in NHPPD. This is detailed for each of the wards included in the research study. As staffing calculations are based on Time 1, the available HPPD at Time 2 should be compared to the required HPPD at Time 1 in order to determine the impact of the recommendations of the Framework on ward staffing. The majority of wards in Hospital 1 were working at a negative variance ranging from -0.38 to -3.73 at Time 1 with the greatest variance apparent in Ward 5. However, it is important to note that some of these wards had not reached actualisation at Time 1, therefore these calculations need to be treated with caution[28]. While still in a negative clinical variance at Time 2, Wards 4, 5, 6, 7, 9, 13, 14, 16, 17, 19, and 20 have seen an improvement in their available HPPD compared to the required HPPD at Time 1. Wards 15 and 21 have a positive variance in HPPD at Time 2. Of these, Wards 7, 10, 12, 13, 14, 16, 17 and 20 had changes made to their staffing levels based on the recommendations of the *Framework*. The required HPPD has increased in many of the wards in Hospital 1 at Time 2 which is having a positive impact on the clinical variance at Time 2 with the majority of wards that received an uplift in staff, now demonstrating less of a negative variance in Time 2, when compared to Time 1[29]. All wards in hospitals 2 and 3 had a positive variance, with the exception of two wards (30 – Hospital 2 and 34 – Hospital 3). At Time 2 it is apparent that most of the wards in Hospitals 2 and 3 have an available HPPD matching the required HPPD at Time 1, with Wards 30 and 35 as the exceptions. While improvements can be seen, data were collected for a relatively short period of time and continuous measurement of NHPPD is required to establish a full stabilisation of the workforce.

[28] Wards that did not meet 95% actualisation in Hospital 1 at Time 1: 4, 5, 6, 8, 11, 15, 18, 19, 21.
[29] The exception is Ward 10.

Table 4.2.1.1: Nursing Hours per Patient Day (Blue indicates wards that received an alteration in staffing).

		Time 1				Time 2					
Hospital	Ward	Required	Clinically available	Total available	Clinical variance	Required	Clinically available	Total available**	Clinical variance	Clin var T1 and T2	Total var T1 and T2
1											
	4*	6.84	3.38	3.59	-3.46	7.66	5.39	2.89	-2.27	-1.45	-0.70
	5	6.95	3.22	3.32	-3.73	6.65	5.50	5.89	-1.16	-1.45	2.57
	6	3.93	4.83	5.26	0.90	6.53	4.40	4.91	-2.13	0.47	-0.35
	7	5.46	4.63	4.97	-0.84	8.22	5.97	6.53	-2.25	0.51	1.56
	8	4.88	2.33	2.59	-2.55	4.65	2.65	2.89	-2.00	-2.23	0.30
	9	7.71	5.55	5.70	-2.16	8.34	6.02	5.93	-2.32	-1.69	0.23
	10	5.61	4.25	4.85	-1.36	5.05	3.63	3.92	-1.42	-1.98	-0.93
	11	5.06	3.31	3.74	-1.74	6.03	3.19	3.60	-2.84	-1.87	-0.14
	12	4.61	4.24	4.76	-0.38	4.68	4.31	4.94	-0.37	-0.30	0.18
	13	6.77	5.16	5.60	-1.61	6.91	5.74	6.53	-1.17	-1.03	0.93
	14	5.88	3.97	4.69	-1.91	5.87	4.67	5.71	-1.19	-1.21	1.02
	15	4.01	7.33	7.84	3.33	4.29	4.50	5.53	0.21	0.49	-2.31
	16	6.03	4.69	5.04	-1.33	8.21	5.13	5.43	-3.08	-0.90	0.39
	17	4.92	3.17	3.68	-1.74	4.60	4.02	4.89	-0.57	-0.90	1.21
	18	4.30	4.30	4.71	-0.01	3.97	2.06	2.82	-1.91	-2.24	-1.89
	19	4.87	4.06	5.24	-0.81	6.58	6.19	14.05	-0.40	1.32	8.81
	20	4.55	3.36	3.77	-1.19	5.75	4.95	5.59	-0.81	0.40	1.82
	21	3.60	4.13	4.96	0.53	4.36	4.81	6.25	0.45	1.21	1.29
2											
	24	6.25	7.45	8.35	1.19	5.85	6.46	6.96	0.61	0.21	-1.39
	25	3.83	4.98	6.14	1.16	4.79	5.16	5.88	0.36	1.33	-0.26
	26	5.01	6.00	6.62	0.99	6.06	6.24	6.84	0.17	1.23	0.22
	27	5.19	5.83	6.64	0.64	6.57	6.43	6.90	-0.14	1.24	0.26
	28	4.58	5.81	6.81	1.22	6.91	6.04	6.95	-0.87	1.46	0.14
	29	4.74	5.59	6.14	0.84	6.56	6.19	6.72	-0.36	1.45	0.58
	30	7.39	6.78	7.29	-0.61	5.94	5.73	6.10	-0.21	-1.66	-1.19
	35	6.04	7.41	8.31	1.37	6.37	5.08	5.25	-1.28	-0.96	-3.06
3											
	32	4.19	4.72	5.01	0.53	5.18	4.89	5.47	-0.29	0.70	0.46
	33	4.19	8.15	8.75	3.96	4.71	6.29	6.96	1.58	2.10	-1.79
	34	6.50	5.56	5.75	-0.94	4.29	4.38	4.81	0.09	-2.12	-0.94

* Missing data, which was accounted for but could not be extracted from the total HPPD which accounts for the variance
**Industrial action period is included in the data; due to the setup of the Trendcare system, it is not possible to extract from the overall data.

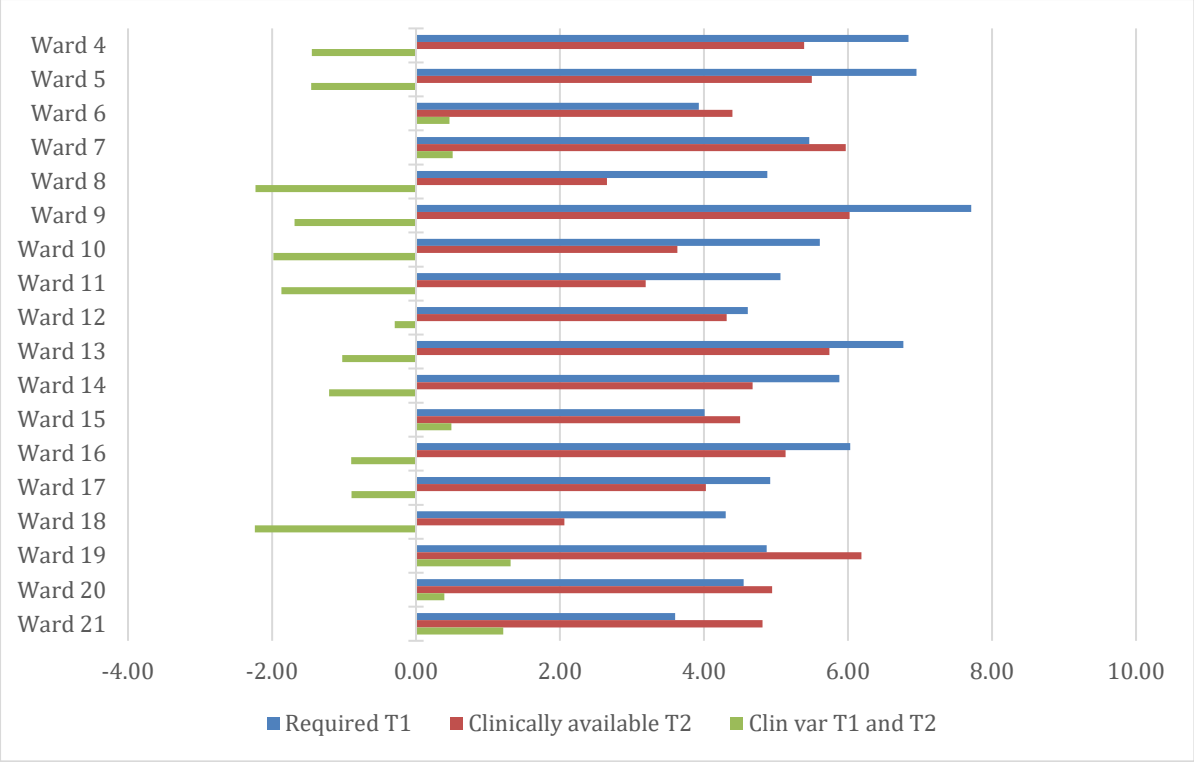

Figure 4.2.1.1: Hospital 1 Required HPPD at Time 1 compared to available HPPD at Time 2

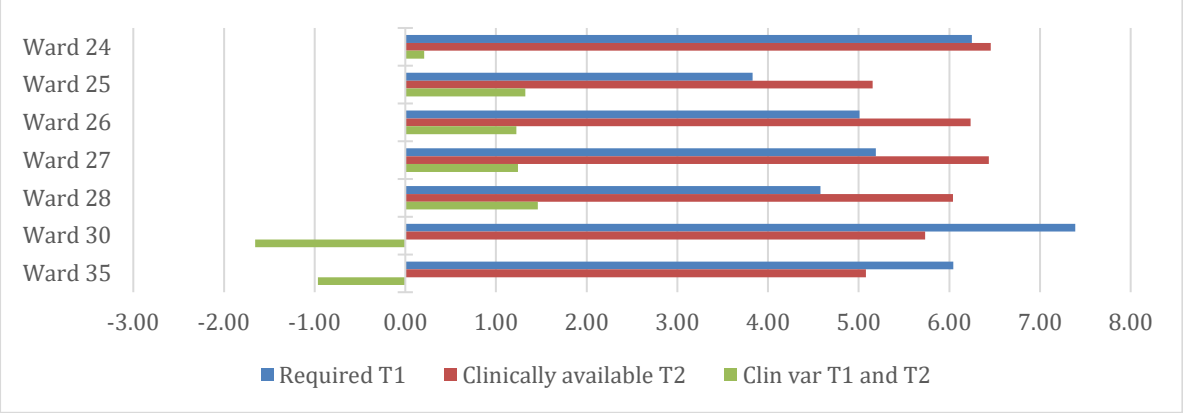

Figure 4.2.1.2 Hospital 2 Required HPPD at Time 1 compared to available HPPD at Time 2

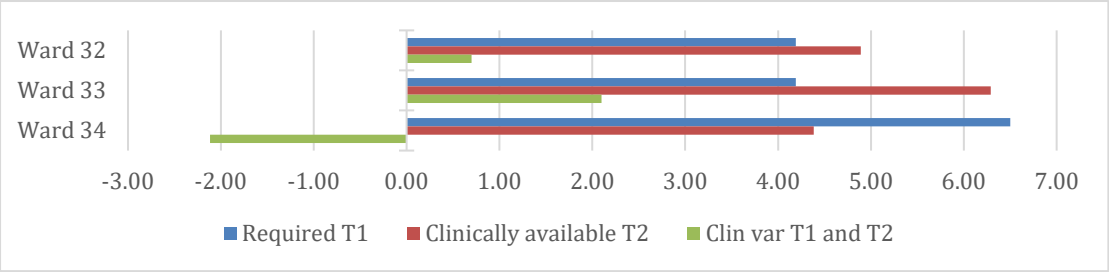

Figure 4.2.1.2 Hospital 3 Required HPPD at Time 1 compared to available HPPD at Time 2

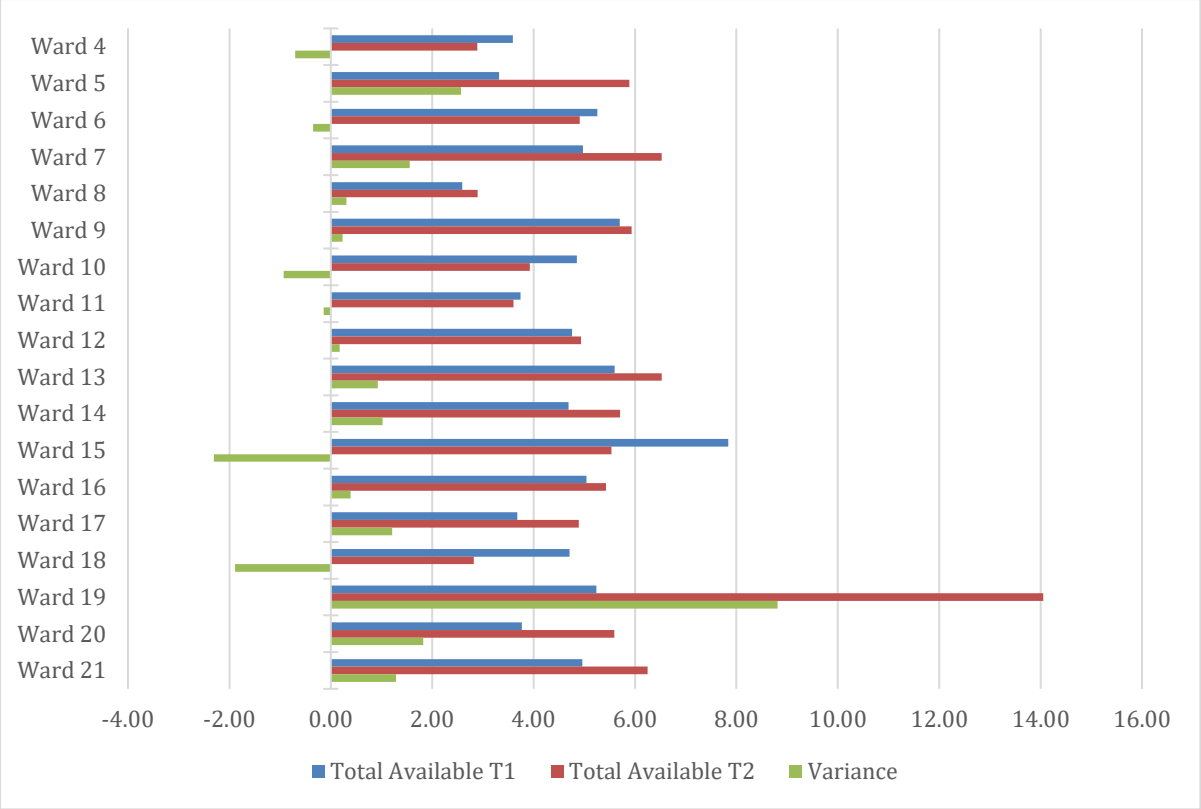

Figure 4.2.1.1: Hospital 1 Total available HPPD at Time 1 compared to Time 2

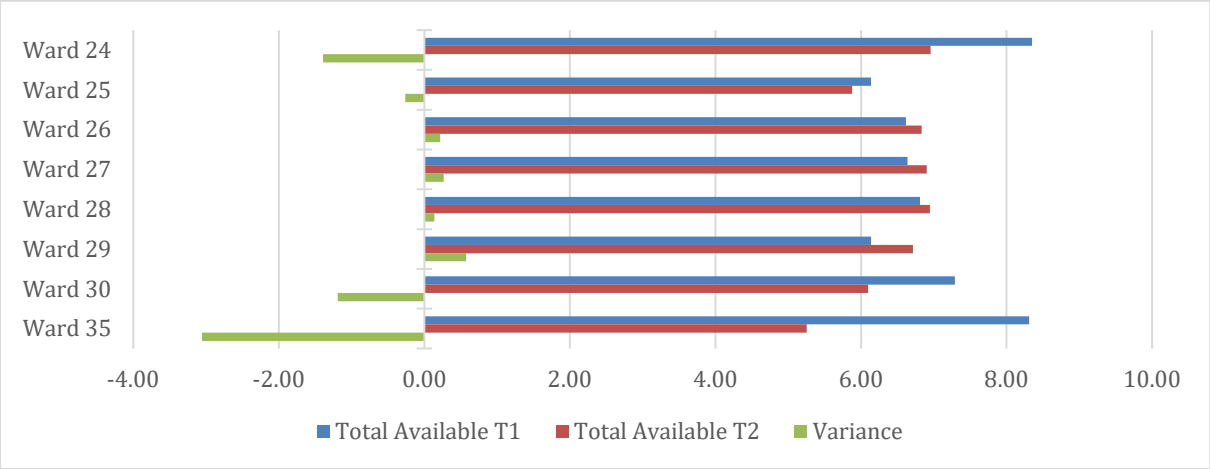

Figure 4.2.1.1: Hospital 2 Total available HPPD at Time 1 compared to Time 2

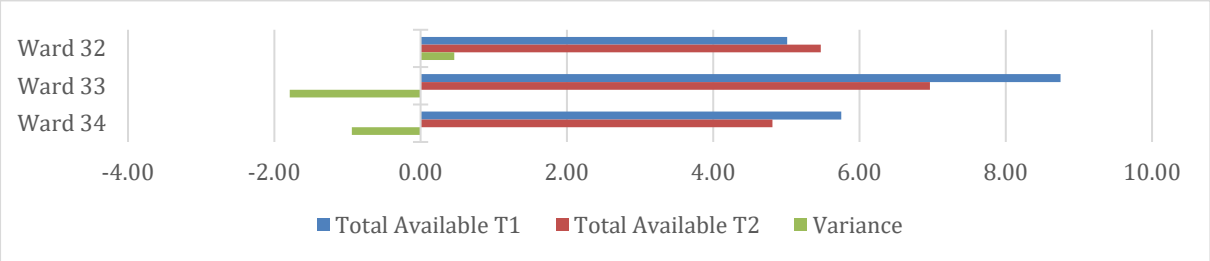

Figure 4.2.1.1: Hospital 3 Total available HPPD at Time 1 compared to Time 2

4.2.2 Clinical Administration

It was recommended in the *Framework* that the CNM2 (ward leader role) is 100% supervisory. From the TrendCare system the proportion of HPPD that is supervisory can be identified; ~0.20 HPPD is the equivalent of 1WTE, therefore it is possible to calculate an approximate percentage of time the CNM2 spends in a supervisory role (see Table 4.2.2.1 below). It is apparent that there is a large variance between the wards ranging from 15% to 266% time allocated to supervision by CNMs in Hospital 1, 90% to 185% in Hospital 2 and 45% to 245% in Hospital 3[30]. At Time 2, Wards 6, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21 in Hospital 1 had all reached 85% or above of a supervisory CNM2 role. In Hospital 1, in those wards that received an alteration in staff, overall proportion of time allocated to supervisory status increased from 80.6% in Time 1 to 83.8% in Time 2. All Wards in Hospitals 2 and 3 had at least 75% supervisory role, with the exception of Ward 35 in Hospital 2 which had 65% supervisory role at Time 2; this ward had a large negative variance between staffing required and staffing available indicating that the CNM may have being undertaking a clinical along with supervision. The time allocated to supervisory status fell from 133.7% in Time 1 to 105.6% in Time 2 in Hospital 2 but this remained within the recommended parameters.

The proportion over 100% is accounted for by CNM1s and CNM3s supervisory time also and is not solely based on the CNM2 role. The high levels of CNM supervisory proportion of time available (> 100%) are generally from wards that have minimum data requirements; these wards have 20 beds or fewer. Therefore, adjustments will be made to account for the wide variance in the time allocated to supervisory status between wards that have under 20 beds and those wards with 20 beds or greater.

Table 4.2.2.1: Percentage of time CNM spends supervisory

		Time 1		Time 2			
Hospital	Ward	HPPD	% WTE	HPPD	% WTE	Difference	% Increase
1							
	4	0.08	40.00	0.00	0.00	-0.08	-40.00
	5	0.03	15.00	0.04	20.00	0.01	5.00
	6	0.11	55.00	0.20	100.00	0.09	45.00
	7	0.03	15.00	0.12	60.00	0.09	45.00
	8	0.03	15.00	0.01	5.00	-0.02	-10.00
	9	0.09	45.00	0.03	15.00	-0.06	-30.00
	10	0.13	65.00	0.11	55.00	-0.03	-10.00
	11	0.21	105.00	0.17	85.00	-0.05	-20.00
	12	0.18	90.00	0.24	120.00	0.06	30.00
	13	0.21	105.00	0.17	85.00	-0.04	-20.00
	14	0.18	90.00	0.15	75.00	-0.04	-15.00
	15	0.32	160.00	0.30	150.00	-0.01	-10.00
	16	0.18	90.00	0.20	100.00	0.02	10.00
	17	0.15	75.00	0.13	65.00	-0.02	-10.00
	18	0.27	135.00	0.17	85.00	-0.10	-50.00
	19	0.53	265.00	0.73	365.00	0.20	100.00

[30] Figures greater than 100% indicate that supervisory status is being allocated to CNM1 grades as well as CNM 2 grades.

	20	0.23	115.00	0.22	110.00	-0.01	-5.00
	21	0.38	190.00	0.40	200.00	0.02	10.00
2							
	24	0.23	115.00	0.23	115.00	0.00	0.00
	25	0.37	185.00	0.23	115.00	-0.14	-70.00
	26	0.31	155.00	0.26	130.00	-0.05	-25.00
	27	0.21	105.00	0.19	95.00	-0.02	-10.00
	28	0.34	170.00	0.20	100.00	-0.14	-70.00
	29	0.27	135.00	0.25	125.00	-0.02	-10.00
	30	0.18	90.00	0.20	100.00	0.02	10.00
	35	0.23	115.00	0.13	65.00	-0.10	-50.00
3							
	32	0.16	80.00	0.16	80.00	0.00	0.00
	33	0.49	245.00	0.36	180.00	-0.13	-65.00
	34	0.09	45.00	0.15	75.00	0.06	30.00

4.2.3 Shift Variance

The variance in the number of hours of care required and provided can further be analysed by day, evening and night shift, as well as the overall total for the day; this is detailed in Table 4.2.3.1 and it is apparent that, in general, the night shift has the lowest level of variance across each of the wards. Overall, Hospital 1 reported the greatest deficit in hours of care required compared to the other two hospitals; however, there is great variation between wards and shifts. In Hospital 1, the shift variance decreased in Wards 4, 5, 8, 13, 14, 15, 17, 19, 20, 21 at Time 2 compared to Time 1. In Hospital 2, Wards 24, 25 and 26 had a reduction in their positive shift variance bringing them more in line with the required hours. Wards 27, 28, 29, 30 and 35 all had a negative shift variance at Time 2. Wards 33 and 34 in Hospital 3 both had a positive variance at Time 2, while Ward 32 had a negative variance.

Table 4.2.3.1: Shift variance

		Time 1				Time 2			
Hospital		No. Patients	Hours available	Hours required	Variance	No. Patients	Hours available	Hours required	Variance
1	Ward 4								
	Day	34.63	50.14	95.15	-45.01	35.95	86.96	107.41	-56.38
	Evening	33.35	36.73	72.63	-35.90	36.23	60.08	95.70	-64.04
	Night	33.96	28.13	57.64	-29.51	35.68	46.77	72.28	-43.71
	Total	33.98	114.99	225.43	-110.43	35.95	193.81	275.39	-81.58
	Ward 5								
	Day	34.33	38.58	90.94	-52.36	35.55	74.84	97.36	-22.52
	Evening	20.23	23.18	39.88	-16.71	36.57	69.66	82.40	-12.74
	Night	20.09	13.82	26.63	-12.80	35.35	52.41	58.65	-6.24
	Total	24.89	75.58	157.45	-81.87	35.83	196.90	238.41	-41.50
	Ward 6								
	Day	26.55	49.75	41.43	8.32	32.57	58.27	89.00	-30.73
	Evening	26.43	34.39	31.31	3.08	33.10	47.24	72.25	-25.01
	Night	24.40	24.80	15.68	9.12	32.23	37.96	51.80	-13.84
	Total	25.79	108.93	88.42	20.51	32.64	143.46	213.05	-69.58
	Ward 7								
	Day	32.33	60.04	68.50	-8.46	31.28	70.17	101.28	-31.11
	Evening	33.64	47.13	58.62	-11.49	32.54	66.54	89.17	-22.63
	Night	31.89	34.34	35.49	-1.16	31.09	52.15	69.63	-17.48
	Total	32.62	141.50	162.61	-21.11	31.63	188.87	260.09	-71.22
	Ward 8								
	Day	19.73	19.31	41.86	-22.55	20.46	22.69	44.89	-22.21
	Evening	19.69	15.52	32.88	-17.36	20.42	17.83	32.18	-14.35

Night	19.23	10.67	20.06	-9.38	19.63	12.95	16.73	-3.78
Total	19.55	45.51	94.80	-49.29	20.17	53.47	93.81	-40.33
Ward 9								
Day	13.45	30.08	38.96	-8.88	13.47	33.92	44.09	-10.16
Evening	13.67	23.57	33.37	-9.79	13.95	25.07	39.39	-14.31
Night	13.67	21.66	24.80	-3.14	13.71	23.54	30.82	-7.28
Total	13.59	75.31	97.13	-21.81	13.71	82.53	114.30	-31.76
Ward 10								
Day	36.13	58.77	77.35	-18.58	36.23	56.50	77.00	-20.49
Evening	36.68	50.79	65.73	-14.94	37.29	45.17	64.78	-19.61
Night	35.53	40.68	44.57	-3.89	35.92	30.71	42.30	-11.59
Total	36.11	150.24	187.65	-37.41	36.48	132.38	184.07	-51.69
Ward 11								
Day	33.66	45.00	69.09	-24.09	35.22	45.02	91.73	-46.71
Evening	33.23	38.41	56.99	-18.58	35.18	35.87	71.24	-35.37
Night	33.17	26.62	37.72	-11.10	34.74	30.93	48.52	-17.59
Total	33.35	110.03	163.80	-53.77	35.04	111.81	211.49	-99.68
Ward 12								
Day	34.44	58.46	67.09	-8.63	33.68	55.70	71.21	-15.51
Evening	36.15	49.48	57.51	-8.03	35.34	46.58	55.65	-9.07
Night	34.50	40.47	35.05	5.42	33.68	45.37	33.46	11.91
Total	35.03	148.42	159.65	-11.24	34.23	147.66	160.32	-12.66
Ward 13								
Day	33.50	64.53	85.28	-20.74	33.80	74.48	95.36	-20.87
Evening	33.44	55.58	73.33	-17.74	34.80	65.30	80.56	-15.26
Night	31.46	49.03	52.07	-3.04	33.31	55.31	58.78	-3.46
Total	32.80	169.15	210.67	-41.52	33.97	195.10	234.70	-39.60
Ward 14								
Day	25.04	38.39	60.82	-22.43	26.72	53.64	66.72	-13.07
Evening	25.23	33.59	48.42	-14.83	27.36	43.24	55.14	-11.91
Night	24.52	26.57	29.63	-3.06	26.60	28.82	35.94	-7.12
Total	24.93	98.54	138.86	-40.32	26.89	125.70	157.80	-32.10
Ward 15								
Day	13.77	33.03	22.20	10.83	21.25	37.96	42.00	-4.04
Evening	10.90	27.29	12.84	14.44	20.86	31.77	30.13	1.64
Night	9.31	18.80	6.20	12.60	19.29	22.40	15.73	6.67
Total	11.33	79.11	41.24	37.88	20.47	92.13	87.86	4.27
Ward 16								
Day	22.25	39.70	51.16	-11.46	22.85	49.87	73.04	-23.17
Evening	22.46	33.42	44.71	-11.29	23.31	36.37	62.63	-26.26
Night	21.21	29.99	30.77	-0.79	22.51	31.22	52.34	-21.11
Total	21.97	103.11	126.64	-23.53	22.89	117.46	188.00	-70.55
Ward 17								
Day	35.46	41.39	73.71	-32.32	34.56	56.51	70.91	-14.39
Evening	34.50	37.90	58.74	-20.84	34.35	46.19	54.98	-8.80
Night	34.44	31.18	35.26	-4.08	33.81	35.08	31.47	3.61
Total	34.80	110.47	167.71	-57.24	34.24	137.78	157.36	-19.58
Ward 18								
Day	19.23	34.39	38.05	-3.66	19.67	16.96	36.16	-19.20
Evening	18.13	26.42	29.05	-2.63	19.83	13.27	29.38	-16.12
Night	19.29	20.34	14.08	6.25	19.63	10.39	12.73	-2.34
Total	18.88	81.15	81.18	-0.03	19.71	40.62	78.28	-37.65
Ward 19								
Day	13.98	22.39	29.24	-6.85	13.74	34.63	37.44	-2.81
Evening	14.41	17.95	23.23	-5.27	13.86	26.84	30.20	-3.36
Night	13.98	15.62	13.23	2.39	13.77	23.81	23.12	0.70
Total	14.12	55.96	65.69	-9.73	13.79	85.28	90.76	-5.48
Ward 20								
Day	32.71	50.69	65.18	-14.48	33.01	66.48	81.00	-14.52
Evening	33.27	31.48	50.76	-19.28	33.34	54.54	65.08	-10.54
Night	32.08	27.69	31.18	-3.49	32.74	42.29	43.96	-1.67
Total	32.69	109.87	147.12	-37.25	33.03	163.32	190.05	-26.73
Ward 21								
Day	16.63	28.70	27.48	1.22	16.49	32.50	32.18	0.31
Evening	17.46	23.18	21.85	1.34	17.04	27.21	25.35	1.86
Night	15.88	16.91	10.58	6.32	15.94	19.67	14.43	5.24
Total	16.65	68.79	59.91	8.88	16.49	79.38	71.97	7.41

2								
Ward 24								
Day	18.90	58.49	47.72	10.77	19.99	52.40	48.57	3.83
Evening	19.58	41.70	41.00	0.70	20.56	37.32	41.26	-3.95
Night	18.90	42.20	26.85	15.35	19.79	40.18	27.77	12.41
Total	19.13	142.40	115.58	26.82	20.12	129.90	117.61	12.29
Ward 25								
Day	13.63	28.22	24.31	3.90	13.49	30.76	28.88	1.88
Evening	13.25	18.70	17.64	1.06	13.47	18.41	22.14	-3.74
Night	12.08	17.81	7.63	10.18	11.98	17.75	11.19	6.56
Total	12.99	64.73	49.59	15.14	12.98	66.92	62.21	4.70
Ward 26								
Day	18.13	51.90	38.09	13.80	17.99	49.68	45.81	3.87
Evening	18.56	32.57	29.79	2.78	18.57	32.03	38.18	-6.14
Night	17.54	24.06	19.71	4.35	17.48	30.61	25.19	5.42
Total	18.08	108.52	87.60	20.92	18.01	112.32	109.18	3.15
Ward 27								
Day	21.60	61.59	46.84	14.75	21.60	62.04	58.35	3.69
Evening	21.31	36.76	37.49	-0.74	21.47	40.22	47.77	-7.55
Night	21.00	25.80	24.80	1.00	20.83	34.78	33.80	0.98
Total	21.31	124.14	109.13	15.01	21.30	137.04	139.92	-2.88
Ward 28								
Day	16.88	45.85	34.93	10.93	25.46	65.35	74.13	-8.78
Evening	16.48	25.13	26.22	-1.09	25.56	45.21	58.84	-13.63
Night	16.83	26.18	15.46	10.72	25.31	43.13	42.76	0.37
Total	16.73	97.16	76.61	20.55	25.44	153.69	175.73	-22.04
Ward 29								
Day	19.50	45.30	41.41	3.89	19.82	50.01	53.24	-3.23
Evening	19.79	32.88	30.98	1.89	20.47	35.79	44.77	-8.98
Night	19.44	31.18	18.56	12.62	19.78	38.20	33.30	4.90
Total	19.58	109.35	90.95	18.40	20.03	124.00	131.31	-7.31
Ward 30								
Day	21.00	61.66	58.67	2.99	21.01	52.75	51.94	0.82
Evening	21.38	42.30	50.76	-8.46	21.75	35.67	43.59	-7.92
Night	21.02	39.21	35.10	4.11	21.02	33.49	30.79	2.70
Total	21.13	143.17	144.54	-1.36	21.26	121.91	126.31	-4.40
Ward 35								
Day	18.90	58.49	47.72	10.77	30.75	66.50	80.67	-14.16
Evening	19.58	41.70	41.00	0.70	31.02	44.96	67.44	-22.48
Night	18.90	41.56	26.85	14.70	30.34	44.52	47.33	-2.81
Total	19.13	141.75	115.58	26.18	30.70	155.99	195.44	-39.45
3								
Ward 32								
Day	20.88	35.53	39.91	-4.38	27.06	52.35	59.94	-7.60
Evening	21.58	32.04	31.95	0.09	27.89	43.04	50.71	-7.67
Night	20.65	31.76	16.28	15.48	26.87	38.00	30.61	7.39
Total	21.03	99.33	88.14	11.19	27.27	133.39	141.27	-7.88
Ward 33								
Day	8.17	21.04	15.84	5.21	11.13	21.73	23.87	-2.13
Evening	8.50	21.75	12.49	9.26	11.49	23.31	18.71	4.60
Night	8.17	24.68	6.38	18.30	11.08	25.62	10.34	15.28
Total	8.28	67.47	34.71	32.76	11.23	70.66	52.92	17.75
Ward 34								
Day	30.02	65.20	77.29	-12.09	32.89	58.47	64.18	-5.71
Evening	30.17	56.75	62.31	-5.56	33.41	50.68	50.13	0.55
Night	29.94	44.99	39.87	5.12	32.67	35.51	27.30	8.21
Total	30.04	166.94	179.47	-12.53	32.99	144.66	141.61	3.05

4.2.4 Skill-mix

The *Framework* recommended that a skill-mix of 80% RN to 20% HCA is recommended for medical and surgical wards. Table 4.2.4.1 shows the rostered skill-mix and it can be see that many of the experiment wards have improved and moved

towards the recommended 80:20 ratio for medical and surgical wards. Table 4.2.4.2 below shows the skill-mix ratios for day, evening and night shift and at the overall ward level. There was variability across wards with Hospital 1 reporting a skill mix ranging from 60%:40% RN to HCA to 93%:7%. During Time 2 this ranged from 47%:53% to 85%:15% RN to HCA. Hospital 2 had a range of 51%:49% to 87%:13% at Time 1 which has remained relatively stable during Time 2. Hospital 3 reported a skill-mix between 69%:31% and 92%:8% which has changed slightly in line with the recommendations to 68%:32% to 83%:17% RN to HCA. It is important to note that the skill-mix is affected by agency staff on the ward. As agency staff are predominantly at HCA level, this can affect the observed skill-mix on each of the wards.

Table 4.2.4.1: Skill-mix by the ward complement (Rostered)

	Time 1				Time 2			
Ward	CNM	RN	HCA		CNM	RN	HCA	
4	2	22	10	71:29	1	20	13	62:38
5	1	24	9	74:26	1	23	9	73:27
6	1	18	8	70:30	1	16	7	71:29
7	1	24	9	74:26	2	24	4	87:13
8	1	10	1	92:8	1	10	2	85:15
9	1	13	4	78:22	1	15	3	84:16
10	1	21	6	79:21	2	21	5	82:18
11	1	23	6	80:20	2	20	8	73:27
12	1	28	6	83:17	1	24	9	74:26
13	1	33	9	79:21	1	32	10	77:23
14	1	23	5	83:17	1	20	6	78:22
15	2	21	6	79:21	2	18	6	77:23
16	1	15	6	73:27	1	17	4	82:18
17	1	25	2	93:7	2	22	10	71:29
18	1	16	4	81:19	1	14	4	79:21
19	1	14	1	94:6	1	14	1	94:6
20	1	22	3	88:12	1	22	6	79:21
21	2	16	1	95:5	2	11	1	93:7
24	1	18	4	83:17	1	18	8	70:30
25	1	13	4	78:22	1	11	2	86:14
26	1	23	3	89:11	1	20	5	81:19
27	1	28	5	85:15	1	25	4	87:13
28	1	23	4	86:14	1	32	9	79:21
29	1	16	7	71:29	1	15	4	80:20
30	1	18	7	73:27	1	16	5	77:23
35	1	31	6	84:16	1	28	8	78:22
32	1	22	1	96:4	1	25	5	84:16
33	1	10	4	73:27	1	10	4	73:27
34	1	22	2	92:8	1	29	7	81:19

Table 4.2.4.2: Skill-mix by proportion of care delivered by RN compared to HCAs (TrendCare)

Hospital		Time 1 Total hours	Time 1 RN hours	Time 1 HCA hours	Time 1 Ratio	Time 2 Total hours	Time 2 RN hours	Time 2 HCA hours	Time 2 Ratio
1	Ward 4								
	Day	50.14	32.46	17.68	65:35	86.96	48.23	39.03	55:45
	Evening	36.73	23.42	13.31	64:36	60.08	33.73	26.23	56:44
	Night	28.13	17.86	10.26	64:36	46.77	21.97	24.63	47:53
	Total	114.99	73.74	41.26	64:36	193.81	103.94	89.89	54:46
	Ward 5								
	Day	38.58	22.97	15.61	60:40	74.84	40.47	34.36	54:46
	Evening	23.18	13.57	9.60	59:41	69.66	31.90	37.76	46:54
	Night	13.82	8.46	5.37	61:39	52.41	21.10	31.31	40:60
	Total	75.58	45.00	30.58	60:40	196.90	93.47	103.43	47:53
	Ward 6								
	Day	49.75	31.48	18.27	63:37	58.27	32.83	25.44	56:44
	Evening	34.39	24.79	9.59	72:28	47.24	26.10	21.14	55:45
	Night	24.80	20.13	4.67	81:19	37.96	18.50	19.46	49:51
	Total	108.93	76.40	32.53	70:30	143.46	77.43	66.03	54:46
	Ward 7								
	Day	60.04	40.96	19.08	68:32	70.17	43.12	27.05	61:39
	Evening	47.13	32.80	14.32	70:30	66.54	36.87	29.66	55:45
	Night	34.34	24.74	9.59	72:28	52.15	25.59	26.56	49:51
	Total	141.50	98.51	43.00	70:30	188.87	105.59	83.27	56:44
	Ward 8								
	Day	19.31	14.88	4.44	77:23	22.69	18.37	4.31	81:19
	Evening	15.52	13.35	2.17	86:14	17.83	15.25	2.59	86:14
	Night	10.67	10.67	0.00	100:0	12.95	12.62	0.34	97:3
	Total	45.51	38.90	6.60	85:15	53.47	46.24	7.24	86:14
	Ward 9								
	Day	30.08	24.23	5.85	81:19	33.92	23.71	10.21	70:30
	Evening	23.57	19.96	3.62	85:15	25.07	18.03	7.04	72:28
	Night	21.66	13.80	7.86	64:36	23.54	13.65	9.89	58:42
	Total	75.31	57.98	17.33	77:12	82.53	55.39	27.14	67:33
	Ward 10								
	Day	58.77	40.64	18.13	69:31	56.50	41.78	14.72	74:26
	Evening	50.79	31.73	19.06	62:38	45.17	32.46	12.72	72:28
	Night	40.68	21.34	19.34	52:48	30.71	22.31	8.40	73:27
	Total	150.24	93.71	56.53	62:38	132.38	96.55	35.83	73:27
	Ward 11								
	Day	45.00	27.94	17.06	62:38	45.02	30.86	14.17	69:31
	Evening	38.41	26.25	12.16	68:32	35.87	25.71	10.16	72:28
	Night	26.62	25.13	1.49	94:6	30.93	24.01	6.92	78:22
	Total	110.03	79.32	30.71	72:28	111.81	80.58	31.24	72:28
	Ward 12								
	Day	58.46	41.85	16.60	72:28	55.70	34.08	21.63	61:39
	Evening	49.48	39.26	10.22	79:21	46.58	32.47	14.11	70:30
	Night	40.47	36.04	4.43	89:11	45.37	32.07	13.31	71:29
	Total	148.42	117.16	31.25	79:21	147.66	98.61	49.05	67:33
	Ward 13								
	Day	64.53	43.44	21.09	67:33	74.48	47.81	26.68	64:36
	Evening	55.58	38.77	16.81	70:30	65.30	42.17	23.13	65:35
	Night	49.03	34.39	14.65	70:30	55.31	38.09	17.23	69:31
	Total	169.15	116.60	52.55	69:31	195.10	128.07	67.03	66:34
	Ward 14								
	Day	38.39	31.51	6.88	82:18	53.64	28.27	25.37	53:47
	Evening	33.59	26.16	7.43	78:22	43.24	23.91	19.33	55:45
	Night	26.57	16.12	10.45	61:39	28.82	16.58	12.24	58:42

Total	98.54	73.79	24.76	75:25	125.70	68.77	56.93	55:45
Ward 15								
Day	33.03	26.15	6.89	79:21	37.96	22.30	15.66	59:41
Evening	27.29	22.89	4.40	84:16	31.77	20.50	11.27	65:35
Night	18.80	18.12	0.67	96:4	22.40	16.71	5.69	75:25
Total	79.11	67.16	11.95	85:15	92.13	59.51	32.62	65:35
Ward 16								
Day	39.70	24.23	15.47	61:39	49.87	27.73	22.14	56:44
Evening	33.42	20.94	12.48	63:37	36.37	21.44	14.93	59:41
Night	29.99	18.74	11.24	63:37	31.22	18.19	13.17	58:42
Total	103.11	63.91	39.20	62:38	117.46	67.36	50.24	57:43
Ward 17								
Day	41.39	34.75	6.64	84:16	56.51	35.03	21.49	62:38
Evening	37.90	32.45	5.45	86:14	46.19	30.53	15.66	66:34
Night	31.18	29.68	1.50	95:5	35.08	24.66	10.41	70:30
Total	110.47	96.88	13.59	88:12	137.78	90.21	47.57	65:35
Ward 18								
Day	34.39	19.00	15.39	55:45	16.96	10.92	6.04	64:36
Evening	26.42	16.36	10.07	62:38	13.27	8.68	4.58	65:35
Night	20.34	15.38	4.96	76:24	10.39	6.83	3.56	66:34
Total	81.15	50.73	30.42	62:37	40.62	26.43	14.19	65:35
Ward 19								
Day	22.39	19.17	3.22	86:14	34.63	25.10	9.52	72:28
Evening	17.95	17.83	0.13	99:1	26.84	23.69	3.15	88:12
Night	15.62	14.81	0.81	95:5	23.81	23.67	0.15	99:1
Total	55.96	51.81	4.15	93:7	85.28	72.46	12.82	85:15
Ward 20								
Day	50.69	34.65	16.05	68:32	66.48	40.67	25.81	61:39
Evening	31.48	26.02	5.46	83:17	54.54	33.28	21.26	61:39
Night	27.69	26.82	0.88	97:3	42.29	25.40	16.90	60:40
Total	109.87	87.49	22.38	80:20	163.32	99.35	63.97	61:39
Ward 21								
Day	28.70	22.55	6.15	79:21	32.50	17.32	15.18	53:47
Evening	23.18	19.93	3.26	86:14	27.21	15.23	11.98	56:44
Night	16.91	16.28	0.63	96:4	19.67	12.48	7.19	63:37
Total	68.79	58.76	10.03	85:15	79.38	45.03	34.35	57:43
2								
Ward 24								
Day	40.51	17.99	58.49	69:31	52.40	39.25	13.15	75:25
Evening	27.45	14.25	41.70	66:34	37.32	24.96	12.36	67:33
Night	27.22	14.98	42.20	65:35	40.18	21.90	18.28	54:46
Total	95.18	47.22	142.40	67:33	129.90	86.11	43.79	66:34
Ward 25								
Day	23.22	5.00	28.22	82:18	30.76	24.57	6.19	80:20
Evening	15.60	3.10	18.70	83:17	18.41	15.61	2.80	85:15
Night	17.63	0.18	17.81	99:1	17.75	17.70	0.05	100:0
Total	56.45	8.28	64.73	87:13	66.92	57.88	9.03	87:13
Ward 26								
Day	36.72	15.17	51.90	70:29	49.68	39.81	9.87	80:20
Evening	23.17	9.40	32.57	71:29	32.03	22.54	9.50	70:30
Night	17.67	6.39	24.06	73:27	30.61	18.68	11.93	61:39
Total	77.56	30.96	108.52	71:29	112.32	81.02	31.30	72:28
Ward 27								
Day	46.16	15.43	61.59	75:25	62.04	42.60	19.45	69:31
Evening	29.89	6.86	36.76	81:19	40.22	28.68	11.54	71:29
Night	25.42	0.38	25.80	99:1	34.78	26.51	8.27	76:24
Total	101.47	22.67	124.14	82:18	137.04	97.78	39.26	71:29
Ward 28								
Day	33.23	12.62	45.85	72:28	65.35	53.33	12.02	82:18
Evening	18.45	6.68	25.13	73:27	45.21	33.44	11.77	74:26

	Night	17.73	8.45	26.18	68:32	43.13	28.07	15.07	65:35
	Total	69.41	27.75	97.16	71:29	153.69	114.83	38.86	75:25
	Ward 29								
	Day	29.94	15.36	45.30	66:34	50.01	32.56	17.45	65:35
	Evening	21.33	11.55	32.88	65:35	35.79	20.72	15.07	58:42
	Night	18.24	12.93	31.18	59:41	38.20	18.32	19.88	48:52
	Total	69.51	39.84	109.35	64:36	124.00	71.60	52.40	58:42
	Ward 30								
	Day	33.43	28.23	61.66	54:46	52.75	37.73	15.02	72:28
	Evening	21.72	20.58	42.30	51:49	35.67	23.53	12.13	66:34
	Night	17.44	21.77	39.21	44:56	33.49	17.72	15.77	53:47
	Total	72.59	70.58	143.17	51:49	121.91	78.99	42.92	65:35
	Ward 35								
	Day	58.49	40.51	17.99	69:31	66.50	45.64	20.86	69:31
	Evening	41.70	27.45	14.25	66:34	44.96	30.28	14.69	67:33
	Night	41.56	27.22	14.33	66:34	44.52	28.43	16.09	64:36
	Total	141.75	95.18	46.57	67:33	155.99	104.35	51.64	67:33
3									
	Ward 32								
	Day	35.53	30.52	5.01	86:14	52.35	38.03	14.32	73:27
	Evening	32.04	29.25	2.79	91:9	43.04	31.73	11.31	74:26
	Night	31.76	31.76	0.00	100:0	38.00	32.10	5.90	84:16
	Total	99.33	91.53	7.80	92:8	133.39	101.86	31.53	76:24
	Ward 33								
	Day	21.04	15.11	5.93	72:28	21.73	15.71	6.02	72:28
	Evening	21.75	15.03	6.72	69:31	23.31	15.65	7.66	67:33
	Night	24.68	16.53	8.15	67:33	25.62	16.84	8.78	66:34
	Total	67.47	46.68	20.79	69:31	70.66	48.20	22.46	68:32
	Ward 34								
	Day	65.20	44.71	20.49	69:31	58.47	45.52	12.95	78:22
	Evening	56.75	39.54	17.21	70:30	50.68	40.87	9.81	81:19
	Night	44.99	33.26	11.73	74:26	35.51	33.80	1.71	95:5
	Total	166.94	117.51	49.43	70:30	144.66	120.19	24.47	83:17

4.2.5 Agency Use

Table 4.2.5.1 below shows the agency hours and the percentage of total hours worked by agency staff. Agency HCA hours were generally of a higher proportion than agency RN hours, with Wards 7, 10, 13, 14, 17, 26, 32 and 34 all relying on agency HCAs; over 40% of all HCA hours were provided by agency staff. Agency hours were very variable across wards ranging from 7.6% to 24% in wards in Hospital 1; Hospital 2, ranged from 1% to 30% and Hospital 3, ranged from 4% to 30% during Time 1. Wards 10, 17 and 19 in Hospital 1; Wards 24, 26, 28, 30 and 35 in Hospital 2, and Ward 34 in Hospital 3 had a substantial reductions in agency use at Time 2. It is of note, that those wards that reduced their dependency on agency staff in generally reported a reduction in the variance between nursing hours required and nursing hours available over the two time periods.

Table 4.2.5.1: Agency Use

		Time 1			Time 2		
Hospital		Agency hours	Total hours	Percentage of hours	Agency hours	Total hours	Percentage of hours
1							
	Ward 4						
	RN	1.32	73.74	1.79	5.93	103.94	5.71
	HCA	6.48	41.26	15.71	22.71	89.89	25.26
	Total	7.81	114.99	6.79	28.64	193.81	14.78
	Ward 5						
	RN	0.00	45.00	0.00	2.70	93.47	2.88
	HCA	4.65	30.58	15.21	68.49	103.43	66.22
	Total	4.65	75.58	6.15	71.19	196.90	36.15
	Ward 6						
	RN	5.86	76.40	7.67	8.54	77.43	11.03
	HCA	0.90	32.53	2.77	20.47	66.03	31.01
	Total	6.76	108.93	6.21	29.02	143.46	20.23
	Ward 7						
	RN	7.77	98.51	7.89	9.22	105.59	8.73
	HCA	20.84	43.00	48.47	58.43	83.27	70.16
	Total	28.61	141.50	20.22	67.65	188.87	35.82
	Ward 8						
	RN	0.17	38.90	0.44	0.52	46.24	1.13
	HCA	0.17	6.60	2.58	0.52	7.24	7.16
	Total	0.33	45.51	0.73	1.04	53.47	1.95
	Ward 9						
	RN	0.42	57.98	0.72	1.78	55.39	3.21
	HCA	5.36	17.33	30.93	14.76	27.14	54.37
	Total	5.78	75.31	7.67	16.54	82.53	20.04
	Ward 10						
	RN	3.89	93.71	4.15	0.89	96.55	0.92
	HCA	31.90	56.53	56.43	0.05	35.83	0.13
	Total	35.78	150.24	23.82	0.93	132.38	0.71
	Ward 11						
	RN	0.84	79.32	1.06	3.25	80.58	4.03
	HCA	2.36	30.71	7.68	2.17	31.24	6.95
	Total	3.19	110.03	2.90	5.42	111.81	4.85
	Ward 12						
	RN	6.21	117.16	5.30	8.63	98.61	8.75
	HCA	6.70	31.25	21.44	4.11	49.05	8.37

Total	12.91	148.42	8.70	12.74	147.66	8.63
Ward 13						
RN	3.00	116.60	2.57	6.46	128.07	5.05
HCA	24.67	52.55	46.95	21.95	67.03	32.74
Total	27.68	169.15	16.36	28.41	195.10	14.56
Ward 14						
RN	0.25	73.79	0.34	7.60	68.77	11.05
HCA	12.07	24.76	48.75	19.72	56.93	34.63
Total	12.32	98.54	12.50	27.32	125.70	21.73
Ward 15						
RN	0.00	67.16	0.00		59.51	0.00
HCA	0.00	11.95	0.00	0.38	32.62	1.16
Total	0.00	79.11	0.00	0.38	92.13	0.41
Ward 16						
RN	2.72	63.91	4.26	2.17	67.36	3.21
HCA	9.17	39.20	23.39	12.63	50.24	25.13
Total	11.89	103.11	11.53	14.79	117.46	12.59
Ward 17						
RN	1.71	96.88	1.77	0.88	90.21	0.98
HCA	9.11	13.59	67.03	0.31	47.57	0.66
Total	10.82	110.47	9.79	1.20	137.78	0.87
Ward 18						
RN	1.57	50.73	3.09		26.43	0.00
HCA	8.45	30.42	27.78	7.08	14.19	49.91
Total	10.02	81.15	12.35	7.08	40.62	17.44
Ward 19						
RN	10.01	51.81	19.32	8.47	72.46	11.69
HCA	1.28	4.15	30.84		12.82	0.00
Total	11.29	55.96	20.18	8.47	85.28	9.93
Ward 20						
RN	7.83	87.49	8.95	9.39	99.35	9.45
HCA	7.92	22.38	35.39	25.66	63.97	40.12
Total	15.75	109.87	14.34	35.05	163.32	21.46
Ward 21						
RN	0.00	58.76	0.00	0.07	45.03	0.16
HCA	1.30	10.03	12.96	13.22	34.35	38.50
Total	1.30	68.79	1.89	13.30	79.38	16.75
2						
Ward 24						
RN	2.63	95.18	2.76	0.76	86.11	0.88
HCA	17.37	47.22	36.79	10.40	43.79	23.75
Total	19.99	142.40	14.04	11.16	129.90	8.59
Ward 25						
RN	0.00	56.45	0.00	3.22	57.88	5.56
HCA	0.66	8.28	7.99	2.18	9.03	24.16
Total	0.66	64.73	1.02	5.40	66.92	8.07
Ward 26						
RN	1.76	77.56	2.27	5.81	81.02	7.17
HCA	16.05	30.96	51.83	4.77	31.30	15.24
Total	17.81	108.52	16.41	10.58	112.32	9.42
Ward 27						
RN	0.00	101.47	0.00	0.14	97.78	0.15
HCA	2.56	22.67	11.28	9.71	39.26	24.73
Total	2.56	124.14	2.06	9.85	137.04	7.19
Ward 28						
RN	4.24	69.41	6.11		114.83	0.00
HCA	8.16	27.75	29.42	10.23	38.86	26.33
Total	12.40	97.16	12.77	10.23	153.69	6.66
Ward 29						
RN	0.17	69.51	0.24	1.10	71.60	1.54

	HCA	12.80	39.84	32.13	14.49	52.40	27.65
	Total	12.97	109.35	11.86	15.59	124.00	12.57
	Ward 30						
	RN	0.00	72.59	0.00	5.47	78.99	6.92
	HCA	42.68	70.58	60.46	8.12	42.92	18.92
	Total	42.68	143.17	29.81	13.59	121.91	11.15
	Ward 35						
	RN	2.63	95.18	2.76	4.75	104.35	4.56
	HCA	16.72	46.57	35.91	20.40	51.64	39.50
	Total	19.35	95.18	20.33	25.15	155.99	16.12
3							
	Ward 32						
	RN	7.16	91.53	7.82	7.91	101.86	7.76
	HCA	4.97	7.80	63.68	11.54	31.53	36.59
	Total	12.13	99.33	12.21	19.44	133.39	14.57
	Ward 33						
	RN	1.86	46.68	3.99	4.68	48.20	9.71
	HCA	0.82	20.79	3.96	6.37	22.46	28.36
	Total	2.69	67.47	3.98	11.05	70.66	15.64
	Ward 34						
	RN	7.64	117.51	6.50	2.05	120.19	1.70
	HCA	42.36	49.43	85.71	3.41	24.47	13.93
	Total	50.00	166.94	29.95	5.46	144.66	3.77

4.2.6 One-to-One Specialling

The hours of care used for one-to-one specialling varied greatly across wards and hospitals. In Hospital 1, the percentage of hours spent on one-to-one specialling ranged from 10% to 70% while Hospital 2 had levels of between 1% and 47%; Hospital three had one ward with no one-to-one specialling, one with minimal (0.2%) and one ward with high levels (46%). Time 2 saw a substantial decrease in hours of one-to-one specialling (between 6.44% and 20.19%) in Wards 5, 8, 12, 13, 14 and 17 in Hospital 1. Of these, Wards 12, 13, 14 and 17 had changes made to their staffing levels indicating that they had more time for surveillance of their patients. Two wards, 26 and 30, in Hospital 2 has a substantial decrease in one-to-one specialling hours: 10.6% and 17.45% respectively. Ward 34, which had the highest levels of specialling at Time 1 reduced by 39.51% at Time 2. Ward 33 increased by a minimal proportion to 2.19% while Ward 32 had a substantial increase from 0.19% to 14.24%.

Table 4.2.6.1: 1:1 One-to-one Specialling

		Time 1					Time 2				
Hospital	Ward	Shifts	Patients	Total 1:1 hours	Total hours	% Total Hours	Shifts	Patients	Total 1:1 hours	Total hours	% Total Hours
1											
	4	28.27	1.21	80.50	114.99	70.00	46.82	1.59	145.18	193.81	74.91**
	5	17.56	1.52	45.42	75.58	60.09	25.89	1.05	78.56	196.90	39.90
	6	2.90	0.77	7.65	108.93	7.02	22.59	1.43	89.10	143.46	62.11*
	7	3.60	0.40	25.10	141.50	17.74	29.43	1.24	115.43	188.87	61.12*
	8	0.50	0.21	4.23	45.51	9.29	29.43	1.36	0.94	53.47	1.76
	9	4.23	0.46	29.56	75.31	39.25	29.43	1.26	25.24	82.53	30.58
	10	6.79	0.75	54.25	150.24	36.11	5.22	0.41	45.20	132.38	34.15
	11	3.75	0.40	23.69	110.03	21.53	12.96	0.70	51.98	111.81	46.49
	12	2.83	0.54	15.94	148.42	10.74	1.28	0.38	6.35	147.66	4.30
	13	19.56	1.38	77.73	169.15	45.95	12.53	1.14	56.97	195.10	29.20
	14	4.54	0.48	30.90	98.54	31.35	1.79	0.44	9.47	125.70	7.54
	15	0.13	0.15	0.46	79.11	0.58	0.50	0.11	2.47	92.13	2.68
	16	14.00	1.04	52.10	103.11	50.53	24.46	1.20	118.63	117.46	101.00*
	17	3.90	0.52	21.98	110.47	19.90	0.62	0.34	2.15	137.78	1.56
	18	0.31	0.17	1.25	81.15	1.54	0.07	0.04	0.22	40.62	0.55
	19	0.44	0.06	3.79	55.96	6.78	4.23	0.28	11.60	85.28	13.60
	20	9.52	0.94	24.44	109.87	22.24	18.32	0.99	70.27	163.32	43.03
	21	0.23	0.15	0.79	68.79	1.15	1.66	0.13	12.28	79.38	15.46
2											
	24	4.27	0.27	27.13	142.40	19.05	5.23	0.45	29.81	129.90	22.95
	25	0.10	0.04	0.90	64.73	1.38	0.50	0.19	1.79	66.92	2.68
	26	4.65	0.31	26.88	108.52	24.76	2.96	0.29	15.91	112.32	14.16
	27	3.25	0.50	19.23	124.14	15.49	7.26	0.74	37.55	137.04	27.40
	28	0.25	0.15	1.02	97.16	1.05	3.38	0.46	20.63	153.69	13.43
	29	1.73	0.15	12.46	109.35	11.39	7.58	0.44	42.10	124.00	33.95
	30	12.42	0.44	68.19	143.17	47.63	7.72	0.57	36.80	121.91	30.18
	35	4.27	0.27	27.13	141.75	19.14	6.79	0.37	46.49	155.99	29.80
3											
	32	0.10	0.08	0.19	99.33	0.19	2.22	0.18	19.00	133.39	14.24
	33	0.00	0.00	0.00	67.47	0.00	0.23	0.07	1.54	70.66	2.19
	34	8.29	0.19	75.96	166.94	45.50	1.22	0.10	8.66	144.66	5.99

*Each of these wards have had issues with actualisation and Interrater Reliability on the 1:1 specialling data, widely skewing the data. They are currently undergoing Interrater Reliability training to rectify this.
**Ward had missing data affecting the proportion of 1:1 specialling; therefore were removed from overall analysis

4.2.7 Overtime

Table 4.2.7.1 below gives the number and percentage of paid overtime hours. Overtime varied greatly across the wards and hospitals ranging from 0 to 2.88% in hospital 1, 0 to 3.73% in hospital 2 and the highest levels of overtime being seen in hospital 3 or between 1.86% and 4.44%. At Time 2, Hospital 1 had very small levels of paid overtime, with 16 of the 18 wards having no overtime and the two remaining wards having less than 1% paid overtime. Paid overtime generally increased in the majority of the wards in Hospital 2 at Time 2, ranging from 0.32% to 3.66%, while remaining relatively stable from Time 1 to Time 2 in Hospital 3.

		Time 1			Time 2		
Hospital	Ward	Total overtime	Total hours	% overtime	Total overtime	Total hours	% overtime
1							
	4	0.16	114.99	0.14	0	193.81	0.00
	5	0	75.58	0	0	196.90	0.00
	6	0	108.93	0	1.33	143.46	0.93
	7	0	141.5	0	0	188.87	0.00
	8	0	45.51	0	0	53.47	0.00
	9	2.17	75.31	2.88	0	82.53	0.00
	10	0.3	150.24	0.2	0	132.38	0.00
	11	0	110.03	0	0	111.81	0.00
	12	0.16	148.42	0.11	0	147.66	0.00
	13	0	169.15	0	0	195.10	0.00
	14	0	98.54	0	0	125.70	0.00
	15	0	79.11	0	0	92.13	0.00
	16	0.4	103.11	0.38	0	117.46	0.00
	17	0.79	110.47	0.72	0	137.78	0.00
	18	0	81.15	0	0	40.62	0.00
	19	0	55.96	0	0	85.28	0.00
	20	0.5	109.87	0.46	0.04	163.32	0.02
	21	0.03	68.79	0.05	0	79.38	0.00
2							
	24	0.74	142.4	0.52	2.91916168	129.90	2.25
	25	2.42	64.73	3.73	0.21556886	66.92	0.32
	26	0.17	108.52	0.16	4.10628743	112.32	3.66
	27	0	124.14	0	1.59730539	137.04	1.17
	28	0.92	97.16	0.95	0.84281437	153.69	0.55
	29	0	109.35	0	3.38922156	124.00	2.73
	30	0	143.17	0	2.0254491	121.91	1.66
	35	0.21	141.75	0.148144	1.45209581	155.99	0.93
3							
	32	4.41	99.33	4.44	7.27	133.39	5.45
	33	2.13	67.47	3.16	3.36	70.66	4.76
	34	3.1	166.94	1.86	0.55	144.66	0.38

4.2.8 Absenteeism

Table 4.2.8.1 below gives the details of absenteeism in the wards with overall absenteeism and results from various categories. The national rate of sickness absence among nursing staff is 4.9% (HSE 2018); the majority of wards in Hospital 1 were below this rate, with only two wards above; while Hospital 2 has two wards surpassing this level and Hospital 3 was generally below the national level. With the exception of 4 wards (13, 14, 15, 20) in Hospital 1, absenteeism decreased from Time 1 to Time 2 and only two wards (17 and 20) being above the national rate of sickness absence: 6.45% and 4.96% respectively. Hospital 2 showed a different pattern of absenteeism rates in Time 2, with absenteeism rates increasing in six of the eight wards, one remained unchanged and one decreased while three wards had sick leave rates over the national average and one at the national rate, the remaining four wards had sick leave rates below the national average.

Table 4.2.7.1: Absenteeism

Hospital		**Time 1** Hours absent	Total Hours	% absent	**Time 2** Hours absent	Total Hours	% absent
1							
	Ward 4						
	Family				0.10		0.05
	Sick	11.94		10.39	0.97		0.50
	Total Leave	11.94	114.99	10.39	1.07	193.81	0.55
	Ward 5						
	Family				1.47		0.75
	Maternity	5.85		7.74	2.06		1.04
	Compassionate				0.22		0.11
	Sick	1.23		1.63	5.09		2.58
	Total Leave	7.08	75.58	9.37	8.83	196.90	4.48
	Ward 6						
	Family	11.21		10.29	0.29		0.20
	Maternity				9.06		6.32
	Compassionate				0.65		0.45
	Sick	10.39		9.54	5.10		3.56
	Total Leave	21.60	108.93	19.83	15.10	143.46	10.52
	Ward 7						
	Sick	0.71		0.50	0.94		0.50
	Total Leave	0.71	141.50	0.50	0.94	188.87	0.50
	Ward 8						
	Family	1.75		3.85	1.01		1.88
	Maternity	4.06		8.93	2.34		4.37
	Sick	0.22		0.48			0.00
	Total Leave	6.03	45.51	13.25	3.34	53.47	6.25
	Ward 9						
	Family				0.36		0.43
	Maternity	4.55		6.04	3.64		4.41
	Sick	1.06		1.41	1.12		1.35
	Total Leave	5.61	75.31	7.45	5.12	82.53	6.20
	Ward 10						
	Family	3.56		2.37	0.84		0.63
	Maternity				1.59		1.20
	Sick	8.15		5.42	1.32		1.00
	Total Leave	11.71	150.24	7.79	3.75	132.38	2.83
	Ward 11						
	Family	1.38		1.25	0.22		0.19

Maternity	5.04		4.58	3.18		2.84
Sick	3.53		3.21	2.60		2.33
Total Leave	9.94	110.03	9.03	5.99	111.81	5.36
Ward 12						
Family	1.88		1.26	0.29		0.19
Maternity				0.05		0.03
Compassionate				0.14		0.10
Bereavement	0.44		0.29			0.00
Sick	7.49		5.05	6.79		4.60
Total Leave	9.80	148.42	6.61	7.27	147.66	4.92
Ward 13						
Family	0.17		0.10	0.92		0.47
Maternity	2.75		1.63	9.88		5.07
Sick	5.09		3.01	4.37		2.24
Total Leave	8.01	169.15	4.74	15.16	195.10	7.77
Ward 14						
Family	3.67		3.72	0.67		0.53
Maternity				5.23		4.16
Compassionate	0.23		0.23			0.00
Sick	1.58		1.60	2.67		2.13
Total Leave	5.48	98.54	5.56	8.57	125.70	6.82
Ward 15						
Family				0.14		0.16
Sick	0.16		0.21	0.87		0.95
Total Leave	0.16	79.11	0.21	1.02	92.13	1.10
Ward 16						
Family	1.08		1.04	0.42		0.36
Maternity	10.40		10.09	4.72		4.02
Sick	2.28		2.22	0.49		0.42
Total Leave	13.76	103.11	13.34	5.63	117.46	4.79
Ward 17						
Family				0.43		0.31
Maternity	9.43		8.53	3.55		2.58
Compassionate	0.75		0.68			0.00
Sick	2.73		2.47	8.89		6.45
Total Leave	12.91	110.47	11.68	12.87	137.78	9.34
Ward 18						
Family	0.50		0.62	0.07		0.18
Sick	7.79		9.60	0.67		1.64
Total Leave	8.29	81.15	10.22	0.74	40.62	1.81
Ward 19						
Maternity				2.24		2.63
Sick	7.56		13.51	0.04		0.05
Total Leave	7.56	55.96	13.51	2.29	85.28	2.68
Ward 20						
Family				0.92		0.56
Maternity				1.91		1.17
Sick	1.25		1.14	8.10		4.96
Total Leave	1.25	109.87	1.14	10.94	163.32	6.70
Ward 21						
Family	0.94		1.36	1.68		2.11
Sick	0.23		0.34	1.13		1.42
Total Leave	1.17	68.79	1.70	2.80	79.38	3.53
2						
Ward 24						
Family	1.25		0.88	0.11		0.08
Maternity	4.88		3.42	2.71		2.09
Administrative				2.71		2.09
Sick	1.32		0.93	1.29		0.99
Total Leave	7.44	142.40	5.23	6.82	129.90	5.25

	Ward 25						
	Family	1.67		2.57	3.56		5.32
	Maternity	5.53		8.54	3.64		5.44
	Sick	0.25		0.39	1.28		1.92
	Total Leave	7.44	64.73	11.49	8.49	66.92	12.68
	Ward 26						
	Family	4.40		4.05	5.08		4.53
	Maternity				9.86		95.26
	Sick	7.12		6.56	6.82		6.07
	Total Leave	11.51	108.52	10.61	21.75	112.32	19.37
	Ward 27						
	Family	2.54		2.04	1.93		1.41
	Maternity				4.55		3.32
	Compassionate	0.50		0.40			0.00
	Sick	2.35		1.89	6.45		4.70
	Total Leave	5.39	124.14	4.34	12.92	137.04	9.43
	Ward 28						
	Family	3.89		4.00	2.69		1.75
	Maternity				3.97		2.58
	Sick	7.71		7.94	8.76		5.70
	Total Leave	11.60	97.16	11.94	15.42	153.69	10.03
	Ward 29						
	Sick	3.75		3.43	7.02		5.66
	Total Leave	3.75	109.35	3.43	7.02	124.00	5.66
	Ward 30						
	Family	7.20		5.03	3.83		3.14
	Maternity				10.09		8.28
	Sick	4.77		3.33	7.01		5.75
	Total Leave	11.97	143.17	8.36	20.94	121.91	17.17
	Ward 35						
	Family	1.25		0.88	0.20		0.13
	Maternity	4.88		3.44	5.28		3.39
	Sick	1.32		0.93	6.30		4.04
	Total Leave	7.44	141.75	5.25	11.77	155.99	7.55
3							
	Ward 32						
	Maternity	4.39		4.42	6.73		5.04
	Prolonged illness	0.32		0.33	0.03		0.02
	Sick	0.66		0.66	4.31		3.23
	Total Leave	7.60	99.33	7.66	11.07	133.39	8.30
	Ward 33						
	Compassionate				0.05		0.08
	Sick	0.25		0.37	1.76		2.49
	Total Leave	0.25	67.47	0.37	1.81	70.66	2.56
	Ward 34						
	Family				0.14		0.10
	Maternity	2.93		1.75			0.00
	Compassionate				0.07		0.05
	Prolonged illness				0.04		0.03
	Prenatal	0.69		0.41	0.83		0.57
	Sick	8.72		5.22	5.93		4.10
	Total Leave	12.33	166.94	7.39	7.02	144.66	4.86

4.2.9 Bed occupancy

Bed occupancy is an important measure as high bed occupancy may increase workload. Overall, Hospital 1 had the highest level of bed occupancy ranging from 86% to 103%. Hospital 2 had a greater range from 72% to 109% while the lowest levels were apparent in Hospital 3, ranging from 69% to 81%. At Time 2 bed occupancy rates have remained high, between 82.13% and 106.15% in Hospital 1, 72.11% and 111.26% in Hospital 2 and 89.16 to 94.05% in Hospital 3.

Table 4.2.8: Bed occupancy

		Time 1			Time 2		
Hospital	Ward	No. Beds	No. Patients	Percent occupancy	No. Beds	No. Patients	Percent occupancy
1							
	4	35	33.98	97.08	35	35.95	102.72
	5	35	25.03	71.52	35	35.83	102.36
	6	35	25.79	73.70	35	32.64	93.25
	7	35	32.62	93.21	35	31.63	90.38
	8	19	19.55	102.89	19	20.17	106.15
	9	14	13.59	97.10	14	13.71	97.90
	10	35	36.11	103.18	35	36.48	104.22
	11	35	33.35	95.28	35	35.04	100.13
	12	35	35.03	100.08	35	34.23	97.81
	13	35	32.80	93.71	35	33.97	97.06
	14	29	24.94	85.99	29	26.89	92.74
	15	33	11.32	34.30	33	20.47	62.02
	16	22	21.97	99.87	22	22.89	104.05
	17	37	34.80	94.05	37	34.24	92.55
	18	24	18.88	78.67	24	19.71	82.13
	19	14	14.12	100.87	14	13.79	98.49
	20	34	32.69	96.14	34	33.03	97.14
	21	16	16.65	104.08	16	16.49	103.07
2							
	24	20	19.13	95.65	20	20.12	100.58
	25	18	12.99	72.17	18	12.98	72.11
	26	24	18.08	75.33	24	18.01	75.05
	27	23	21.31	92.65	23	21.30	92.61
	28*	18	16.73	92.94	31	25.44	82.06
	29	18	19.58	108.78	18	20.03	111.26
	30	21	21.13	100.62	21	21.26	101.25
	35	20	19.13	95.63	29	30.70	105.88
3							
	32	29	21.03	72.52	29	27.27	94.05
	33	12	8.28	69.00	12	11.23	93.61
	34	37	30.04	81.19	37	32.99	89.16

*Ward 28 moved and a greater number of beds are now available

4.2.10 Conclusion

This report outlines data from the 28 wards that were added to the next phase of the programme of research into safe nurse staffing and skill-mix. Required nursing hours per patient day at Time 1 were higher than actual hours available; however, Time 2 is beginning to show signs of stabilisation. All wards in Hospital 2 (with the exception of

ward 30) and Hospital 3 (with the exception of ward 34) reported a positive variance; that is, the actual nursing hours available exceed those required. Variance at shift level was also measured with lower levels of variance noted on night shifts; however, there were substantial variances on day shifts across wards. Time 2 shows that overall shift variance is beginning to improve.

There was a large variability in the extent to which CNM2s were at 100% supervisory level at both time points and further ongoing analysis is required in this regard. In particular, this measurement needs to take into account wards that have 20 or fewer patients.

Skill-mix was variable across the three sites and across wards. Hospital 1 reporting an overall skill mix of 72.5% RN to 27.5% HCA; Hospital 2 had an overall skill mix of 70.4% RN to 29.6% HCA; Hospital 3 reported an overall skill-mix of 77.0% RN to 13.0% HCA, which are generally moving towards the recommended 80:20 skill-mix ratio at Time 2.

Agency use across wards and hospitals was also variable with the vast majority of agency staff at HCA level and showed a downward trend in the proportion of agency use following the implementation of the recommendations of the *Framework*.

As with other results, the extent of one-to-one specialling was also variable. Generally, the levels of one-to-one specialling were associated with agency use. However, one-to-one specialling decreases in line with an increase in available HPPD or hours of care as staff have more time for observation and thus the need to one-to-one specialling reduces.

Absenteeism rates related to sickness varied across the sites; however, in the vast majority of wards, levels of sickness absence were below the national average. Bed occupancy rates were high in Hospital 1 and, to a lesser extent in Hospital 2; these levels of occupancy rates are an indicator of a high workload.

4.3 Hospital In-patient Enquiry System

4.3.1 Nursing Sensitive Patient Outcome Measures

The Nursing Sensitive Outcomes (NSOs) are extracted from the HIPE data and follow the same procedure as detailed in the pilot wards in section 3.3.1 above.

4.3.2 Patient Demographics

This section outlines the patient profile collected across the duration of the study for the extension wards. The rationale is to demonstrate the variation in patient profiles among the three sites as well as identifying the key variables that were used in case-mix applied to the HIPE data. As will be seen from the data, the cohort of patients cared for in the three sites have varying lengths of stay and admission profiles. The

demographic data reflects the profile of the hospitals, moving from higher to lower complexity (Level 4 – Hospital 1; Level 3 –Hospital 2; Level 2 – Hospital 3).

The table below shows the period that the HIPE data that is available in each time-point (Time 1 and Time 2) of the study. Note that some patients admitted during Time 1 may have continued their stay during Time 2 and for the purposes of this analysis they will be included in the time point in which they were admitted. As such, there may be a slight overestimation of NSOs in Time 1 and a slight underestimation in Time 2.

Table 4.3.2.1: HIPE data reporting timeframes for Time 1 and Time 2

	Available dates Time 1	Available dates Time 2
Hospital 1	15/08/2018 – 30/09/2018	01/09/2018 – 31/03/2019
Hospital 2	15/08/2018 – 30/09/2018	01/09/2018 – 31/03/2019
Hospital 3	15/08/2018 – 30/09/2018	01/09/2018 – 31/03/2019

During Time 1 of the study, a total of 12,426 patients were admitted to one of the 29 wards: Hospital 1 (n = 17,377), Hospital 2 (n = 5,336), and Hospital 3 (n =1,322). Within Hospital 1, Ward 17 had the greatest number of admissions closely followed by Wards 15 and 6, with Wards 9, 19 and 19 having relatively small numbers of admissions. Ward 26, in Hospital 2 had the greatest number of admissions with Ward 35 having the smallest number. Ward 32 had almost twice as many admissions as the other two wards in Hospital 3. Time 2 of the study had a total of 13,091 patient admissions (Hospital 1, n = 8645; Hospital 2, n = 3709; Hospital 3, n = 737). This is a smaller sample size than Time 1 due to the relatively shorter time frame. However, the data regarding number of admissions to each of the wards generally follows a similar pattern to Time 1.

Of the 12426 patients admitted during Time 1, 1064 (51.7%) were male. In Hospitals 1 and 2 there were slightly more males than males, while Hospital 3 had slightly more females, however, overall the gender split is relatively equal. In individual wards in Hospital 1, the gender split was generally skewed to one or the other gender. For example, in Wards 4, 5 and 11 there were between 60-70% females, while in Wards 8, 15 and 21 there were between 60-70% males. Hospitals 2 and 3 had closer to a 50:50 split in individual wards, with a similar pattern for Time 2.

In both Time 1 and Time 2 of the study, most admissions to hospital were emergency: ~80%. Hospital 1 had the lowest emergency admissions: 77.4% (Time 1) and 77% (Time 2), while emergency admissions accounted for between 80-90% in both time points for Hospitals 2 and 3. Emergency admissions had a range of 46-99% during Time 1 in the wards in Hospital 1 (Ward 18 as an exception), comparable to the range of 49-99% in Time 2 (Ward 18 as an exception). All Wards of Hospital 2 had similarly high percentages of emergency admissions between Time 1 (76-99%) and Time 2 (60%-100%) and Hospital 3 also had high percentages of emergency admissions for Time 1 and Time 2: 74-88% and 70-88% respectively. Therefore, the trends in admission for both time points of the study were relatively similar.

The mean overall age of patients during Time 1 was 62.71 years, similarly the mean age in Time 2 was 63.24 years. The youngest profile was seen in Hospital 1 at Time 1 (mean = 61.08) but Hospital 2 at Time 2 (mean = 60.78). The oldest profile was in Hospital 3 at both time-points (Time 1, mean = 71.30; Time 2, mean = 67.69). Within the Hospital 1, the age ranged from the youngest in Ward 12 (Time 1, mean = 51.73;

Time 2, mean = 52.19) to the oldest in Ward 4 (Time 1, mean = 79.22; Time 2, mean = 77.09). Within Hospital 2, the ages ranged from 53.21 in Ward 25 to 74.92 in Ward 30 at Time 1 and similarly from 55.66 in Ward 25 to 77.71 in Ward 30 in Time 2. There was a slight decrease in age in Hospital 3 from Time 1 (mean range = 70.25-72.40) to Time 2 (mean range = 69.26-70.27).

The overall mean length of stay (LOS) for the 12,426 patients in Time 1 was 11.20 days compared to 9.68 days in Time 2. Both time points show the pattern whereby the longest LOS is seen in Hospital 3 (Time 1, mean = 20.23 days; Time 2, mean = 14.02 days), followed by Hospital 1 (Time 1, mean = 11.43 days; Time 2, mean = 9.85 days) with Hospital 2 having the shortest LOS (Time 1, mean = 8.21 days; Time 2, mean = 8.25 days). In general, Hospital 1 showed a pattern of shorter LOS in Time 2 compared to Time 1 with Ward 4 had the longest LOS in Hospital 1 at both times (Time 1, mean = 23.43 days; Time 2 mean = 20.26 days) while Ward 15 had the shortest LOS (Time 1, mean = 5.24 days; Time 2, mean = 4.58 days). The LOS in individual wards in Hospital 2 remained relatively similar between Time 1 and Time 2 (Time 1 mean range = 4.07-11.91 days; Time 2 mean range = 4.52-10.43 days). The three wards in Hospital 2 saw a decrease in mean LOS by 4.31, 2.48 and 17.27 days in Ward 32, 33 and 34 respectively.

Table 4.3.2.1: Patient profile admitted to the three hospitals during Time 1

Time 1	Gender		Admission type		Age		LOS	
	Male	Female	Elective	Emergency	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
Ward 4 (n=662)	194 (29.3)	468 (70.7)	11 (1.7)	651 (98.3)	79.22 (13.05)	82.00 (11.00)	23.43 (36.78)	12.00 (19.00)
Ward 5 (n=708)	280 (39.5)	428 (60.5)	12 (1.7)	696 (98.3)	77.76 (13.78)	81.00 (12.00)	21.35 (30.57)	10.00 (20.00)
Ward 6 (n=1289)	738 (57.3)	551 (42.7)	34 (2.6)	1,255 (97.4)	64.55 (18.92)	69.00 (26.00)	11.16 (18.67)	6.00 (8.00)
Ward 7 (n=1021)	606 (59.4)	415 (40.6)	20 (2.0)	1,001 (98.0)	62.09 (19.50)	66.00 (30.00)	14.47 (29.10)	7.00 (11.00)
Ward 8 (n=932)	573 (61.5)	359 (38.5)	500 (53.6)	432 (46.4)	51.99 (18.08)	53.00 (29.00)	7.88 (14.04)	3.00 (4.00)
Ward 9 (n=352)	187 (53.1)	165 (46.9)	25 (7.1)	327 (92.9)	57.69 (15.82)	59.50 (25.00)	17.74 (25.68)	11.00 (16.00)
Ward 10 (n=1247)	656 (52.6)	591 (47.4)	55 (4.4)	1,192 (95.6)	61.56 (19.26)	63.00 (31.00)	11.04 (19.00)	6.00 (8.00)
Ward 11 (n=1040)	388 (37.3)	652 (62.7)	252 (24.2)	788 (75.8)	63.30 (18.75)	67.00 (29.00)	12.90 (21.14)	7.00 (11.00)
Ward 12 (n=1293)	701 (54.2)	592 (45.8)	447 (34.6)	846 (65.4)	51.73 (17.08)	53.00 (27.00)	10.55 (16.71)	6.00 (7.00)
Ward 13 (n=1221)	560 (45.9)	661 (54.1)	400 (32.8)	821 (67.2)	53.51 (19.20)	54.00 (32.00)	9.11 (16.28)	6.00 (6.00)
Ward 14 (n=898)	507 (56.5)	391 (43.5)	67 (7.5)	831 (92.5)	64.11 (17.10)	67.00 (25.00)	11.18 (18.14)	6.00 (9.00)
Ward 15 (n=1382)	936 (67.7)	446 (32.3)	713 (51.6)	669 (48.4)	56.21 (17.48)	58.00 (27.00)	5.24 (6.95)	4.00 (5.00)
Ward 16 (n=842)	468 (55.6)	374 (44.4)	11 (1.3)	831 (98.7)	67.91 (15.44)	71.00 (21.00)	11.30 (16.02)	6.00 (10.00)
Ward 17 (n=1471)	591 (40.2)	880 (59.8)	489 (33.2)	982 (66.8)	55.99 (18.93)	58.00 (31.00)	9.20 (17.45)	5.00 (8.00)
Ward 18 (n=512)	273 (53.3)	239 (46.7)	511 (99.8)	1 (0.2)	65.41 (17.48)	67.00 (28.00)	15.47 (25.88)	1.00 (22.00)
Ward 19 (n=341)	187 (54.8)	154 (45.2)	126 (37.0)	215 (63.0)	59.35 (16.05)	63.00 (21.00)	16.91 (14.24)	13.00 (19.00)
Ward 20 (n=1190)	596 (50.1)	594 (49.9)	12 (1.0)	1,178 (99.0)	64.74 (17.87)	68.00 (25.00)	10.74 (17.42)	6.00 (8.00)
Ward 21 (n=976)	642 (65.8)	334 (34.2)	241 (24.7)	735 (75.3)	59.53 (18.86)	63.00 (30.00)	6.62 (10.14)	4.00 (5.00)
Total (n=17377)	9,083 (52.3)	8,294 (47.7)	3,926 (22.6)	13,451 (77.4)	61.08 (19.15)	64.00 (30.00)	11.43 (20.20)	6.00 (9.00)
Ward 24 (n=448)	250 (55.8)	198 (44.2)	39 (8.7)	409 (91.3)	71.65 (14.33)	74.00 (16.00)	11.76 (19.05)	6.00 (9.00)
Ward 25 (n=770)	443 (57.5)	327 (42.5)	165 (21.4)	605 (78.6)	53.21 (20.07)	54.00 (33.00)	4.07 (5.20)	2.00 (4.00)
Ward 26 (n=1123)	636 (56.6)	487 (43.4)	268 (23.9)	855 (76.1)	61.79 (19.20)	65.00 (29.00)	5.34 (7.82)	3.00 (5.00)
Ward 27 (n=874)	438 (50.1)	436 (49.9)	8 (0.9)	866 (99.1)	67.40 (18.66)	72.00 (27.00)	8.79 (13.01)	5.00 (8.00)
Ward 28 (n=729)	359 (49.2)	370 (50.8)	13 (1.8)	716 (98.2)	66.45 (19.59)	71.00 (26.00)	9.02 (13.79)	5.00 (9.00)
Ward 29 (n=507)	184 (36.3)	323 (63.7)	6 (1.2)	501 (98.8)	76.36 (12.60)	79.00 (15.00)	10.04 (12.10)	6.00 (9.00)
Ward 30 (n=473)	254 (53.7)	219 (46.3)	3 (0.6)	468 (99.4)	74.92 (13.57)	78.00 (17.00)	11.91 (16.53)	7.00 (10.00)
Ward 35 (n=412)	188 (45.6)	224 (54.4)	34 (8.3)	377 (91.7)	67.38 (18.74)	73.00 (26.00)	10.71 (13.88)	6.00 (10.00)
Total (n=5336)	2,752 (51.6)	2,584 (48.4)	536 (10.1)	4,797 (89.9)	65.92 (19.19)	71.00 (27.00)	8.21 (12.69)	4.00 (7.00)
Ward 32 (n=604)	258 (42.7)	346 (57.3)	75 (12.4)	529 (87.6)	70.25 (17.99)	74.50 (24.00)	15.84 (29.24)	6.00 (11.00)
Ward 33 (n=338)	162 (47.9)	176 (52.1)	48 (14.2)	290 (85.8)	72.40 (17.46)	77.00 (21.00)	15.65 (25.56)	6.00 (12.00)
Ward 34 (n=380)	171 (45.0)	209 (55.0)	100 (26.3)	280 (73.7)	71.98 (15.73)	75.00 (20.00)	31.29 (63.39)	11.00 (33.00)
Total (n=1322)	591 (44.7)	731 (55.3)	223 (16.9)	1,099 (83.1)	71.30 (17.24)	75.00 (22.00)	20.23 (41.94)	7.00 (17.00)
Overall total (n = 24,035)	12,426 (51.7)	11,609 (48.3)	4,685 (19.5)	19,347 (80.5)	62.71 (19.27)	66.00 (29.00)	11.20 (20.83)	6.00 (8.00)

Table 4.3.2.2 Patient profile admitted to the three hospitals during Time 2

Time 2	Gender		Admission type		Age		LOS	
	Male	Female	Elective	Emergency	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
Ward 4 (n=307)	100 (32.6)	207 (67.4)	5 (1.6)	302 (98.4)	77.09 (15.66)	81.00 (14.00)	20.26 (21.78)	13.00 (20.00)
Ward 5 (n=415)	163 (39.3)	252 (60.7)	4 (1.0)	411 (99.0)	74.79 (15.66)	79.00 (16.00)	15.51 (21.29)	8.00 (14.00)
Ward 6 (n=520)	244 (46.9)	276 (53.1)	10 (1.9)	510 (98.1)	63.58 (19.46)	68.00 (30.00)	11.67 (15.70)	6.00 (11.00)
Ward 7 (n=516)	269 (52.1)	247 (47.9)	8 (1.6)	508 (98.4)	61.23 (20.04)	64.00 (28.00)	9.66 (12.94)	6.00 (8.00)
Ward 8 (n=525)	329 (62.7)	196 (37.3)	268 (51.0)	257 (49.0)	53.74 (18.58)	56.00 (29.00)	6.91 (10.96)	3.00 (5.00)
Ward 9 (n=151)	87 (57.6)	64 (42.4)	10 (6.6)	141 (93.4)	55.73 (16.25)	57.00 (25.00)	14.59 (13.42)	9.00 (13.00)
Ward 10 (n=671)	340 (50.7)	331 (49.3)	29 (4.3)	642 (95.7)	62.05 (20.68)	66.00 (32.00)	9.85 (12.23)	6.00 (8.00)
Ward 11 (n=455)	165 (36.3)	290 (63.7)	111 (24.4)	344 (75.6)	64.60 (19.36)	69.00 (29.00)	12.71 (17.37)	7.00 (11.00)
Ward 12 (n=709)	374 (52.8)	335 (47.2)	255 (36.0)	454 (64.0)	52.19 (16.68)	53.00 (25.00)	8.96 (8.78)	6.00 (7.00)
Ward 13 (n=548)	255 (46.5)	293 (53.5)	151 (27.6)	397 (72.4)	54.92 (19.72)	56.00 (32.00)	7.99 (11.43)	5.00 (6.00)
Ward 14 (n=421)	219 (52.0)	202 (48.0)	24 (5.7)	397 (94.3)	62.85 (17.41)	66.00 (25.00)	10.12 (13.45)	6.00 (8.00)
Ward 15 (n=824)	553 (67.1)	271 (32.9)	418 (50.7)	406 (49.3)	56.04 (17.02)	57.00 (24.00)	4.58 (4.83)	3.00 (4.00)
Ward 16 (n=444)	288 (64.9)	156 (35.1)	11 (2.5)	433 (97.5)	66.44 (16.95)	70.00 (23.00)	10.06 (13.21)	6.00 (9.00)
Ward 17 (n=757)	298 (39.4)	459 (60.6)	283 (37.4)	474 (62.6)	57.29 (19.39)	60.00 (33.00)	7.82 (10.22)	5.00 (7.00)
Ward 18 (n=248)	156 (62.9)	92 (37.1)	244 (98.4)	4 (1.6)	61.02 (17.91)	58.00 (29.00)	10.59 (20.30)	1.00 (13.00)
Ward 19 (n=155)	96 (61.9)	59 (38.1)	39 (25.2)	116 (74.8)	62.30 (16.40)	65.00 (23.00)	16.75 (14.55)	13.00 (17.00)
Ward 20 (n=490)	210 (42.9)	280 (57.1)	5 (1.0)	485 (99.0)	64.54 (19.09)	69.00 (27.00)	11.60 (17.81)	6.00 (8.00)
Ward 21 (n=489)	326 (66.7)	163 (33.3)	113 (23.1)	376 (76.9)	60.11 (18.55)	63.00 (28.00)	6.42 (8.30)	4.00 (5.00)
Total (n=8645)	4,472 (51.7)	4,173 (48.3)	1,988 (23.0)	6,657 (77.0)	62.71 (19.27)	63.00 (30.00)	9.85 (19.93)	5.00 (8.00)
Ward 24 (n=291)	145 (49.8)	146 (50.2)	6 (2.1)	284 (97.9)	72.50 (15.92)	77.00 (16.00)	10.21 (13.01)	6.00 (8.00)
Ward 25 (n=686)	431 (62.8)	255 (37.2)	269 (39.2)	417 (60.8)	55.66 (19.39)	57.00 (30.00)	4.52 (7.32)	2.00 (4.00)
Ward 26 (n=599)	314 (52.4)	285 (47.6)	27 (4.5)	572 (95.5)	65.68 (18.75)	70.00 (25.00)	6.66 (9.48)	4.00 (5.00)
Ward 27 (n=590)	257 (43.6)	333 (56.4)	3 (0.5)	587 (99.5)	69.49 (18.18)	74.00 (23.00)	9.24 (11.47)	5.00 (8.00)
Ward 28 (n=421)	195 (46.3)	226 (53.7)	2 (0.5)	418 (99.5)	68.22 (17.74)	72.00 (23.00)	9.40 (10.64)	6.00 (9.00)
Ward 29 (n=371)	136 (36.7)	235 (63.3)	0 (0.0)	371 (100.0)	77.71 (13.45)	81.00 (14.00)	9.75 (11.04)	6.00 (9.00)
Ward 30 (n=322)	170 (52.8)	152 (47.2)	2 (0.6)	320 (99.4)	76.46 (12.35)	80.00 (13.00)	9.41 (9.59)	7.00 (7.00)
Ward 35 (n=429)	213 (49.7)	216 (50.3)	38 (8.9)	390 (91.1)	68.24 (18.38)	73.00 (23.00)	10.43 (14.59)	6.00 (8.00)
Total (n=3709)	1,861 (50.2)	1,848 (49.8)	347 (9.4)	3,359 (90.6)	60.78 (19.36)	72.00 (25.00)	8.25 (10.978)	5.00 (8.00)
Ward 32 (n=348)	173 (49.7)	175 (50.3)	41 (11.8)	307 (88.2)	69.26 (18.63)	74.00 (25.00)	11.53 (16.41)	6.00 (8.00)
Ward 33 (n=166)	79 (47.6)	87 (52.4)	22 (13.3)	144 (86.7)	69.68 (17.94)	75.00 (22.00)	13.17 (18.10)	6.50 (14.00)
Ward 34 (n=223)	75 (33.6)	148 (66.4)	67 (30.0)	156 (70.0)	70.27 (17.15)	74.00 (23.00)	18.54 (25.96)	9.00 (17.00)
Total (n=737)	327 (44.4)	410 (55.6)	130 (17.6)	607 (82.4)	67.69 (18.73)	74.00 (23.00)	14.02 (20.32)	7.00 (12.00)
Overall Total (n = 13091)	6,660 (50.9)	6,431 (49.1)	2,465 (18.8)	10,623 (81.2)	63.24 (19.42)	67.00 (29.00)	9.63 (13.68)	5.00 (8.00)

4.3.3 Nursing Sensitive Patient Outcome Measures

As highlighted, and discussed in previous sections, nurses play a central role in ensuring patient safety and in-patient surveillance. Previous research has demonstrated a relationship between nurse staffing, skill-mix and nursing sensitive patient outcome measures including mortality, failure to rescue, urinary tract infections, pneumonia, thromboembolism, metabolic derangement, sepsis, ulcer/gastritis/upper gastrointestinal bleed shock/cardiac arrest, and average length of stay. These nursing sensitive outcome measures are central to the evaluation and, as seen in previous research, can be used to measure an association between nurse staffing and patient outcomes.

4.3.3.1 Hospital 1

Of the 17377 patients admitted during Time 1 441 (2.5%) died during their stay, comparable with the 217 out of 8645 (2.5%) deaths during Time 2, with 50.3% over the age of 80 years at Time 1 and 55.8% at Time 2. There was variance between wards in mortality with the greatest proportion of the 441 deaths occurring in Ward 9 (13.4%) followed by Wards 4 (10.7%), 5 (10.4%) and 10 (10.4%) and the least occurring in Ward 18 (0.68%). This pattern changed slightly in Time 2 with the largest proportion of the 217 deaths occurring in Ward 4 (12.0%) followed by Wards 5 (11.5%), 9 (11.5%) and 10 (11.1%), while the lowest proportion occurred in Ward 21 (0.46%) followed by Ward 18 (0.92%). Of the 441 deaths in Time 1, 181 (1.0%) were identified that could be associated with failure to rescue (54.14% over 80 years). Pneumonia (88 cases) and sepsis were the main criteria (86 cases) for inclusion, however other cases included shock/cardiac arrest (n = 11) upper GI bleeding (n = 18) and DVT (n = 16); with some patients having multiple criteria for failure to rescue. Cases of failure to rescue decreased slightly in Hospital 1 at Time 2 (0.7%) with 59.4% of these over the age of 80 years. During Time 2 pneumonia (n = 34) and sepsis (n = 22) were the main criteria for inclusion with five cases of shock/cardiac arrest, nine cases of upper GI bleeding and four cases of DVT. As with all cases of failure to rescue, some patients may have multiple criteria for inclusion. It should be noted that for both time points (Time 1 and Time 2) further work is required on the association between nurse staffing and failure to rescue; in effect, this would require a much larger sample size over a longer period of time. The research team will continue to collect this data over a longitudinal time period.

Excluding mortality, 250 patients (18.5%) in Hospital 1 had a diagnosis related to a nurse sensitive outcome (NSO) in Time 1, which decreased by 1.5% at Time 2 (17.0%). Time 2 saw a decrease in NSOs in Wards 4 (1.3%), 5 (7.4%), 6 (4.1%), 7 (1.0%), 12 (0.3%), 14 (3.9%), 15 (1.7%), 16 (8.3%), 18 (6.3%) and 19 (7.5%). Of these, Wards 7, 12, 14 and 16 received changes to their staffing. Of the patients identified with NSOs, 4.5% (n = 785) of these had multiple NSOs at Time 1 decreasing to 3.9% (n = 337) at Time 2.

Overall, the most frequent NSO in Hospital 1 was metabolic derangement (Time 1 = 7.5%; Time 2 = 7.7%) followed by UTIs (Time 1 = 3.7%; Time 2 = 3.7%). Pneumonia, the third most common NSO in Time 1 (3.3%) decreased to 2.8% during Time 2, followed closely by sepsis which decreased by 1.5% in Time 2. The remaining NSOs

remained relatively equal between the two times and equal to or below a 2% prevalence rate.

4.3.3.2 Hospital 2

In Hospital 2 there were 213 (4.0%) deaths during Time 1 with 52.1% of these over the age of 80 years compared to 156 (4.2%) with 61.5% of these over the age of 80 years in Time 2. Of those that died during Time 1 and Time 2, the highest mortality rates were in Wards 24 (8.5% and 8.2%), 27 (4.5% and 4.4%), 29 (7.1% and 5.7%), 30 (8.0% and 5.6%) and 35 (4.1% and 7.0%). Of the deaths that occurred during Time 1 111 (2.1%) could be considered for inclusion as failure to rescue, with 50.5% over the age of 80 years. Pneumonia was the most common diagnosis for inclusion (75 cases), followed by sepsis (n = 35), shock or cardia arrest (n = 16), upper GI bleeding (n = 8) and DVT (n = 5). During Time 2, 39 patients (1.1%) could be considered under failure to rescue and 59.0% of these were over the age of 80 years. Pneumonia remained the most common diagnosis for inclusion with 32 cases, with the second most common at Time 2 upper GI bleeding (n = 5), followed by sepsis (n = 4), DVT (n = 2) and shock/cardiac arrest (n = 1). As with all cases of failure to rescue patients may have had more than one diagnosis for inclusion to the category.

During Time 1, 21.9% of patients had an NSO which decreased to 18.9% in Time 2. With the exception of one ward (Ward 28) each of the other wards saw a decrease in prevalence of NSOs: Ward 26 (0.2%), Ward 25 and 27 (0.6%) Ward 35 (5.9%), Ward 29 (10.4%) and Ward 24 (10.8%). Time 1 had 325 patients (6.1%) with more than one NSO compared to 158 (4.3%) during Time 2.

Metabolic derangement was the most common type of NSO during both Times and fell by 0.9% in Time 2. Pneumonia, the second most common NSO, had a prevalence of 6.5% in Time 1, falling to 4.5% in time 2. Sepsis and Pressure ulcers decreased by 1.7% and 1.2% respectively. The remaining NSOs remained relatively unchanged or slightly increased, UTIs and DVT (+0.3%), with UTIs the third most common NSO at Time 1 and second at Time 2.

4.3.3.3 Hospital 3

Hospital 3 had 52 (3.9%) and 23 (3.1%) deaths during Time 1 and Time 2 respectively. Of these, 86.5% were over the age of 80 years during Time 1 compared to 78.3% at Time 2. During Time 1, the majority of these deaths occurred in Ward 32 (50.0%) with a small proportion of the deaths occurring in Ward 34 (11.5%) and the remaining 44% in ward 33. This pattern changed in Time 2 with Ward 33 having the largest proportion of deaths (56.5%), followed by Ward 32 (26%) and Ward 34 (17.4%). During Time 1, 15 cases (1.1%) were identified as failure to rescue cases, with a slight increase of 10 cases (1.4%) at Time 2. At Time 1 73.3% of these cases were over the age of 80 while all 10 cases at Time 2 were over the age of 80 years. During Time 1, 10 patients had pneumonia as the diagnosis for inclusion, with n=6 for Time 2. Sepsis accounted for inclusion for n=6 and n=4 patients during Time 1 and Time 2 respectively. Only one case had upper GI bleeding as inclusion during Time 1, with no patients with this diagnosis during Time 2.
Of the 1322 patient in Time 1, 22.2% had an NSO, compared to 131 out of 737 (17.8%) in Time 2. Each of the three wards saw a decrease in the prevalence of NSO from

Time 1 to Time 2 with the largest decrease being seen in Ward 33 (7.3%) and Ward 32 and 33 having a 3.3% and 3.2% decrease respectively. Of the patients with NSOs, 1.9% had multiple NSOs in Time 1, which increased to 3.1% during Time 2.

During Time 1 the most common NSO was Metabolic derangement (8.6%) which reduced by 4.3% at Time 2. UTIs and pneumonia, the second and third most common NSO, increased slightly from Time 1 (6.2% and 4.7% respectively) by 0.2% and 0.3% respectively during Time 2. Sepsis decreased slightly from 2.7% to 2.6% while CNS complications had a larger decrease of 1.2% from 1.5% at Time 1 to 0.3% at Time 2. The remaining NSOs were relatively low at Time 1 and remained low at Time 2.

Table 4.3.3.1: NSO prevalence during Time 1 and Time 2 for Hospital 1

	Any NSO (excl. mortality)	Metabolic derangement	Urinary tract infection	Pneumonia	Sepsis	Pulmonary failure	Pressure ulcers	Deep vein thrombosis	Upper GI bleeding	Shock/ cardiac arrest	CNS complications	Wound infection	Failure to rescue	Mortality
Time 1														
Ward 4 (n=662)	250 (37.8)	104 (15.7)	62 (9.4)	40 (6.0)	30 (4.5)	12 (1.8)	50 (7.6)	10 (1.5)	10 (1.5)	1 (0.2)	48 (7.3)	0 (0.0)	24 (3.6)	47 (7.1)
Ward 5 (n=708)	264 (37.3)	104 (14.7)	52 (7.3)	54 (7.6)	33 (4.7)	15 (2.1)	48 (6.8)	5 (0.7)	10 (1.4)	1 (0.1)	42 (5.9)	0 (0.0)	24 (3.4)	46 (6.5)
Ward 6 (n=1289)	391 (30.3)	205 (15.9)	66 (5.1)	53 (4.1)	61 (4.7)	36 (2.8)	16 (1.2)	9 (0.7)	16 (1.2)	2 (0.2)	33 (2.6)	0 (0.0)	10 (0.8)	38 (2.9)
Ward 7 (n=1021)	202 (19.8)	78 (7.6)	40 (3.9)	32 (3.1)	45 (4.4)	10 (1.0)	10 (1.0)	11 (1.1)	11 (1.1)	2 (0.2)	21 (2.1)	0 (0.0)	11 (1.1)	15 (1.5)
Ward 8 (n=932)	68 (7.3)	32 (3.4)	7 (0.8)	20 (2.1)	17 (1.8)	3 (0.3)	3 (0.3)	1 (0.1)	4 (0.4)	2 (0.2)	5 (0.5)	0 (0.0)	2 (0.2)	6 (0.6)
Ward 9 (n=352)	77 (21.9)	29 (8.2)	9 (2.6)	12 (3.4)	20 (5.7)	0 (0.0)	3 (0.9)	12 (3.4)	3 (0.9)	0 (0.0)	9 (2.6)	0 (0.0)	18 (5.1)	59 (16.8)
Ward 10 (n=1247)	307 (24.6)	151 (12.1)	62 (5.0)	41 (3.3)	36 (2.9)	20 (1.6)	11 (0.9)	8 (0.6)	43 (3.4)	3 (0.2)	32 (2.6)	0 (0.0)	15 (1.2)	46 (3.7)
Ward 11 (n=1040)	122 (11.7)	40 (3.8)	31 (3.0)	23 (2.2)	10 (1.0)	6 (0.6)	12 (1.2)	9 (0.9)	1 (0.1)	3 (0.3)	22 (2.1)	0 (0.0)	7 (0.7)	13 (1.3)
Ward 12 (n=1293)	119 (9.2)	45 (3.5)	21 (1.6)	44 (3.4)	4 (0.3)	6 (0.5)	11 (0.9)	17 (1.3)	2 (0.2)	5 (0.4)	13 (1.0)	0 (0.0)	5 (0.4)	9 (0.7)
Ward 13 (n=1221)	110 (9.0)	40 (3.3)	26 (2.1)	25 (2.0)	8 (0.7)	6 (0.5)	10 (0.8)	11 (0.9)	5 (0.4)	0 (0.0)	19 (1.6)	0 (0.0)	5 (0.4)	35 (2.9)
Ward 14 (n=898)	252 (28.1)	112 (12.5)	33 (3.7)	46 (5.1)	49 (5.5)	16 (1.8)	55 (6.1)	3 (0.3)	21 (2.3)	3 (0.3)	20 (2.2)	0 (0.0)	13 (1.4)	26 (2.9)
Ward 15 (n=1382)	116 (8.4)	46 (3.3)	43 (3.1)	9 (0.7)	16 (1.2)	2 (0.1)	1 (0.1)	3 (0.2)	1 (0.1)	2 (0.1)	4 (0.3)	0 (0.0)	1 (0.1)	6 (0.4)
Ward 16 (n=842)	188 (22.3)	82 (9.7)	34 (4.0)	41 (4.9)	21 (2.5)	42 (5.0)	0 (0.0)	5 (0.6)	7 (0.8)	3 (0.4)	14 (1.7)	0 (0.0)	11 (1.3)	21 (2.5)
Ward 17 (n=1471)	153 (10.4)	57 (3.9)	15 (1.0)	37 (2.5)	39 (2.7)	8 (0.5)	7 (0.5)	11 (0.7)	16 (1.1)	3 (0.2)	19 (1.3)	0 (0.0)	7 (0.5)	13 (0.9)
Ward 18 (n=512)	86 (16.8)	20 (3.9)	35 (6.8)	26 (5.1)	9 (1.8)	1 (0.2)	14 (2.7)	0 (0.0)	4 (0.8)	1 (0.2)	13 (2.5)	0 (0.0)	1 (0.2)	3 (0.6)
Ward 19 (n=341)	109 (32.0)	6 (1.8)	10 (2.9)	10 (2.9)	87 (25.5)	1 (0.3)	1 (0.3)	4 (1.2)	3 (0.9)	0 (0.0)	4 (1.2)	0 (0.0)	7 (2.1)	16 (4.7)
Ward 20 (n=1190)	277 (23.3)	109 (9.2)	57 (4.8)	48 (4.0)	45 (3.8)	26 (2.2)	8 (0.7)	4 (0.3)	15 (1.3)	2 (0.2)	30 (2.5)	0 (0.0)	17 (1.4)	31 (2.6)
Ward 21 (n=976)	122 (12.5)	46 (4.7)	42 (4.3)	12 (1.2)	26 (2.7)	5 (0.5)	6 (0.6)	2 (0.2)	6 (0.6)	0 (0.0)	7 (0.7)	0 (0.0)	3 (0.3)	11 (1.1)
Total (n=17377)	3,213 (18.5)	1,306 (7.5)	645 (3.7)	573 (3.3)	556 (3.2)	215 (1.2)	266 (1.5)	125 (0.7)	178 (1.0)	33 (0.2)	355 (2.0)	0 (0.0)	181 (1.0)	441 (2.5)
Time 2														
Ward 4 (n=307)	112 (36.5)	47 (15.3)	25 (8.1)	26 (8.5)	7 (2.3)	7 (2.3)	14 (4.6)	5 (1.6)	5 (1.6)	0 (0.0)	18 (5.9)	0 (0.0)	8 (2.6)	26 (8.5)
Ward 5 (n=415)	124 (29.9)	63 (15.2)	30 (7.2)	28 (6.7)	10 (2.4)	13 (3.1)	6 (1.4)	7 (1.7)	3 (0.7)	0 (0.0)	14 (3.4)	0 (0.0)	9 (2.2)	25 (6.0)
Ward 6 (n=520)	136 (26.2)	79 (15.2)	34 (6.5)	17 (3.3)	14 (2.7)	7 (1.3)	15 (2.9)	5 (1.0)	9 (1.7)	2 (0.4)	14 (2.7)	0 (0.0)	3 (0.6)	12 (2.3)
Ward 7 (n=516)	97 (18.8)	44 (8.5)	22 (4.3)	11 (2.1)	7 (1.4)	8 (1.6)	7 (1.4)	4 (0.8)	8 (1.6)	1 (0.2)	11 (2.1)	0 (0.0)	2 (0.4)	12 (2.3)
Ward 8 (n=525)	42 (8.0)	15 (2.9)	4 (0.8)	11 (2.1)	7 (1.3)	3 (0.6)	3 (0.6)	3 (0.6)	4 (0.8)	0 (0.0)	5 (1.0)	0 (0.0)	0 (0.0)	6 (1.1)
Ward 9 (n=151)	36 (23.8)	12 (7.9)	4 (2.6)	9 (6.0)	8 (5.3)	2 (1.3)	3 (2.0)	3 (2.0)	1 (0.7)	0 (0.0)	7 (4.6)	0 (0.0)	6 (4.0)	25 (16.6)
Ward 10 (n=671)	191 (28.5)	105 (15.6)	33 (4.9)	23 (3.4)	9 (1.3)	4 (0.6)	15 (2.2)	4 (0.6)	39 (5.8)	2 (0.3)	18 (2.7)	0 (0.0)	10 (1.5)	24 (3.6)
Ward 11 (n=455)	66 (14.5)	25 (5.5)	20 (4.4)	8 (1.8)	3 (0.7)	4 (0.9)	6 (1.3)	5 (1.1)	2 (0.4)	1 (0.2)	8 (1.8)	0 (0.0)	1 (0.2)	7 (1.5)
Ward 12 (n=709)	63 (8.9)	23 (3.2)	11 (1.6)	21 (3.0)	6 (0.8)	2 (0.3)	0 (0.0)	6 (0.8)	2 (0.3)	0 (0.0)	8 (1.1)	0 (0.0)	2 (0.3)	3 (0.4)
Ward 13 (n=548)	42 (7.7)	18 (3.3)	4 (0.7)	11 (2.0)	4 (0.7)	2 (0.4)	0 (0.0)	4 (0.7)	1 (0.2)	1 (0.2)	6 (1.1)	0 (0.0)	3 (0.5)	16 (2.9)
Ward 14 (n=421)	102 (24.2)	43 (10.2)	23 (5.5)	10 (2.4)	20 (4.8)	7 (1.7)	4 (1.0)	2 (0.5)	5 (1.2)	2 (0.5)	7 (1.7)	0 (0.0)	4 (1.0)	10 (2.4)
Ward 15 (n=824)	55 (6.7)	20 (2.4)	19 (2.3)	3 (0.4)	7 (0.8)	1 (0.1)	1 (0.1)	4 (0.5)	1 (0.1)	1 (0.1)	4 (0.5)	0 (0.0)	2 (0.2)	4 (0.5)
Ward 16 (n=444)	62 (14.0)	26 (5.9)	11 (2.5)	8 (1.8)	8 (1.8)	11 (2.5)	1 (0.2)	2 (0.5)	3 (0.7)	1 (0.2)	3 (0.7)	0 (0.0)	1 (0.2)	10 (2.3)
Ward 17 (n=757)	88 (11.6)	50 (6.6)	9 (1.2)	14 (1.8)	10 (1.3)	6 (0.8)	10 (1.3)	5 (0.7)	7 (0.9)	2 (0.3)	10 (1.3)	0 (0.0)	3 (0.4)	7 (0.9)
Ward 18 (n=248)	26 (10.5)	5 (2.0)	9 (3.6)	8 (3.2)	0 (0.0)	0 (0.0)	1 (0.4)	1 (0.4)	2 (0.8)	0 (0.0)	4 (1.6)	0 (0.0)	1 (0.4)	2 (0.8)
Ward 19 (n=155)	38 (24.5)	18 (11.6)	7 (4.5)	4 (2.6)	11 (7.1)	2 (1.3)	1 (0.6)	2 (1.3)	3 (1.9)	0 (0.0)	0 (0.0)	0 (0.0)	4 (2.6)	10 (6.5)
Ward 20 (n=490)	123 (25.1)	49 (10.0)	30 (6.1)	21 (4.3)	11 (2.2)	12 (2.4)	11 (2.2)	3 (0.6)	4 (0.8)	1 (0.2)	14 (2.9)	0 (0.0)	5 (1.0)	17 (3.5)
Ward 21 (n=489)	66 (13.5)	22 (4.5)	27 (5.5)	7 (1.4)	5 (1.0)	1 (0.2)	3 (0.6)	2 (0.4)	3 (0.6)	0 (0.0)	6 (1.2)	0 (0.0)	0 (0.0)	1 (0.2)
Total (n=8645)	1,469 (17.0)	664 (7.7)	322 (3.7)	240 (2.8)	147 (1.7)	92 (1.1)	101 (1.2)	67 (0.8)	102 (1.2)	14 (0.2)	157 (1.8)	0 (0.0)	64 (0.7)	217 (2.5)

Table 4.3.3.2: NSO prevalence during Time 1 and Time 2 for Hospital 2

	Any NSO (excl. mortality)	Metabolic derangement	Urinary tract infection	Pneumonia	Sepsis	Pulmonary failure	Pressure ulcers	Deep vein thrombosis	Upper GI bleeding	Shock/ cardiac arrest	CNS complications	Wound infection	Failure to rescue	Mortality
Time 1														
Ward 24 (n=448)	161 (35.9)	66 (14.7)	30 (6.7)	55 (12.3)	17 (3.8)	3 (0.7)	14 (3.1)	1 (0.2)	13 (2.9)	3 (0.7)	6 (1.3)	0 (0.0)	21 (4.7)	38 (8.5)
Ward 25 (n=770)	63 (8.2)	22 (2.9)	16 (2.1)	22 (2.9)	7 (0.9)	2 (0.3)	3 (0.4)	2 (0.3)	6 (0.8)	0 (0.0)	1 (0.1)	0 (0.0)	3 (0.4)	5 (0.6)
Ward 26 (n=1123)	160 (14.2)	64 (5.7)	33 (2.9)	53 (4.7)	21 (1.9)	8 (0.7)	18 (1.6)	3 (0.3)	11 (1.0)	4 (0.4)	10 (0.9)	2 (0.2)	18 (1.6)	23 (2.0)
Ward 27 (n=874)	195 (22.3)	78 (8.9)	48 (5.5)	59 (6.8)	18 (2.1)	7 (0.8)	25 (2.9)	3 (0.3)	15 (1.7)	3 (0.3)	18 (2.1)	1 (0.1)	12 (1.4)	39 (4.5)
Ward 28 (n=729)	124 (17.0)	42 (5.8)	41 (5.6)	28 (3.8)	4 (0.5)	2 (0.3)	25 (3.4)	3 (0.4)	4 (0.5)	3 (0.4)	11 (1.5)	0 (0.0)	10 (1.4)	17 (2.3)
Ward 29 (n=507)	185 (36.5)	70 (13.8)	41 (8.1)	61 (12.0)	21 (4.1)	5 (1.0)	15 (3.0)	3 (0.6)	6 (1.2)	3 (0.6)	20 (3.9)	0 (0.0)	18 (3.6)	36 (7.1)
Ward 30 (n=473)	154 (32.6)	68 (14.4)	49 (10.4)	39 (8.2)	12 (2.5)	9 (1.9)	23 (4.9)	0 (0.0)	3 (0.6)	3 (0.6)	15 (3.2)	1 (0.2)	19 (4.0)	38 (8.0)
Ward 35 (n=412)	129 (31.3)	63 (15.3)	39 (9.5)	28 (6.8)	10 (2.4)	2 (0.5)	13 (3.2)	2 (0.5)	5 (1.2)	0 (0.0)	13 (3.2)	1 (0.2)	10 (2.4)	17 (4.1)
Total (n=5336)	1,171 (21.9)	473 (8.9)	297 (5.6)	345 (6.5)	110 (2.1)	38 (0.7)	136 (2.5)	17 (0.3)	63 (1.2)	19 (0.4)	94 (1.8)	5 (0.1)	111 (2.1)	213 (4.0)
Time 2														
Ward 24 (n=291)	73 (25.1)	32 (11.0)	28 (9.6)	22 (7.6)	0 (0.0)	0 (0.0)	5 (1.7)	3 (1.0)	2 (0.7)	1 (0.3)	2 (0.7)	0 (0.0)	4 (1.4)	24 (8.2)
Ward 25 (n=686)	52 (7.6)	17 (2.5)	13 (1.9)	13 (1.9)	4 (0.6)	0 (0.0)	3 (0.4)	1 (0.1)	3 (0.4)	0 (0.0)	2 (0.3)	1 (0.1)	1 (0.1)	7 (1.0)
Ward 26 (n=599)	84 (14.0)	45 (7.5)	19 (3.2)	18 (3.0)	2 (0.3)	0 (0.0)	6 (1.0)	2 (0.3)	6 (1.0)	1 (0.2)	4 (0.7)	0 (0.0)	2 (0.3)	15 (2.5)
Ward 27 (n=590)	128 (21.7)	56 (9.5)	33 (5.6)	36 (6.1)	2 (0.3)	3 (0.5)	4 (0.7)	6 (1.0)	14 (2.4)	1 (0.2)	7 (1.2)	1 (0.2)	8 (1.4)	26 (4.4)
Ward 28 (n=421)	75 (17.8)	27 (6.4)	26 (6.2)	21 (5.0)	2 (0.5)	1 (0.2)	8 (1.9)	1 (0.2)	5 (1.2)	0 (0.0)	11 (2.6)	0 (0.0)	6 (1.4)	15 (3.6)
Ward 29 (n=371)	97 (26.1)	34 (9.2)	42 (11.3)	16 (4.3)	1 (0.3)	3 (0.8)	7 (1.9)	4 (1.1)	3 (0.8)	0 (0.0)	7 (1.9)	0 (0.0)	4 (1.1)	21 (5.7)
Ward 30 (n=322)	84 (26.1)	36 (11.2)	25 (7.8)	16 (5.0)	2 (0.6)	2 (0.6)	5 (1.6)	1 (0.3)	5 (1.6)	0 (0.0)	8 (2.5)	0 (0.0)	2 (0.6)	18 (5.6)
Ward 35 (n=429)	109 (25.4)	49 (11.4)	34 (7.9)	26 (6.1)	2 (0.5)	4 (0.9)	10 (2.3)	6 (1.4)	3 (0.7)	0 (0.0)	9 (2.1)	0 (0.0)	12 (2.8)	30 (7.0)
Total (n=3709)	702 (18.9)	296 (8.0)	220 (5.9)	168 (4.5)	15 (0.4)	13 (0.4)	48 (1.3)	24 (0.6)	41 (1.1)	3 (0.1)	50 (1.3)	2 (0.1)	39 (1.1)	156 (4.2)

Table 4.3.3.2: NSO prevalence during Time 1 and Time 2 for Hospital 3

	Any NSO (excl. mortality)	Metabolic derangement	Urinary tract infection	Pneumonia	Sepsis	Pulmonary failure	Pressure ulcers	Deep vein thrombosis	Upper GI bleeding	Shock/ cardiac arrest	CNS complications	Wound infection	Failure to rescue	Mortality
Time 1														
Ward 32 (n=604)	131 (21.7)	49 (8.1)	35 (5.8)	29 (4.8)	19 (3.1)	3 (0.5)	2 (0.3)	5 (0.8)	3 (0.5)	0 (0.0)	11 (1.8)	1 (0.2)	6 (1.0)	26 (4.3)
Ward 33 (n=338)	90 (26.6)	31 (9.2)	28 (8.3)	20 (5.9)	14 (4.1)	5 (1.5)	0 (0.0)	1 (0.3)	1 (0.3)	0 (0.0)	4 (1.2)	0 (0.0)	8 (2.4)	23 (6.8)
Ward 34 (n=380)	72 (18.9)	34 (8.9)	19 (5.0)	13 (3.4)	3 (0.8)	0 (0.0)	1 (0.3)	6 (1.6)	2 (0.5)	0 (0.0)	5 (1.3)	0 (0.0)	1 (0.3)	3 (0.8)
Total (n=1322)	293 (22.2)	114 (8.6)	82 (6.2)	62 (4.7)	36 (2.7)	8 (0.6)	3 (0.2)	12 (0.9)	6 (0.5)	0 (0.0)	20 (1.5)	1 (0.1)	15 (1.1)	52 (3.9)
Time 2														
Ward 32 (n=348)	64 (18.4)	13 (3.7)	24 (6.9)	18 (5.2)	13 (3.7)	1 (0.3)	0 (0.0)	2 (0.6)	2 (0.6)	0 (0.0)	1 (0.3)	0 (0.0)	4 (1.1)	6 (1.7)
Ward 33 (n=166)	32 (19.3)	11 (6.6)	7 (4.2)	14 (8.4)	4 (2.4)	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (3.0)	13 (7.8)
Ward 34 (n=223)	35 (15.7)	8 (3.6)	16 (7.2)	5 (2.2)	2 (0.9)	2 (0.9)	0 (0.0)	0 (0.0)	2 (0.9)	0 (0.0)	1 (0.4)	0 (0.0)	1 (0.4)	4 (1.8)
Total (n=737)	131 (17.8)	32 (4.3)	47 (6.4)	37 (5.0)	19 (2.6)	4 (0.5)	0 (0.0)	2 (0.3)	4 (0.5)	0 (0.0)	2 (0.3)	0 (0.0)	10 (1.4)	23 (3.1)

4.3.4 Segmented Time Series Analysis

We again used a segmented time series model to estimate the effect of the uplift in the 29 extension wards (15/08/2017 to 30/04/2019), for which 10 received implementation of the *Framework* from 01/09/2019, while the other 19 did not. Consequently, we allowed the NSO time-trend in the post-uplift period to vary across these two groups using an interaction term. The results from the model are summarised in Figure 4.3.4.1. The parallel time trend in the two groups of wards suggests that there was no change in the NSO rate that could be attributed to the uplift (and the p-value for the interaction was 0.87). An analysis using the daily count of deaths as the outcome yielded similar results.

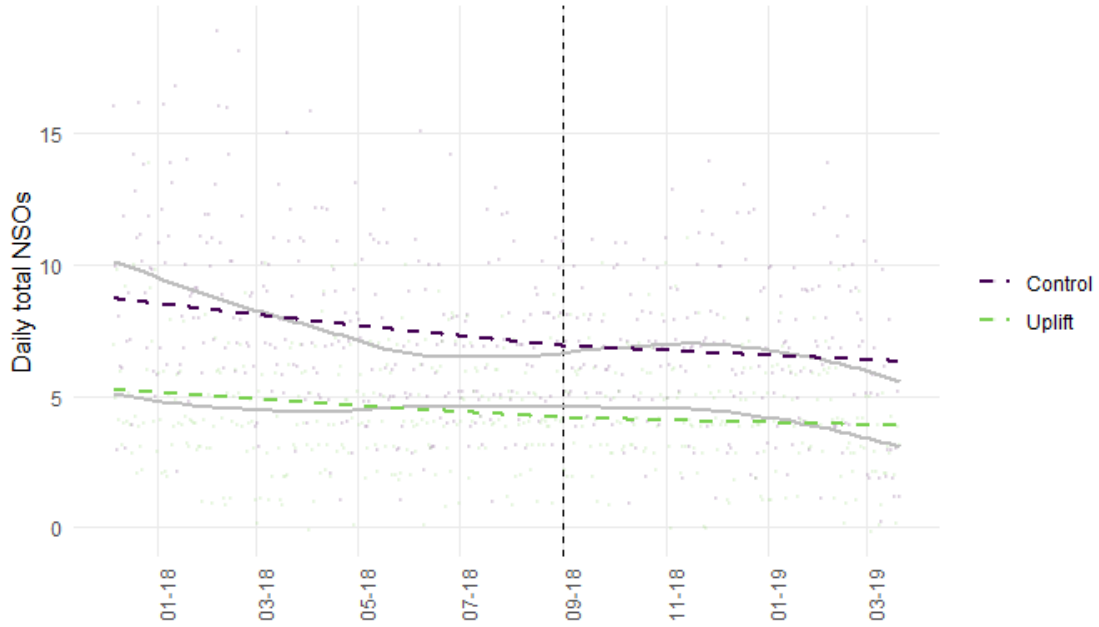

Figure 4.3.4.1: Daily total NSOs for all extension wards over the observation period

The points reflect the total NSO count (y-axis) for each day of observation (x-axis). The vertical line marks when the Framework was introduced. The dashed lines follows the predicted NSO counts in each group of wards (uplift vs non-implementation) from the segmented time series Poisson regression, while the grey line shows the LOESS (smoothed) fit to the data.

4.3.6 Conclusion

From the analysis of the HIPE data, it is apparent that mortality and failure to rescue rates have decreased in Hospitals 1 and 2 from Time 1 to Time 2 overall; however, there is no overall trend. However, it is important to note that a longer data collection period is required in order to definitively state this along with plotting this data over a longitudinal time-period. The prevalence of NSOs decreased in all three hospitals from

Time 1 to Time 2, with the most metabolic derangement as the most prevalent NSO, generally followed by pneumonia, UTIs and sepsis. While the NSOs appear to be decreasing in all extension wards there was no difference in this decrease between the wards.

4.4 Staff survey

An additional 18 wards in hospital 1, seven wards in hospital 2 and three ward in hospital 3 have been included in the research study. Staff in these wards provided with the same survey discussed at Time 2 and 3 of the pilot above and were surveyed at the same time point as the pilot wards. However, as this is their baseline, the time point shall be referred to Time 1 and the follow-up as Time 2.

4.4.1 Staff profile

The demographic staff profile of the respondents included in Time 1 and Time 2 of this research is detailed below in Tables 4.4.1.1, 4.4.1.2., 4.4.1.3., 4.4.1.4., 4.4.1.5., 4.4.1.6., and 4.4.1.7. As seen in table 4.4.1.1., the majority of staff were RNs (78.8% in Time 1, 68.45% in Time 2) and had completed degree level education (64.1% in Time 1, 65% in Time 2). HCA responses appeared to remain constant at an average of 20% for both Time 1 and Time 2 and there was a slight increase in the number of CNM responses from 2.9% in Time 1 to 9.3% in Time 2. Approximately 90% of staff were working in full-time posts over both time periods and over 80% of respondents were female. The majority of the cohort (69.2% in Time 1, 70.6% in Time 2) came from those whose last shift had been a day shift. The reported experience respondents had as a nurse/HCA remained constant at 12 years through both time periods and time spent on current ward was observed at 5 years in both Time 1 and Time 2.

Table: 4.4.1.1 Staff profile

	Time 1				Time 2		
Grade	CNM	RN	HCA		CNM	RN	HCA
Hospital 1				*Hospital 1*			
Ward 4 (n = 12)	1 (8.3)	9 (75.0)	2 (16.7)	Ward 4 (n = 12)	0 (0.0)	8 (66.7)	4 (33.3)
Ward 5 (n = 26)	0 (0.0)	19 (73.1)	7 (26.9)	Ward 5 (n = 15)	2 (14.3)	8 (57.1)	4 (28.6)
Ward 6 (n = 10)	0 (0.0)	6 (60.0)	4 (40.0)	Ward 6 (n = 9)	1 (11.1)	6 (66.7)	2 (22.2)
Ward 7 (n = 13)	0 (0.0)	10 (83.3)	2 (16.7)	Ward 7 (n = 13)	0 (0.0)	10 (76.9)	3 (23.1)
Ward 8 (n = 6)	0 (0.0)	5 (100.0)	0 (0.0)	Ward 8 (n = 6)	0 (0.0)	6 (100)	0 (0)
Ward 9 (n = 13)	0 (0.0)	10 (76.9)	3 (23.1)	Ward 9 (n= 9)	2 (22.2)	6 (66.7)	1 (11.1)
Ward 10 (n = 17)	0 (0.0)	12 (70.6)	5 (29.4)	Ward 10 (n =8)	1 (14.3)	6 (85.7)	0 (0)
Ward 11 (n = 13)	0 (0.0)	9 (69.4.0)	4 (30.8)	Ward 11 (n = 10)	1 (10)	6 (60)	3 (30)
Ward 12 (n = 13)	0 (0.0)	12 (92.3)	1 (7.7)	Ward 12 (n = 16)	1 (6.7)	7 (46.7)	7 (46.7)
Ward 13 (n = 36)	2 (5.7)	26 (74.3)	7 (20.0)	Ward 13 (n = 22)	2 (9.1)	14 (63.6)	6 (27.3)
Ward 14 (n = 11)	1 (9.1)	7 (63.6)	3 (27.3)	Ward 14 (n = 12)	0 (0.0)	9 (75)	3 (25)
Ward 15 (n = 12)	0 (0.0)	8 (66.7)	4 (33.3)	Ward 15 (n = 11)	1 (9.1)	6 (54.5)	4 (36.4)
Ward 16 (n = 23)	1 (4.3)	16 (69.6)	6 (26.1)	Ward 16 (n = 10)	1 (10)	8 (80)	1 (10)
Ward 17 (n = 27)	2 (7.4)	24 (88.9)	1 (3.7)	Ward 17 (n = 13)	0 (0.0)	10 (83.3)	2 (16.7)
Ward 18 (n = 15)	1 (6.7)	11 (73.3)	3 (20.0)	Ward 18 (n = 2)	0 (0.0)	1 (50)	1 (50)
Ward 19 (n = 14)	1 (7.1)	13 (92.9)	0 (0.0)	Ward 19 (n = 10)	2 (20)	8 (80)	0 (0)
Ward 20 (n = 17)	1 (5.9)	15 (88.2)	1 (5.9)	Ward 20 (n = 10)	1 (10)	6 (60)	3 (30)
Ward 21 (n = 8)	0 (0.0)	8 (100.0)	0 (0.0)	Ward 21 (n = 8)	2 (28.6)	4 (57.1)	1 (14.3)
Total (n = 286)	10 (3.6)	220 (77.5)	53 (18.8)	Total (n = 196)	18 (9.3)	129 (66.8)	46 (23.8)
Hospital 2				*Hospital 2*			
Ward 24 (n = 16)	1 (6.3)	11 (68.8)	4 (25.0)	Ward 24 (n =17)	1 (5.9)	11 (64.7)	5 (29.4)
Ward 25 (n = 15)	0 (0.0)	12 (80.0)	3 (20.0)	Ward 25 (n = 2)	1 (50)	1 (50)	0 (0)
Ward 26 (n = 25)	0 (0.0)	22 (88.0)	3 (12.0)	Ward 26 (n = 18)	1 (5.6)	14 (77.8)	3 (16.7)
Ward 27 (n = 22)	0 (0.0)	19 (86.4)	3 (13.6)	Ward 27 (n = 8)	1 (14.3)	4 (57.1)	2 (28.6)
Ward 28 (n = 22)	2 (9.1)	16 (72.7)	4 (18.2)	Ward 28 (n = 18)	1 (5.6)	13 (72.2)	4 (22.2)
Ward 29 (n = 10)	0 (0.0)	7 (70.0)	3 (30.0)	Ward 29 (n= 11)	3 (27.3)	5 (45.5)	3 (27.3)
Ward 30 (n = 12)	0 (0.0)	9 (75.0)	3 (25.0)	Ward 30 (n = 12)	0 (0)	8 (66.7)	4 (33.3)
-	-	-	-	Ward 35 (n= 12)	2 (16.7)	10 (83.3)	0 (0)
Total (n = 122)	3 (2.5)	96 (78.5)	23 (19.0)	Total (n = 98)	9 (9.5)	66 (69.5)	20 (21.1)
Hospital 3				*Hospital 3*			
Ward 32 (n = 11)	0 (0.0)	11 (100.0)	0 (0.0)	Ward 32 (n = 3)	0 (0.0)	3 (100.0)	0 (0.0)
Ward 33 (n = 7)	0 (0.0)	7 (100.0)	0 (0.0)	Ward 33 (n = 5)	1 (20.0)	4 (80.0)	0 (0.0)
Ward 34 (n = 18)	0 (0.0)	16 (88.9)	2 (11.1)	Ward 34 (n = 6)	0 (0.0)	4 (80.0)	1 (20.0)
Total (n = 36)	0 (0.0)	34 (94.4)	2 (5.6)	Total (n =14)	1 (7.7)	11 (84.6)	1 (7.7)
Overall total (n = 444)	13 (2.9)	350 (78.8)	78 (17.6)	*Overall total (n= 308)*	28 (9.3)	206 (68.4)	67 (22.3)

Table: 4.4.1.2 Highest qualification

Time 1

Nurse Qualification	Registered nurse – hospital certificate	Registered nurse – diploma (e.g. university/college)	Registered nurse – degree (e.g. university/college)	Post-graduate certificate Nursing (e.g. university/college)	Post-graduate diploma Nursing (e.g. university/college)	Masters in Nursing
Hospital 1						
Ward 4 (n = 12)	1 (10.0)	2 (20.0)	5 (50.0)	0 (0.0)	2 (20.0)	0 (0.0)
Ward 5 (n = 26)	1 (5.6)	5 (27.8)	7 (38.9)	0 (0.0)	5 (27.8)	0 (0.0)
Ward 6 (n = 10)	0 (0.0)	0 (0.0)	4 (80.0)	1 (20.0)	0 (0.0)	0 (0.0)
Ward 7 (n = 13)	0 (0.0)	1 (9.1)	10 (90.9)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 8 (n = 6)	0 (0.0)	2 (33.3)	3 (50.0)	0 (0.0)	0 (0.0)	1 (16.7)
Ward 9 (n = 13)	1 (10.0)	0 (0.0)	6 (60.0)	0 (0.0)	3 (30.0)	0 (0.0)
Ward 10 (n = 17)	0 (0.0)	2 (16.7)	9 (75.0)	0 (0.0)	1 (8.3)	0 (0.0)
Ward 11 (n = 13)	1 (11.1)	3 (33.3)	4 (44.4)	0 (0.0)	1 (11.1)	0 (0.0)
Ward 12 (n = 13)	1 (8.3)	3 (25.0)	6 (50.0)	0 (0.0)	2 (16.7)	0 (0.0)
Ward 13 (n = 36)	2 (7.1)	4 (14.3)	17 (60.7)	3 (10.7)	2 (7.1)	0 (0.0)
Ward 14 (n = 11)	0 (0.0)	1 (14.3)	5 (71.4)	0 (0.0)	1 (14.3)	0 (0.0)
Ward 15 (n = 12)	0 (0.0)	2 (25.0)	2 (25.0)	0 (0.0)	3 (37.5)	1 (12.5)
Ward 16 (n = 23)	0 (0.0)	0 (0.0)	13 (81.3)	1 (6.3)	2 (12.5)	0 (0.0)
Ward 17 (n = 27)	0 (0.0)	1 (3.8)	23 (88.5)	2 (7.7)	0 (0.0)	0 (0.0)
Ward 18 (n = 15)	0 (0.0)	1 (8.3)	6 (50.0)	1 (8.3)	4 (33.3)	0 (0.0)
Ward 19 (n = 14)	1 (7.1)	0 (0.0)	11 (78.6)	0 (0.0)	1 (7.1)	1 (7.1)
Ward 20 (n = 17)	3 (18.8)	1 (6.3)	10 (62.5)	0 (0.0)	1 (6.3)	1 (6.3)
Ward 21 (n = 8)	1 (12.5)	2 (25.0)	2 (25.0)	2 (25.0)	0 (0.0)	1 (12.5)
Total (n = 286)	12 (5.3)	30 (13.2)	143 (62.7)	10 (4.4)	28 (12.3)	5 (2.2)
Hospital 2						
Ward 24 (n = 16)	0 (0.0)	1 (8.3)	10 (83.3)	0 (0.0)	1 (8.3)	0 (0.0)
Ward 25 (n = 15)	0 (0.0)	2 (16.7)	8 (66.7)	0 (0.0)	1 (8.3)	1 (8.3)
Ward 26 (n = 25)	3 (14.3)	2 (9.5)	13 (61.9)	0 (0.0)	2 (9.5)	1 (4.8)
Ward 27 (n = 22)	3 (15.8)	0 (0.0)	16 (84.2)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 28 (n = 22)	2 (11.1)	6 (33.3)	9 (50.0)	0 (0.0)	1 (5.6)	0 (0.0)
Ward 29 (n = 10)	0 (0.0)	1 (14.3)	6 (85.7)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 30 (n = 12)	2 (25.0)	1 (12.5)	5 (62.5)	0 (0.0)	0 (0.0)	0 (0.0)
Total (n = 122)	10 (10.3)	13 (13.4)	66 (69.1)	0 (0.0)	5 (5.2)	2 (2.1)
Hospital 3						
Ward 32 (n = 11)	3 (27.3)	2 (18.2)	3 (27.3)	0 (0.0)	3 (27.3)	0 (0.0)
Ward 33 (n = 7)	0 (0.0)	2 (28.6)	4 (57.1)	0 (0.0)	1 (14.3)	0 (0.0)
Ward 34 (n = 18)	0 (0.0)	0 (0.0)	12 (85.7)	1 (7.1)	1 (7.1)	0 (0.0)
Total (n = 36)	3 (9.4)	4 (12.5)	19 (59.4)	1 (3.1)	5 (15.6)	0 (0.0)
Overall total (n = 444)	25 (7.0)	47 (13.2)	229 (64.1)	11 (3.1)	38 (10.6)	7 (2.0)

Time 2

Nurse Qualification	Registered nurse – hospital certificate	Registered nurse – diploma (e.g. university/college)	Registered nurse – degree (e.g. university/college)	Post-graduate certificate Nursing (e.g. university/college)	Post-graduate diploma Nursing (e.g. university/college)	Masters in Nursing
Hospital 1						
Ward 4 (n = 12)	1 (12.5)	1 (12.5)	2 (25.0)	0 (0.0)	4 (50.0)	0 (0.0)
Ward 5 (n = 15)	1 (9.1)	4 (36.4)	4 (36.4)	0 (0.0)	2 (18.2)	0 (0.0)
Ward 6 (n = 9)	0 (0.0)	1 (14.3)	4 (57.1)	0 (0.0)	0 (0.0)	2 (28.6)
Ward 7 (n = 13)	0 (0.0)	1 (10.0)	6 (60.0)	1 (10.0)	1 (10.0)	1 (10.0)
Ward 8 (n = 6)	0 (0.0)	0 (0.0)	5 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 9 (n= 9)	1 (12.5)	0 (0.0)	3 (37.5)	1 (12.5)	3 (37.5)	0 (0.0)
Ward 10 (n =8)	0 (0.0)	1 (12.5)	7 (87.5)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 11 (n = 10)	0 (0.0)	2 (28.6)	5 (71.4)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 12 (n = 16)	0 (0.0)	2 (25.0)	4 (50.0)	1 (12.5)	1 (12.5)	0 (0.0)
Ward 13 (n = 22)	0 (0.0)	2 (13.3)	11 (73.3)	1 (6.7)	1 (6.7)	0 (0.0)
Ward 14 (n = 12)	0 (0.0)	1 (11.1)	6 (66.7)	0 (0.0)	2 (22.2)	0 (0.0)
Ward 15 (n = 11)	0 (0.0)	2 (28.6)	2 (28.6)	0 (0.0)	2 (28.6)	1 (14.3)
Ward 16 (n = 10)	0 (0.0)	0 (0.0)	8 (88.9)	0 (0.0)	1 (11.1)	0 (0.0)
Ward 17 (n = 13)	0 (0.0)	2 (18.2)	9 (81.8)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 18 (n = 2)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 19 (n = 10)	0 (0.0)	0 (0.0)	6 (60.0)	1 (10.0)	2 (20.0)	1 (10.0)
Ward 20 (n = 10)	1 (16.7)	1 (16.7)	4 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 21 (n = 8)	0 (0.0)	1 (14.3)	0 (0.0)	1 (14.3)	3 (42.9)	2 (28.6)
Total (n = 196)	4 (2.7)	21 (14.2)	88 (59.5)	6 (4.1)	22 (14.9)	7 (4.7)
Hospital 2						
Ward 24 (n =17)	0 (0.0)	2 (16.7)	10 (83.3)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 25 (n = 2)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 26 (n = 18)	0 (0.0)	2 (13.3)	12 (80.0)	0 (0.0)	0 (0.0)	1 (6.7)
Ward 27 (n = 8)	0 (0.0)	0 (0.0)	6 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 28 (n = 18)	1 (7.1)	0 (0.0)	10 (71.4)	1 (7.1)	2 (14.3)	0 (0.0)
Ward 29 (n= 11)	0 (0.0)	2 (25.0)	4 (50.0)	1 (12.5)	1 (12.5)	0 (0.0)
Ward 30 (n = 12)	1 (12.5)	3 (37.5)	4 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 35 (n= 12)	0 (0.0)	0 (0.0)	12 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total (n = 98)	2 (2.6)	10 (13.2)	58 (76.3)	2 (2.6)	3 (3.9)	1 (1.3)
Hospital 3						
Ward 32 (n = 3)	1 (33.3)	0 (0.0)	2 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 33 (n = 5)	1 (20.0)	0 (0.0)	3 (60.0)	0 (0.0)	1 (20.0)	0 (0.0)
Ward 34 (n = 6)	1 (20.0)	1 (20.0)	3 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total (n =14)	3 (23.1)	1 (7.7)	8 (61.5)	0 (0.0)	1 (7.7)	0 (0.0)
Overall total (n= 308)	9 (3.8)	32 (13.5)	154 (65.0)	8 (3.4)	26 (11.0)	8 (3.4)

Table: 4.4.1.3 Highest education level

Time 1

Education	No formal education	Junior/ Intermediate Certificate (or equivalent)	Leaving Certificate (or equivalent)	Vocational/ Technical Qualification	Certificate (Third-level)	Diploma (Third-level)	Bachelor's Degree	Master's Degree	Doctoral Degree
Hospital 1									
Ward 4 (n = 12)	1 (9.1)	1 (9.1)	4 (36.4)	0 (0.0)	1 (9.1)	2 (18.2)	2 (18.2)	0 (0.0)	0 (0.0)
Ward 5 (n = 26)	0 (0.0)	1 (4.2)	12 (50.0)	3 (12.5)	1 (4.2)	5 (20.8)	2 (8.3)	0 (0.0)	0 (0.0)
Ward 6 (n = 10)	0 (0.0)	1 (11.1)	2 (22.2)	3 (33.3)	1 (11.1)	0 (0.0)	2 (22.2)	0 (0.0)	0 (0.0)
Ward 7 (n = 13)	0 (0.0)	0 (0.0)	4 (44.4)	2 (22.2)	0 (0.0)	1 (11.1)	2 (22.2)	0 (0.0)	0 (0.0)
Ward 8 (n = 6)	0 (0.0)	0 (0.0)	3 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (50.0)	0 (0.0)	0 (0.0)
Ward 9 (n = 13)	0 (0.0)	0 (0.0)	6 (46.2)	3 (23.1)	1 (7.7)	0 (0.0)	3 (23.1)	0 (0.0)	0 (0.0)
Ward 10 (n = 17)	0 (0.0)	0 (0.0)	3 (23.1)	2 (15.4)	1 (7.7)	3 (23.1)	4 (30.8)	0 (0.0)	0 (0.0)
Ward 11 (n = 13)	0 (0.0)	0 (0.0)	1 (12.5)	2 (25.0)	0 (0.0)	0 (0.0)	5 (62.5)	0 (0.0)	0 (0.0)
Ward 12 (n = 13)	0 (0.0)	2 (15.4)	7 (53.8)	1 (7.7)	0 (0.0)	1 (7.7)	2 (15.4)	0 (0.0)	0 (0.0)
Ward 13 (n = 36)	3 (9.1)	0 (0.0)	12 (36.4)	4 (12.1)	4 (12.1)	3 (9.1)	7 (21.2)	0 (0.0)	0 (0.0)
Ward 14 (n = 11)	1 (9.1)	0 (0.0)	4 (36.4)	2 (18.2)	1 (9.1)	2 (18.2)	1 (9.1)	0 (0.0)	0 (0.0)
Ward 15 (n = 12)	0 (0.0)	0 (0.0)	5 (45.5)	4 (36.4)	1 (9.1)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)
Ward 16 (n = 23)	0 (0.0)	0 (0.0)	8 (36.4)	4 (18.2)	2 (9.1)	2 (9.1)	5 (22.7)	1 (4.5)	0 (0.0)
Ward 17 (n = 27)	0 (0.0)	0 (0.0)	15 (62.5)	1 (4.2)	1 (4.2)	2 (8.3)	5 (20.8)	0 (0.0)	0 (0.0)
Ward 18 (n = 15)	0 (0.0)	1 (8.3)	4 (33.3)	1 (8.3)	0 (0.0)	0 (0.0)	6 (50.0)	0 (0.0)	0 (0.0)
Ward 19 (n = 14)	0 (0.0)	0 (0.0)	7 (50.0)	0 (0.0)	1 (7.1)	1 (7.1)	4 (28.6)	1 (7.1)	0 (0.0)
Ward 20 (n = 17)	0 (0.0)	1 (6.3)	7 (43.8)	1 (6.3)	2 (12.5)	1 (6.3)	4 (25.0)	0 (0.0)	0 (0.0)
Ward 21 (n = 8)	0 (0.0)	0 (0.0)	0 (0.0)	3 (50.0)	0 (0)	1 (16.7)	2 (33.3)	0 (0.0)	0 (0.0)
Total (n = 286)	5 (2.0)	7 (2.8)	107 (42)	33 (12.9)	18 (7.2)	25 (9.8)	58 (22.7)	2 (0.8)	0 (0.0)
Hospital 2									
Ward 24 (n = 16)	0 (0.0)	0 (0.0)	5 (38.5)	3 (23.1)	0 (0.0)	0 (0.0)	5 (38.5)	0 (0.0)	0 (0.0)
Ward 25 (n = 15)	0 (0.0)	0 (0.0)	4 (28.6)	1 (7.1)	1 (7.1)	2 (14.3)	6 (42.9)	0 (0.0)	0 (0.0)
Ward 26 (n = 25)	2 (8.7)	0 (0.0)	9 (39.1)	2 (8.7)	1 (4.3)	2 (8.7)	7 (30.4)	0 (0.0)	0 (0.0)
Ward 27 (n = 22)	1 (4.8)	0 (0.0)	9 (42.9)	4 (19.0)	1 (4.8)	2 (9.5)	3 (14.3)	0 (0.0)	1 (4.8)
Ward 28 (n = 22)	0 (0.0)	0 (0.0)	10 (52.6)	4 (21.1)	1 (5.3)	3 (15.8)	1 (5.3)	0 (0.0)	0 (0.0)
Ward 29 (n = 10)	0 (0.0)	0 (0.0)	2 (22.2)	3 (33.3)	0 (0.0)	1 (11.1)	3 (33.3)	0 (0.0)	0 (0.0)
Ward 30 (n = 12)	0 (0.0)	1 (9.1)	3 (27.3)	4 (36.4)	0 (0.0)	2 (18.2)	0 (0.0)	1 (9.1)	0 (0.0)
Total (n = 122)	3 (2.7)	1 (0.9)	42 (38.2)	21 (19.1)	4 (3.6)	12 (10.9)	25 (22.7)	1 (0.9)	1 (0.9)
Hospital 3									
Ward 32 (n = 11)	0 (0.0)	0 (0.0)	5 (50.0)	0 (0.0)	0 (0.0)	2 (20.0)	2 (20.0)	1 (10.0)	0 (0.0)
Ward 33 (n = 7)	1 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (28.6)	4 (57.1)	0 (0.0)	0 (0.0)
Ward 34 (n = 18)	0 (0.0)	0 (0.0)	7 (58.3)	2 (16.7)	0 (0.0)	0 (0.0)	2 (16.7)	1 (8.3)	0 (0.0)
Total (n = 36)	1 (3.4)	0 (0.0)	12 (41.4)	2 (6.9)	0 (0.0)	4 (13.8)	8 (27.6)	2 (6.9)	0 (0.0)
Overall total (n = 444)	9 (2.3)	8 (2.0)	161 (40.9)	56 (14.2)	22 (5.6)	41 (10.4)	91 (23.1)	5 (1.3)	1 (0.3)

Time 2

Education	No formal education	Junior/ Intermediate Certificate (or equivalent)	Leaving Certificate (or equivalent)	Vocational/ Technical Qualification	Certificate (Third-level)	Diploma (Third-level)	Bachelor's Degree	Master's Degree	Doctoral Degree

Hospital 1									
Ward 4 (n = 12)	0 (0.0)	0 (0.0)	5 (45.5)	3 (27.3)	1 (9.1)	1 (9.1)	1 (9.1)	0 (0.0)	0 (0.0)
Ward 5 (n = 15)	0 (0.0)	0 (0.0)	7 (58.3)	1 (8.3)	0 (0.0)	3 (25.0)	1 (8.3)	0 (0.0)	0 (0.0)
Ward 6 (n = 9)	0 (0.0)	0 (0.0)	2 (22.2)	0 (0.0)	2 (22.2)	0 (0.0)	5 (55.6)	0 (0.0)	0 (0.0)
Ward 7 (n = 13)	0 (0.0)	0 (0.0)	3 (25.0)	2 (16.7)	0 (0.0)	2 (16.7)	5 (41.7)	0 (0.0)	0 (0.0)
Ward 8 (n = 6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (100.0)	0 (0.0)	0 (0.0)
Ward 9 (n= 9)	0 (0.0)	0 (0.0)	6 (66.7)	0 (0.0)	0 (0.0)	2 (22.2)	1 (11.1)	0 (0.0)	0 (0.0)
Ward 10 (n =8)	0 (0.0)	0 (0.0)	2 (33.3)	1 (16.7)	1 (16.7)	0 (0.0)	2 (33.3)	0 (0.0)	0 (0.0)
Ward 11 (n = 10)	0 (0.0)	0 (0.0)	3 (33.3)	2 (22.2)	0 (0.0)	1 (11.1)	3 (33.3)	0 (0.0)	0 (0.0)
Ward 12 (n = 16)	0 (0.0)	0 (0.0)	5 (33.3)	4 (26.7)	0 (0.0)	2 (13.3)	3 (20.0)	1 (6.7)	0 (0.0)
Ward 13 (n = 22)	1 (5.3)	0 (0.0)	9 (47.4)	2 (10.5)	3 (15.8)	2 (10.5)	1 (5.3)	1 (5.3)	0 (0.0)
Ward 14 (n = 12)	0 (0.0)	0 (0.0)	5 (50.0)	5 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 15 (n = 11)	0 (0.0)	0 (0.0)	3 (27.3)	7 (63.6)	0 (0.0)	0 (0.0)	1 (9.1)	0 (0.0)	0 (0.0)
Ward 16 (n = 10)	0 (0.0)	0 (0.0)	5 (55.6)	1 (11.1)	0 (0.0)	1 (11.1)	2 (22.2)	0 (0.0)	0 (0.0)
Ward 17 (n = 13)	1 (8.3)	0 (0.0)	5 (41.7)	2 (16.7)	0 (0.0)	2 (16.7)	2 (16.7)	0 (0.0)	0 (0.0)
Ward 18 (n = 2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)
Ward 19 (n = 10)	1 (10.0)	0 (0.0)	4 (40.0)	1 (10.0)	0 (0.0)	0 (0.0)	4 (40.0)	0 (0.0)	0 (0.0)
Ward 20 (n = 10)	0 (0.0)	1 (11.1)	4 (44.4)	2 (22.2)	0 (0.0)	0 (0.0)	2 (22.2)	0 (0.0)	0 (0.0)
Ward 21 (n = 8)	1 (12.5)	0 (0.0)	5 (62.5)	1 (12.5)	0 (0.0)	0 (0.0)	1 (12.5)	0 (0.0)	0 (0.0)
Total (n = 196)	4 (2.2)	1 (0.6)	74 (41.1)	36 (20.0)	7 (3.9)	16 (8.9)	40 (22.2)	2 (1.1)	0 (0.0)
Hospital 2									
Ward 24 (n =17)	0 (0.0)	0 (0.0)	3 (20.0)	2 (13.3)	1 (6.7)	2 (13.3)	7 (46.7)	0 (0.0)	0 (0.0)
Ward 25 (n = 2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 26 (n = 18)	0 (0.0)	0 (0.0)	4 (26.7)	1 (6.7)	1 (6.7)	2 (13.3)	7 (46.7)	0 (0.0)	0 (0.0)
Ward 27 (n = 8)	0 (0.0)	0 (0.0)	2 (28.6)	2 (28.6)	0 (0.0)	1 (14.3)	2 (28.6)	0 (0.0)	0 (0.0)
Ward 28 (n = 18)	0 (0.0)	0 (0.0)	10 (55.6)	3 (16.7)	0 (0.0)	2 (11.1)	3 (16.7)	0 (0.0)	0 (0.0)
Ward 29 (n= 11)	0 (0.0)	1 (9.1)	4 (36.4)	0 (0.0)	0 (0.0)	2 (18.2)	3 (27.3)	1 (9.1)	0 (0.0)
Ward 30 (n = 12)	0 (0.0)	1 (10.0)	3 (30.0)	3 (30.0)	0 (0.0)	1 (10.0)	2 (20.0)	0 (0.0)	0 (0.0)
Ward 35 (n= 12)	0 (0.0)	0 (0.0)	4 (33.3)	2 (16.7)	0 (0.0)	1 (8.3)	5 (41.7)	0 (0.0)	0 (0.0)
Total (n = 98)	0 (0.0)	2 (2.3)	29 (33.3)	13 (14.9)	2 (2.3)	11 (12.6)	29 (33.3)	1 (1.1)	0 (0.0)
Hospital 3									
Ward 32 (n = 3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)
Ward 33 (n = 5)	0 (0.0)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (66.7)	0 (0.0)	0 (0.0)
Ward 34 (n = 6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	0 (0.0)	3 (75.0)	0 (0.0)	0 (0.0)
Total (n =14)	0 (0.0)	0 (0.0)	1 (11.1)	0 (0.0)	1 (11.1)	1 (11.1)	6 (66.7)	0 (0.0)	0 (0.0)
Overall total (n= 308)	4 (1.4)	3 (1.1)	104 (37.7)	49 (17.8)	10 (3.6)	28 (10.1)	75 (27.2)	3 (1.1)	0 (0.0)

Table: 4.4.1.4 Staff contract

Time 1				Time 2			
Contract type	Full-time	Part-time	Other	Contract type	Full-time	Part-time	Other
Hospital 1				*Hospital 1*			
Ward 4 (n = 12)	11 (91.7)	1 (8.3)	0 (0.0)	Ward 4 (n = 12)	11 (91.7)	1 (8.3)	0 (0.0)
Ward 5 (n = 26)	24 (96.0)	1 (4.0)	0 (0.0)	Ward 5 (n = 15)	15 (100.0)	0 (0.0)	0 (0.0)
Ward 6 (n = 10)	9 (100.0)	0 (0.0)	0 (0.0)	Ward 6 (n = 9)	9 (100.0)	0 (0.0)	0 (0.0)
Ward 7 (n = 13)	13 (100.0)	0 (0.0)	0 (0.0)	Ward 7 (n = 13)	12 (92.3)	0 (0.0)	0 (0.0)
Ward 8 (n = 6)	6 (100.0)	0 (0.0)	0 (0.0)	Ward 8 (n = 6)	4 (80.0)	1 (20.0)	0 (0.0)
Ward 9 (n = 13)	11 (84.6)	2 (15.4)	0 (0.0)	Ward 9 (n= 9)	9 (100.0)	0 (0.0)	0 (0.0)
Ward 10 (n = 17)	17 (100.0)	0 (0.0)	0 (0.0)	Ward 10 (n =8)	8 (100.0)	0 (0.0)	0 (0.0)
Ward 11 (n = 13)	12 (92.3)	0 (0.0)	1 (7.7)	Ward 11 (n = 10)	9 (90.0)	1 (10.0)	0 (0.0)
Ward 12 (n = 13)	12 (92.3)	1 (7.7)	0 (0.0)	Ward 12 (n = 16)	15 (100.0)	0 (0.0)	0 (0.0)
Ward 13 (n = 36)	32 (91.4)	3 (8.6)	0 (0.0)	Ward 13 (n = 22)	20 (95.2)	1 (4.8)	0 (0.0)
Ward 14 (n = 11)	10 (90.9)	1 (9.1)	0 (0.0)	Ward 14 (n = 12)	9 (75.0)	2 (16.7)	1 (8.3)
Ward 15 (n = 12)	9 (75.0)	2 (16.7)	1 (8.3)	Ward 15 (n = 11)	9 (81.8)	1 (9.1)	1 (9.1)
Ward 16 (n = 23)	20 (90.9)	2 (9.1)	0 (0.0)	Ward 16 (n = 10)	9 (90.0)	1 (10.0)	0 (0.0)
Ward 17 (n = 27)	27 (100.0)	0 (0.0)	0 (0.0)	Ward 17 (n = 13)	13 (100.0)	0 (0.0)	0 (0.0)
Ward 18 (n = 15)	13 (86.7)	1 (6.7)	1 (6.7)	Ward 18 (n = 2)	1 (50.0)	1 (50.0)	0 (0.0)
Ward 19 (n = 14)	14 (100.0)	0 (0.0)	0 (0.0)	Ward 19 (n = 10)	10 (100.0)	0 (0.0)	0 (0.0)
Ward 20 (n = 17)	15 (88.2)	2 (11.8)	0 (0.0)	Ward 20 (n = 10)	8 (88.9)	1 (11.1)	0 (0.0)
Ward 21 (n = 8)	8 (100.0)	0 (0.0)	0 (0.0)	Ward 21 (n = 8)	8 (100.0)	0 (0.0)	0 (0.0)
Total (n = 286)	263 (93.3)	16 (5.7)	3 (1.1)	Total (n = 196)	181 (93.3)	10 (5.2)	2 (1.0)
Hospital 2				*Hospital 2*			
Ward 24 (n = 16)	16 (100.0)	0 (0.0)	0 (0.0)	Ward 24 (n =17)	16 (94.1)	1 (5.9)	0 (0.0)
Ward 25 (n = 15)	14 (93.3)	1 (6.7)	0 (0.0)	Ward 25 (n = 2)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	19 (79.2)	5 (20.8)	0 (0.0)	Ward 26 (n = 18)	16 (88.9)	2 (11.1)	0 (0.0)
Ward 27 (n = 22)	17 (77.3)	4 (18.2)	1 (4.5)	Ward 27 (n = 8)	6 (75.0)	1 (12.5)	1 (12.5)
Ward 28 (n = 22)	19 (90.5)	2 (9.5)	0 (0.0)	Ward 28 (n = 18)	15 (83.3)	3 (16.7)	0 (0.0)
Ward 29 (n = 10)	10 (100.0)	0 (0.0)	0 (0.0)	Ward 29 (n= 11)	10 (90.9)	1 (9.1)	0 (0.0)
Ward 30 (n = 12)	11 (91.7)	1 (8.3)	0 (0.0)	Ward 30 (n = 12)	11 (91.7)	1 (8.3)	0 (0.0)
-	-	-	-	Ward 35 (n= 12)	12 (100.0)	0 (0.0)	0 (0.0)
Total (n = 122)	106 (88.3)	13 (10.8)	1 (0.8)	Total (n = 98)	84 (87.5)	11 (11.5)	1 (1.0)
Hospital 3				*Hospital 3*			
Ward 32 (n = 11)	8 (72.7)	3 (27.3)	0 (0.0)	Ward 32 (n = 3)	3 (100.0)	0 (0.0)	0 (0.0)
Ward 33 (n = 7)	7 (100.0)	0 (0.0)	0 (0.0)	Ward 33 (n = 5)	4 (80.0)	1 (20.0)	0 (0.0)
Ward 34 (n = 18)	16 (100.0)	0 (0.0)	0 (0.0)	Ward 34 (n = 6)	6 (100.0)	0 (0.0)	0 (0.0)
Total (n = 36)	31 (91.2)	3 (8.8)	0 (0.0)	Total (n =14)	13 (92.9)	1 (7.1)	0 (0.0)
Overall total (n = 444)	400 (91.7)	32 (7.3)	4 (0.9)	*Overall total (n= 308)*	278 (91.4)	22 (7.2)	3 (1.0)

Table: 4.4.1.5 Staff demographics

Time 1			Time 2		
Gender	Female	Male		Female	Male
Hospital 1			*Hospital 1*		
Ward 4 (n = 12)	12 (100.0)	0 (0.0)	Ward 4 (n = 12)	9 (75.0)	3 (25.0)
Ward 5 (n = 26)	21 (84.0)	4 (16.0)	Ward 5 (n = 15)	13 (86.7)	2 (13.3)
Ward 6 (n = 10)	8 (88.9)	1 (11.1)	Ward 6 (n = 9)	8 (88.9)	1 (11.1)
Ward 7 (n = 13)	10 (76.9)	3 (23.1)	Ward 7 (n = 13)	10 (76.9)	3 (23.1)
Ward 8 (n = 6)	6 (100.0)	0 (0.0)	Ward 8 (n = 6)	5 (100.0)	0 (0.0)
Ward 9 (n = 13)	11 (84.6)	2 (15.4)	Ward 9 (n= 9)	9 (100.0)	0 (0.0)
Ward 10 (n = 17)	13 (76.5)	4 (23.5)	Ward 10 (n =8)	6 (75.0)	2 (25.0)
Ward 11 (n = 13)	11 (84.6)	2 (15.4)	Ward 11 (n = 10)	8 (80.0)	2 (20.0)
Ward 12 (n = 13)	12 (92.3)	1 (7.7)	Ward 12 (n = 16)	11 (73.3)	4 (26.7)
Ward 13 (n = 36)	30 (85.7)	5 (14.3)	Ward 13 (n = 22)	17 (81.0)	4 (19.0)
Ward 14 (n = 11)	11 (100.0)	0 (0.0)	Ward 14 (n = 12)	11 (91.7)	1 (8.3)
Ward 15 (n = 12)	9 (75.0)	3 (25.0)	Ward 15 (n = 11)	8 (72.7)	3 (27.3)
Ward 16 (n = 23)	17 (77.3)	5 (22.7)	Ward 16 (n = 10)	10 (100.0)	0 (0.0)
Ward 17 (n = 27)	26 (96.3)	1 (3.7)	Ward 17 (n = 13)	9 (69.2)	4 (30.8)
Ward 18 (n = 15)	12 (80.0)	3 (20.0)	Ward 18 (n = 2)	2 (100.0)	0 (0.0)
Ward 19 (n = 14)	14 (100.0)	0 (0.0)	Ward 19 (n = 10)	9 (90.0)	1 (10.0)
Ward 20 (n = 17)	15 (88.2)	2 (11.8)	Ward 20 (n = 10)	8 (88.9)	1 (11.1)
Ward 21 (n = 8)	8 (100.0)	0 (0.0)	Ward 21 (n = 8)	6 (75.0)	2 (25.0)
Total (n = 286)	246 (87.2)	36 (12.8)	Total (n = 196)	160(82.5)	34(17.5)
Hospital 2			*Hospital 2*		
Ward 24 (n = 16)	14 (87.5)	2 (12.5)	Ward 24 (n =17)	14 (82.4)	3 (17.6)
Ward 25 (n = 15)	12 (80.0)	3 (20.0)	Ward 25 (n = 2)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	24 (100.0)	0 (0.0)	Ward 26 (n = 18)	17 (94.4)	1 (5.6)
Ward 27 (n = 22)	20 (90.9)	2 (9.1)	Ward 27 (n = 8)	7 (87.5)	1 (12.5)
Ward 28 (n = 22)	19 (86.4)	3 (13.6)	Ward 28 (n = 18)	14 (77.8)	4 (22.2)
Ward 29 (n = 10)	6 (60.0)	4 (40.0)	Ward 29 (n= 11)	9 (81.8)	2 (18.2)
Ward 30 (n = 12)	10 (83.3)	2 (16.7)	Ward 30 (n = 12)	8 (66.7)	4 (33.3)
-	-	-	Ward 35 (n= 12)	8 (66.7)	4 (33.3)
Total (n = 122)	105 (86.8)	16 (13.2)	Total (n = 98)	78(81.3)	18(18.8)
Hospital 3			*Hospital 3*		
Ward 32 (n = 11)	10 (90.9)	1 (9.1)	Ward 32 (n = 3)	3 (100.0)	0 (0.0)
Ward 33 (n = 7)	5 (71.4)	2 (28.6)	Ward 33 (n = 5)	3 (60.0)	2 (40.0)
Ward 34 (n = 18)	13 (81.3)	3 (18.8)	Ward 34 (n = 6)	4 (66.7)	2 (33.3)
Total (n = 36)	28 (82.4)	6 (17.6)	Total (n =14)	10(71.4)	4(28.6)
Overall total (n = 444)	379 (86.7)	58 (13.3)	*Overall total (n= 308)*	248(81.6)	56(18.4)

Table: 4.4.1.6 Staff level of experience

	Time 1				Time 2				
	Years as Nurse/HCA	Years in current hospital	Years in current ward	Years as agency staff		Years as Nurse/HCA	Years in current hospital	Years in current ward	Years as agency staff
Hospital 1					*Hospital 1*				
Ward 4 (n = 12)	16.82 (11.26)	7.26 (7.03)	7.76 (7.44)	0.56 (0.66)	Ward 4 (n = 12)	17.11 (10.86)	11.38 (9.48)	7.36 (6.31)	1.00 (0.00)
Ward 5 (n = 26)	13.36 (7.61)	6.71 (7.03)	5.82 (6.43)	0.27 (0.49)	Ward 5 (n = 15)	11.11 (6.39)	5.59 (5.26)	3.87 (3.61)	0.00 (0.00)
Ward 6 (n = 10)	8.25 (9.15)	2.76 (1.56)	2.86 (1.47)	0.00 (0.00)	Ward 6 (n = 9)	13.68 (13.42)	4.70 (6.50)	2.19 (1.88)	0.00 (0.00)
Ward 7 (n = 13)	5.31 (6.13)	2.83 (4.75)	1.51 (1.90)	0.00 (0.00)	Ward 7 (n = 13)	6.42 (6.64)	3.78 (4.10)	4.27 (4.36)	0.00 (0.00)
Ward 8 (n = 6)	10.11 (11.40)	5.93 (7.56)	5.08 (6.56)	0.00 (0.00)	Ward 8 (n = 6)	7.29 (8.59)	6.04 (8.00)	7.23 (7.15)	0.00 (0.00)
Ward 9 (n = 13)	8.22 (6.75)	7.40 (6.05)	5.39 (5.07)	0.00 (0.00)	Ward 9 (n= 9)	8.78 (8.35)	5.25 (4.78)	2.96 (2.99)	0.00 (0.00)
Ward 10 (n = 17)	8.74 (5.92)	4.29 (4.45)	3.85 (3.53)	0.83 (1.18)	Ward 10 (n =8)	10.42 (6.50)	5.75 (7.01)	4.15 (3.60)	0.00 (0.00)
Ward 11 (n = 13)	10.34 (6.91)	5.89 (6.15)	4.49 (5.40)	0.00 (0.00)	Ward 11 (n = 10)	13.51 (9.30)	9.15 (7.49)	9.15 (7.49)	5.00 (0.00)
Ward 12 (n = 13)	7.76 (8.31)	4.24 (5.04)	3.49 (4.92)	0.00 (0.00)	Ward 12 (n = 16)	8.63 (8.62)	3.64 (4.75)	4.72 (6.19)	6.00 (0.00)
Ward 13 (n = 36)	11.64 (10.95)	6.03 (6.08)	4.62 (5.67)	1.45 (3.24)	Ward 13 (n = 22)	10.41 (9.96)	9.29 (7.94)	5.68 (4.86)	0.00 (0.00)
Ward 14 (n = 11)	11.46 (8.53)	7.49 (4.25)	6.09 (3.78)	1.25 (0.00)	Ward 14 (n = 12)	11.64 (11.15)	9.23 (7.58)	5.70 (4.45)	0.00 (0.00)
Ward 15 (n = 12)	16.78 (9.93)	11.86 (8.67)	8.55 (6.29)	0.00 (0.00)	Ward 15 (n = 11)	15.81 (11.67)	8.19 (6.46)	7.14 (6.65)	0.00 (0.00)
Ward 16 (n = 23)	7.61 (6.79)	4.79 (5.16)	3.42 (3.93)	0.67 (1.15)	Ward 16 (n = 10)	9.29 (8.39)	5.29 (4.28)	4.50 (4.26)	0.00 (0.00)
Ward 17 (n = 27)	7.51 (8.01)	4.68 (4.96)	3.79 (4.69)	0.17 (0.35)	Ward 17 (n = 13)	6.91 (4.75)	3.57 (5.05)	3.56 (4.95)	3.00 (0.00)
Ward 18 (n = 15)	15.78 (6.26)	10.33 (6.63)	7.50 (4.43)	0.00 (0.00)	Ward 18 (n = 2)	20.00 (0.00)	14.00 (0.00)	9.00 (0.00)	0.00 (0.00)
Ward 19 (n = 14)	10.61 (11.55)	8.76 (9.07)	6.14 (6.28)	0.00 (0.00)	Ward 19 (n = 10)	10.58 (11.12)	8.97 (8.49)	6.90 (8.69)	0.00 (0.00)
Ward 20 (n = 17)	11.89 (9.42)	10.66 (8.45)	10.15 (8.59)	0.00 (0.00)	Ward 20 (n = 10)	9.19 (9.23)	6.92 (9.26)	6.38 (5.97)	0.00 (0.00)
Ward 21 (n = 8)	7.53 (6.15)	5.83 (5.90)	3.39 (5.29)	0.50 (0.71)	Ward 21 (n = 8)	9.29 (3.48)	6.67 (5.16)	3.02 (1.88)	0.00 (0.00)
Total (n = 286)	10.54 (8.90)	6.47 (6.50)	5.14 (5.61)	0.44 (1.23)	Total (n = 196)	10.76 (9.10)	6.77 (6.75)	5.22 (5.34)	3.75 (2.22)
Hospital 2					*Hospital 2*				
Ward 24 (n = 16)	13.93 (10.35)	7.56 (4.63)	5.56 (3.38)	2.22 (3.89)	Ward 24 (n =17)	12.70 (9.95)	6.78 (5.58)	2.47 (4.18)	0.00 (0.00)
Ward 25 (n = 15)	14.09 (8.35)	5.35 (5.87)	1.36 (0.64)	3.07 (3.98)	Ward 25 (n = 2)	11.08 (7.19)	9.25 (8.84)	1.96 (1.36)	1.00 (0.00)
Ward 26 (n = 25)	12.11 (9.22)	7.41 (6.15)	3.52 (2.65)	1.32 (2.34)	Ward 26 (n = 18)	11.39 (6.60)	7.23 (6.38)	4.36 (3.34)	2.50 (0.71)
Ward 27 (n = 22)	11.93 (10.77)	9.26 (10.27)	7.46 (6.95)	0.25 (0.46)	Ward 27 (n = 8)	16.89 (12.11)	9.37 (8.63)	8.80 (8.11)	1.00 (0.00)
Ward 28 (n = 22)	17.51 (9.95)	13.16 (8.67)	11.98 (7.33)	0.04 (0.06)	Ward 28 (n = 18)	15.11 (11.07)	10.37 (10.24)	8.75 (9.38)	5.50 (4.77)
Ward 29 (n = 10)	8.83 (9.59)	4.11 (5.75)	2.61 (3.63)	3.11 (4.17)	Ward 29 (n= 11)	13.81 (7.90)	8.09 (8.41)	2.32 (2.29)	5.97 (5.03)
Ward 30 (n = 12)	7.19 (6.87)	2.99 (4.06)	2.29 (2.27)	0.00 (0.00)	Ward 30 (n = 12)	9.98 (8.45)	3.24 (3.95)	2.02 (1.18)	2.08 (0.00)
-	-	-	-	-	Ward 35 (n= 12)	6.13 (6.32)	1.77 (1.36)	1.03 (0.38)	0.63 (0.65)
Total (n = 122)	12.72 (9.75)	7.89 (7.70)	5.56 (5.90)	1.59 (2.94)	Total (n = 98)	12.29 (9.31)	6.88 (7.46)	4.27 (6.06)	3.44 (3.66)
Hospital 3					*Hospital 3*				
Ward 32 (n = 11)	19.18 (5.39)	12.12 (8.32)	7.77 (6.02)	1.00 (1.41)	Ward 32 (n = 3)	19.36 (11.86)	13.22 (13.14)	7.22 (5.71)	0.00 (0.00)
Ward 33 (n = 7)	25.29 (7.19)	12.39 (7.29)	2.60 (2.17)	0.50 (0.71)	Ward 33 (n = 5)	26.40 (7.77)	15.80 (7.26)	2.88 (0.25)	0.00 (0.00)
Ward 34 (n = 18)	23.04 (5.73)	10.99 (6.29)	9.63 (6.51)	0.00 (0.00)	Ward 34 (n = 6)	20.17 (5.38)	19.65 (17.78)	19.65 (17.78)	5.08 (6.95)
Total (n = 36)	22.25 (6.21)	11.64 (7.00)	7.67 (6.20)	0.43 (0.79)	Total (n =14)	22.22 (7.87)	16.44 (11.98)	10.16 (12.70)	5.08 (6.95)
Overall total (n = 444)	12.09 (9.49)	7.31 (7.04)	5.76 (5.77)	1.01 (2.30)	*Overall total (n= 308)*	11.81 (9.41)	7.25 (7.54)	5.13 (6.14)	3.68 (3.56)

Table: 4.4.1.7 Staff day shift and night shift

	Time 1					Time 2				
	Day Shift (8 hours)	Day Shift (12 Hours)	Night shift (12 hours)	Other		Day Shift (8 hours)	Day Shift (12 Hours)	Night shift (12 hours)	Other
Hospital 1					*Hospital 1*				
Ward 4 (n = 12)	1 (8.3)	8 (66.7)	3 (25.0)	0 (0.0)	Ward 4 (n = 12)	0 (0.0)	9 (75.0)	3 (25.0)	0 (0.0)
Ward 5 (n = 26)	1 (4.2)	20 (83.3)	3 (12.5)	0 (0.0)	Ward 5 (n = 15)	0 (0.0)	13 (92.9)	1 (7.1)	0 (0.0)
Ward 6 (n = 10)	0 (0.0)	6 (60.0)	3 (30.0)	1 (10.0)	Ward 6 (n = 9)	0 (0.0)	7 (77.8)	1 (11.1)	1 (11.1)
Ward 7 (n = 13)	0 (0.0)	13 (100.0)	0 (0.0)	0 (0.0)	Ward 7 (n = 13)	0 (0.0)	12 (92.3)	1 (7.7)	0 (0.0)
Ward 8 (n = 6)	0 (0.0)	5 (83.3)	1 (16.7)	0 (0.0)	Ward 8 (n = 6)	0 (0.0)	2 (40.0)	3 (60.0)	0 (0.0)
Ward 9 (n = 13)	0 (0.0)	8 (61.5)	5 (38.5)	0 (0.0)	Ward 9 (n= 9)	1 (11.1)	4 (44.4)	4 (44.4)	0 (0.0)
Ward 10 (n = 17)	0 (0.0)	12 (70.6)	4 (23.5)	1 (9.1)	Ward 10 (n =8)	1 (12.5)	6 (75.0)	1 (12.5)	0 (0.0)
Ward 11 (n = 13)	0 (0.0)	8 (66.7)	3 (25.0)	1 (8.3)	Ward 11 (n = 10)	0 (0.0)	7 (77.8)	2 (22.2)	0 (0.0)
Ward 12 (n = 13)	0 (0.0)	8 (66.7)	4 (33.3)	0 (0.0)	Ward 12 (n = 16)	0 (0.0)	12 (80.0)	3 (20.0)	0 (0.0)
Ward 13 (n = 36)	2 (5.7)	21 (60.0)	11 (31.4)	1 (2.9)	Ward 13 (n = 22)	1 (4.5)	14 (63.6)	7 (31.8)	0 (0.0)
Ward 14 (n = 11)	0 (0.0)	7 (63.6)	3 (27.3)	1 (9.1)	Ward 14 (n = 12)	0 (0.0)	8 (66.7)	3 (25.0)	1 (8.3)
Ward 15 (n = 12)	0 (0.0)	10 (83.3)	2 (16.7)	0 (0.0)	Ward 15 (n = 11)	1 (9.1)	7 (63.6)	3 (27.3)	0 (0.0)
Ward 16 (n = 23)	1 (4.3)	17 (73.9)	5 (21.7)	0 (0.0)	Ward 16 (n = 10)	1 (10.0)	8 (80.0)	1 (10.0)	0 (0.0)
Ward 17 (n = 27)	0 (0.0)	17 (65.4)	9 (34.6)	0 (0.0)	Ward 17 (n = 13)	0 (0.0)	9 (75.0)	3 (25.0)	0 (0.0)
Ward 18 (n = 15)	1 (6.7)	8 (53.3)	3 (20.0)	3 (20.0)	Ward 18 (n = 2)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)
Ward 19 (n = 14)	0 (0.0)	8 (57.1)	5 (35.7)	1 (7.1)	Ward 19 (n = 10)	1 (10.0)	5 (50.0)	4 (40.0)	0 (0.0)
Ward 20 (n = 17)	0 (0.0)	9 (56.3)	3 (18.8)	4 (25.0)	Ward 20 (n = 10)	0 (0.0)	7 (70.0)	2 (20.0)	1 (10.0)
Ward 21 (n = 8)	0 (0.0)	6 (75.0)	2 (25.0)	0 (0.0)	Ward 21 (n = 8)	0 (0.0)	6 (85.7)	1 (14.3)	0 (0.0)
Total (n = 286)	6 (2.2)	191 (68.5)	69 (24.7)	13 (4.7)	Total (n = 196)	6 (3.1)	140 (72.9)	43 (22.4)	3 (1.6)
Hospital 2					*Hospital 2*				
Ward 24 (n = 16)	0 (0.0)	12 (80.0)	3 (20.0)	0 (0.0)	Ward 24 (n =17)	0 (0.0)	11 (73.3)	4 (26.7)	0 (0.0)
Ward 25 (n = 15)	1 (6.7)	11 (73.3)	3 (20.0)	0 (0.0)	Ward 25 (n = 2)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)
Ward 26 (n = 25)	3 (12.0)	14 (56.0)	8 (32.0)	0 (0.0)	Ward 26 (n = 18)	0 (0.0)	11 (64.7)	6 (35.3)	0 (0.0)
Ward 27 (n = 22)	1 (4.5)	14 (63.6)	7 (31.8)	0 (0.0)	Ward 27 (n = 8)	0 (0.0)	4 (57.1)	3 (42.9)	0 (0.0)
Ward 28 (n = 22)	2 (9.1)	12 (54.5)	8 (36.4)	0 (0.0)	Ward 28 (n = 18)	1 (5.6)	11 (61.1)	6 (33.3)	0 (0.0)
Ward 29 (n = 10)	0 (0.0)	4 (40.0)	6 (60.0)	0 (0.0)	Ward 29 (n= 11)	2 (20.0)	5 (50.0)	3 (30.0)	0 (0.0)
Ward 30 (n = 12)	1 (9.1)	5 (45.5)	5 (45.5)	0 (0.0)	Ward 30 (n = 12)	0 (0.0)	6 (50.0)	6 (50.0)	0 (0.0)
-	-	-	-	-	Ward 35 (n= 12)	0 (0.0)	6 (50.0)	6 (50.0)	0 (0.0)
Total (n = 122)	8 (6.7)	72 (60.0)	40 (33.3)	0 (0.0)	Total (n = 98)	3 (3.3)	54 (59.3)	34 (37.4)	0 (0.0)
Hospital 3					*Hospital 3*				
Ward 32 (n = 11)	1 (9.1)	6 (54.5)	3 (27.3)	1 (9.1)	Ward 32 (n = 3)	0 (0.0)	1 (33.3)	2 (66.7)	0 (0.0)
Ward 33 (n = 7)	1 (14.3)	2 (28.6)	4 (57.1)	0 (0.0)	Ward 33 (n = 5)	0 (0.0)	2 (50.0)	2 (50.0)	0 (0.0)
Ward 34 (n = 18)	1 (5.6)	13 (72.2)	4 (22.2)	0 (0.0)	Ward 34 (n = 6)	0 (0.0)	2 (40.0)	3 (60.0)	0 (0.0)
Total (n = 36)	3 (8.3)	21 (58.3)	11 (30.6)	1 (2.8)	Total (n =14)	0 (0.0)	5 (41.7)	7 (58.3)	0 (0.0)
Overall total (n = 444)	17 (3.9)	284 (65.3)	120 (27.6)	14 (3.2)	*Overall total (n= 308)*	9 (3.1)	199 (67.5)	84 (28.5)	3 (1.0)

4.4.2 Nurse-to-Patient Ratios

The nursing staff-to-patient ratio, as above, was derived from a single item that asked respondents to report the numbers of staff giving direct patient care (specifically 'RNs' and 'other nursing care staff') and the numbers of patients on the ward on the last shift they worked. The mean number of patients per nursing staff (including RNs and HCAs) is presented below in Tables 4.4.2.1. The overall average 'Patients per RN on all shifts' remained constant at an average of 6.4 in both Time 1 and Time 2. Similarly, there was very little change in 'number of patients per nursing staff (RN+HCA)' moving from a mean of 4.69 in Time 1 to 4.74 in Time 2. However, the ratios demonstrated variability across wards and hospitals. For example, Wards 5,8,10,11,18 and 30 all reported RN:Patient ratios higher than 1:8. Wards 7, 12, 14, 16, 17, and 20 all reported lower RN:Patient ratios at Time 1 compared to Time 2. These wards all received changes to their staffing.

Table: 4.4.2.1 Nurse-to-Patient Ratios

	Time 1					Time 2				
	Number of patients per nursing staff (RN+HCA)	No. of patients per nursing staff for day shift (RN + HCA)	Patients per RN on all shifts	Patients per RN on day shift only		Number of patients per nursing staff (RN+HCA)	No. of patients per total nursing staff for day shift (RN + HCA)	Patients per RN on all shifts	Patients per RN on day shift only
Hospital 1					*Hospital 1*				
Ward 4 (n = 12)	4.45 (0.81)	4.17 (0.51)	7.50 (2.30)	6.55 (0.81)	Ward 4 (n = 12)	3.49 (1.20)	2.95 (0.75)	7.18 (3.02)	7.18 (3.02)
Ward 5 (n = 26)	4.04 (1.07)	3.69 (0.77)	7.39 (1.60)	6.86 (0.42)	Ward 5 (n = 15)	3.85 (0.55)	3.76 (0.46)	8.72 (1.77)	8.72 (1.77)
Ward 6 (n = 10)	5.96 (1.08)	5.20 (0.61)	10.22 (2.50)	7.00 (0.00)	Ward 6 (n = 9)	4.68 (1.30)	4.62 (1.38)	7.28 (1.58)	7.28 (1.58)
Ward 7 (n = 13)	3.82 (0.44)	3.82 (0.44)	6.17 (0.83)	6.17 (0.83)	Ward 7 (n = 13)	3.26 (1.04)	3.05 (0.73)	5.79 (1.12)	5.79 (1.12)
Ward 8 (n = 6)	6.23 (2.77)	5.58 (2.53)	7.79 (2.05)	7.37 (2.10)	Ward 8 (n = 6)	7.23 (2.40)	5.00 (0.00)	8.57 (1.75)	8.57 (1.75)
Ward 9 (n = 13)	3.93 (0.75)	3.62 (0.72)	6.12 (3.06)	5.74 (3.67)	Ward 9 (n= 9)	3.60 (1.17)	2.74 (0.83)	5.02 (1.75)	5.02 (1.75)
Ward 10 (n = 17)	5.12 (1.67)	4.50 (1.25)	5.85 (1.68)	5.72 (1.71)	Ward 10 (n =8)	5.54 (0.83)	5.31 (0.53)	8.19 (1.88)	8.19 (1.88)
Ward 11 (n = 13)	7.33 (2.19)	6.72 (2.53)	11.24 (4.08)	10.50 (4.74)	Ward 11 (n = 10)	6.02 (1.04)	5.74 (1.02)	8.95 (2.17)	8.95 (2.17)
Ward 12 (n = 13)	5.35 (1.26)	4.53 (0.74)	6.90 (0.98)	6.68 (1.13)	Ward 12 (n = 16)	5.04 (1.16)	4.61 (0.83)	6.80 (0.94)	6.80 (0.94)
Ward 13 (n = 36)	3.82 (0.90)	3.33 (0.33)	5.48 (0.85)	5.24 (0.75)	Ward 13 (n = 22)	4.29 (1.25)	3.59 (0.61)	6.38 (1.51)	6.38 (1.51)
Ward 14 (n = 11)	5.44 (1.39)	4.73 (1.27)	6.90 (2.07)	5.41 (1.29)	Ward 14 (n = 12)	4.59 (1.94)	3.91 (0.80)	6.71 (2.83)	6.71 (2.83)
Ward 15 (n = 12)	4.30 (1.33)	3.76 (0.47)	5.21 (1.20)	4.79 (0.58)	Ward 15 (n = 11)	4.76 (1.44)	4.04 (0.88)	6.21 (0.75)	6.21 (0.75)
Ward 16 (n = 23)	4.37 (1.32)	4.02 (1.33)	6.05 (1.52)	5.58 (1.53)	Ward 16 (n = 10)	3.31 (1.26)	3.63 (0.83)	5.30 (2.06)	5.30 (2.06)
Ward 17 (n = 27)	6.21 (1.51)	5.32 (0.83)	7.25 (1.31)	6.39 (0.86)	Ward 17 (n = 13)	5.20 (2.16)	4.58 (2.16)	6.87 (2.78)	6.87 (2.78)
Ward 18 (n = 15)	4.55 (1.30)	4.27 (0.36)	7.02 (2.37)	6.43 (0.68)	Ward 18 (n = 2)	4.50 (0.71)	4.50 (0.71)	10.00 (0.00)	10.00 (0.00)
Ward 19 (n = 14)	4.18 (1.18)	4.03 (1.48)	5.47 (1.53)	4.81 (1.45)	Ward 19 (n = 10)	4.05 (0.76)	3.88 (0.89)	4.63 (1.02)	4.63 (1.02)
Ward 20 (n = 17)	4.23 (1.35)	3.98 (0.71)	6.26 (2.32)	5.87 (0.99)	Ward 20 (n = 10)	3.52 (1.00)	3.54 (0.43)	6.02 (2.66)	6.02 (2.66)
Ward 21 (n = 8)	4.99 (1.90)	4.00 (0.00)	5.33 (0.00)	6.30 (1.34)	Ward 21 (n = 8)	5.03 (2.05)	4.53 (1.73)	6.00 (1.63)	6.00 (1.63)
Total (n = 286)	4.74 (1.59)	4.23 (1.23)	6.72 (2.22)	6.09 (1.74)	Total (n = 196)	4.55(1.29)	4.11(0.86)	6.92 (1.73)	6.92 (1.73)
Hospital 2					*Hospital 2*				
Ward 24 (n = 16)	3.45 (1.00)	3.02 (0.69)	4.70 (1.35)	3.81 (0.43)	Ward 24 (n =17)	4.01 (1.00)	3.47 (0.37)	5.92 (2.50)	5.92 (2.50)
Ward 25 (n = 15)	3.80 (0.98)	3.48 (0.31)	4.97 (0.85)	4.83 (0.76)	Ward 25 (n = 2)	4.50 (0.71)	4.50 (0.71)	6.33 (0.47)	6.33 (0.47)
Ward 26 (n = 25)	5.33 (2.79)	3.43 (0.60)	6.17 (2.50)	4.35 (0.96)	Ward 26 (n = 18)	4.81 (1.37)	4.41 (1.30)	6.69 (2.29)	6.69 (2.29)
Ward 27 (n = 22)	4.70 (2.07)	3.43 (0.89)	5.47 (1.77)	4.33 (1.02)	Ward 27 (n = 8)	5.08 (2.53)	3.06 (0.24)	6.33 (1.99)	6.33 (1.99)
Ward 28 (n = 22)	4.14 (1.24)	3.39 (0.41)	5.45 (2.09)	4.29 (0.40)	Ward 28 (n = 18)	4.23 (0.96)	3.72 (0.35)	5.76 (2.13)	5.76 (2.13)
Ward 29 (n = 10)	5.11 (1.87)	3.33 (1.27)	8.17 (3.15)	4.50 (3.06)	Ward 29 (n= 11)	3.92 (1.28)	3.71 (0.54)	4.98 (2.32)	4.98 (2.32)
Ward 30 (n = 12)	4.93 (2.05)	3.32 (1.32)	7.14 (3.43)	4.25 (2.01)	Ward 30 (n = 12)	5.34 (1.80)	3.67 (0.69)	8.27 (3.10)	8.27 (3.10)
Ward 35					Ward 35 (n= 12)	4.56 (0.95)	3.69 (0.21)	6.43 (1.52)	6.43 (1.52)
Total (n = 122)	4.51 (1.96)	3.35 (0.72)	5.80 (2.31)	4.33 (0.98)	Total (n = 98)	4.56(1.33)	3.84(0.64)	6.34 (2.04)	6.34 (2.04)
Hospital 3					*Hospital 3*				
Ward 32 (n = 11)	4.27 (1.49)	4.64 (0.61)	5.08 (1.86)	5.63 (0.85)	Ward 32 (n = 3)	6.18 (0.35)	5.80 (0.00)	6.67 (0.52)	6.67 (0.52)
Ward 33 (n = 7)	3.67 (0.47)	3.33 (0.58)	5.36 (0.94)	4.67 (1.15)	Ward 33 (n = 5)	3.00 (1.73)	1.00 (0.00)	4.50 (2.60)	4.50 (2.60)
Ward 34 (n = 18)	5.93 (1.99)	4.91 (0.37)	6.63 (1.78)	5.68 (0.48)	Ward 34 (n = 6)	6.19 (3.36)	6.00 (0.00)	6.68 (3.03)	6.68 (3.03)
Total (n = 36)	4.96 (1.88)	4.62 (0.70)	5.84 (1.78	5.52 (0.77)	Total (n =14)	5.12(1.81)	4.27(0)	5.95 (2.05)	5.95 (2.05)
Overall total (n = 444)	4.69 (1.72)	4.03 (1.16)	6.38 (2.25)	5.58 (1.68)	*Overall total (n= 308)*	4.74(1.47)	4.07(0.50)	6.40 (1.94)	6.40 (1.94)

4.4.3 Nursing Work Index (NWI)

The Practice Environment Scale of the Nursing Work Index (NWI) was used to evaluate qualities of the work environment. It includes five subscales: Staffing and Resource Adequacy; Collegial Nurse–Doctor Relations; Nurse Manager Ability, Leadership, and Support of Nurses; Nurse Participation in Hospital Affairs; and Nursing Foundations for Quality of Care. The items were scored on a scale of 1 to 5 with higher scores indicative of positive ratings of the environment.

While each of these subscales remained below 3.0 at hospital and overall level, it is apparent that there are wide ranges between wards in both Time 1 and Time 2 (Table 4.4.3.1). Reported scores were highest within the Nursing Foundations for Quality Care and Collegial Nurse-Doctor Relations with both subscales remaining similar across both time periods, 0.01-point decrease for both subscales at Time 2. However, some wards, 7, 12, 13, 14, 32 and 34 increased at Time 2 for Nursing Foundations of Quality of Care and Wards 7, 12, 14, 20 and 32 increasing for Collegial Nurse-Doctor Relations. These wards all received changes to their staffing levels.

Staffing and Resource Adequacy was had the lowest score of each subscale and decreased in each of the Hospitals from Time 1 to Time 2, between 0.08 and 0.24-point decrease at time 2. However, at ward level some increases were seen in wards receiving changes to their staffing; Wards 7, 20, 32 and 34. The lowest scores were reported on Ward 4 Ward 5, Ward 8 and Ward 9 where no uplift was implemented.

Nurse Manager Ability, Leadership and Support saw a slight increase from Time 1 to Time 2, 0.03-point and Wards 7, 13, 14, 17, 20, 32 and 34 increased on this scale, each of these received changes to their staffing levels. Wards 4, 5, 6, 8, 19, 25, 28 and 30 decreased on this scale from Time 1 to Time 2 and these wards did not receive changes to their staffing levels. Nurse Participation in Hospital Affairs remained relatively unchanged in all wards between Times 1 and 2, with only Ward 7 having a notable change in score, 2.49 in Time 1 to 2.70 in Time 2.

Table: 4.4.3.1 Nurse work index

	Time 1						Time 2					
	Staffing and Resource Adequacy	Collegial Nurse-Doctor Relations	Manager Ability, Leadership and Support	Nurse Participation in Hospital Affairs	Nursing Foundations for Quality of Care		Staffing and Resource Adequacy	Collegial Nurse-Doctor Relations	Manager Ability, Leadership and Support	Nurse Participation in Hospital Affairs	Nursing Foundations for Quality of Care
Hospital 1						*Hospital 1*					
Ward 4 (n=12)	1.80 (0.47)	3.04 (0.35)	2.64 (0.44)	2.47 (0.43)	2.86 (0.27)	Ward 4 (n=12)	1.91 (0.72)	2.75 (0.30)	2.37 (0.53)	2.35 (0.31)	2.79 (0.30)
Ward 5 (n=26)	2.28 (0.58)	2.93 (0.33)	2.94 (0.28)	2.57 (0.30)	2.92 (0.19)	Ward 5 (n=15)	1.70 (0.40)	2.91 (0.22)	2.58 (0.29)	2.39 (0.23)	2.81 (0.21)
Ward 6 (n=10)	2.21 (0.83)	3.33 (0.30)	3.00 (0.74)	2.74 (0.71)	3.09 (0.46)	Ward 6 (n=9)	2.25 (0.45)	3.10 (0.16)	2.83 (0.50)	2.73 (0.32)	2.93 (0.42)
Ward 7 (n=13)	2.28 (0.51)	2.85 (0.27)	3.00 (0.30)	2.49 (0.45)	2.87 (0.29)	Ward 7 (n=13)	2.56 (0.58)	2.83 (0.65)	3.34 (0.37)	2.70 (0.46)	3.18 (0.37)
Ward 8 (n=6)	2.04 (0.53)	3.39 (0.44)	2.90 (0.50)	2.87 (0.48)	3.02 (0.36)	Ward 8 (n=6)	1.45 (0.48)	2.87 (0.84)	2.46 (0.85)	2.13 (0.81)	2.68 (0.63)
Ward 9 (n=13)	1.75 (0.50)	3.03 (0.33)	2.62 (0.67)	2.33 (0.55)	2.71 (0.49)	Ward 9 (n=9)	1.68 (0.37)	3.04 (0.49)	2.73 (0.43)	2.50 (0.34)	2.71 (0.26)
Ward 10 (n=17)	2.32 (0.87)	3.10 (0.55)	2.81 (0.67)	2.64 (0.68)	2.99 (0.42)	Ward 10 (n=8)	2.13 (0.21)	2.83 (0.71)	2.58 (0.80)	2.62 (0.58)	2.83 (0.53)
Ward 11 (n=13)	1.36 (0.31)	2.78 (0.41)	2.28 (0.35)	2.19 (0.36)	2.61 (0.35)	Ward 11 (n=10)	2.50 (1.13)	2.78 (0.93)	2.87 (0.96)	2.69 (0.98)	2.80 (0.72)
Ward 12 (n=13)	2.27 (0.49)	3.18 (0.43)	3.00 (0.43)	2.83 (0.41)	2.97 (0.41)	Ward 12 (n=16)	2.13 (0.76)	3.19 (0.34)	2.93 (0.36)	2.89 (0.37)	3.03 (0.38)
Ward 13 (n=36)	2.46 (0.62)	3.02 (0.36)	2.78 (0.55)	2.67 (0.49)	2.99 (0.36)	Ward 13 (n=22)	1.95 (0.54)	2.98 (0.48)	2.81 (0.39)	2.67 (0.37)	3.01 (0.28)
Ward 14 (n=11)	1.72 (0.45)	2.71 (0.33)	2.60 (0.24)	2.56 (0.49)	2.59 (0.69)	Ward 14 (n=12)	1.61 (0.33)	3.04 (0.38)	2.98 (0.47)	2.44 (0.27)	2.84 (0.42)
Ward 15 (n=12)	2.19 (0.53)	2.92 (0.46)	2.94 (0.43)	2.53 (0.40)	2.89 (0.35)	Ward 15 (n=11)	2.29 (0.49)	2.81 (0.57)	2.97 (0.29)	2.45 (0.37)	2.86 (0.26)
Ward 16 (n=23)	2.17 (0.65)	3.08 (0.35)	2.96 (0.57)	2.64 (0.51)	2.95 (0.44)	Ward 16 (n=10)	1.97 (0.75)	2.83 (0.59)	2.56 (0.64)	2.72 (0.47)	2.79 (0.37)
Ward 17 (n=27)	1.70 (0.43)	2.89 (0.61)	2.66 (0.62)	2.36 (0.43)	2.94 (0.45)	Ward 17 (n=13)	1.64 (0.42)	2.88 (0.58)	2.73 (0.67)	2.48 (0.60)	2.89 (0.37)
Ward 18 (n=15)	2.46 (0.66)	2.82 (0.64)	2.91 (0.52)	2.57 (0.43)	2.97 (0.35)	Ward 18 (n=2)	3.00 (0.00)	3.00 (0.00)	3.00 (0.00)	3.00 (0.00)	2.90 (0.00)
Ward 19 (n=14)	2.25 (0.66)	3.29 (0.39)	2.85 (0.73)	2.75 (0.55)	3.16 (0.41)	Ward 19 (n=10)	2.33 (0.53)	2.90 (0.69)	2.70 (0.61)	2.48 (0.57)	3.03 (0.37)
Ward 20 (n=17)	1.86 (0.63)	2.52 (0.56)	2.73 (0.46)	2.49 (0.54)	2.84 (0.32)	Ward 20 (n=10)	1.96 (0.27)	2.76 (0.32)	2.85 (0.28)	2.48 (0.35)	2.83 (0.18)
Ward 21 (n=8)	2.07 (0.59)	2.71 (0.45)	2.89 (0.51)	2.68 (0.26)	2.84 (0.32)	Ward 21 (n=8)	2.29 (0.53)	2.87 (0.30)	2.86 (0.22)	2.52 (0.39)	2.93 (0.11)
Total (n=286)	2.09 (0.64)	2.96 (0.47)	2.80 (0.54)	2.57 (0.49)	2.92 (0.40)	Total (n=196)	2.01 (0.61)	2.91 (0.51)	2.78 (0.54)	2.56 (0.47)	2.89 (0.37)
Hospital 2						*Hospital 2*					
Ward 24 (n=16)	2.16 (0.53)	2.60 (0.58)	2.63 (0.31)	2.57 (0.48)	2.78 (0.41)	Ward 24 (n=17)	1.98 (0.45)	2.80 (0.39)	2.66 (0.46)	2.55 (0.36)	2.80 (0.44)
Ward 25 (n=15)	2.86 (0.41)	2.94 (0.31)	3.05 (0.43)	2.74 (0.42)	3.01 (0.25)	Ward 25 (n=2)	2.38 (0.53)	2.83 (0.24)	2.40 (0.00)	2.94 (0.39)	2.85 (0.07)
Ward 26 (n=25)	2.06 (0.45)	2.56 (0.38)	2.05 (0.60)	2.36 (0.30)	2.66 (0.32)	Ward 26 (n=18)	1.70 (0.77)	2.40 (0.54)	2.54 (0.47)	2.28 (0.44)	2.53 (0.43)
Ward 27 (n=22)	2.16 (0.43)	2.47 (0.49)	2.56 (0.51)	2.45 (0.31)	2.77 (0.35)	Ward 27 (n=8)	1.58 (0.66)	2.08 (0.32)	2.06 (0.74)	2.22 (0.68)	2.14 (0.47)
Ward 28 (n=22)	2.23 (0.50)	2.83 (0.44)	2.81 (0.33)	2.53 (0.34)	2.92 (0.28)	Ward 28 (n=18)	1.95 (0.42)	2.67 (0.56)	2.69 (0.60)	2.52 (0.39)	2.94 (0.33)
Ward 29 (n=10)	1.96 (0.66)	2.67 (0.89)	2.73 (0.88)	2.54 (0.96)	2.87 (1.00)	Ward 29 (n=11)	2.41 (0.55)	3.21 (0.25)	3.13 (0.41)	2.84 (0.39)	3.19 (0.30)
Ward 30 (n=12)	2.00 (0.85)	3.08 (0.56)	2.82 (0.80)	2.61 (0.67)	2.86 (0.67)	Ward 30 (n=12)	2.03 (0.80)	3.04 (0.65)	2.75 (0.78)	2.76 (0.51)	3.03 (0.52)
-	-	-	-	-	-	Ward 35 (n=12)	2.08 (0.83)	2.94 (0.45)	2.58 (0.82)	2.56 (0.57)	2.99 (0.40)
Total (n=122)	2.21 (0.57)	2.70 (0.51)	2.59 (0.61)	2.51 (0.45)	2.82 (0.43)	Total (n=98)	1.97 (0.67)	2.76 (0.55)	2.63 (0.63)	2.53 (0.49)	2.84 (0.47)
Hospital 3						*Hospital 3*					
Ward 32 (n=11)	1.95 (0.51)	2.67 (0.61)	2.33 (0.54)	2.55 (0.51)	2.84 (0.43)	Ward 32 (n=3)	2.08 (0.58)	3.00 (0.00)	2.40 (1.04)	2.52 (0.65)	2.87 (0.06)
Ward 33 (n=7)	2.46 (0.47)	2.86 (0.18)	2.91 (0.34)	2.84 (0.24)	3.03 (0.14)	Ward 33 (n=5)	3.00 (0.68)	3.13 (0.61)	3.20 (0.51)	3.13 (0.51)	3.28 (0.41)
Ward 34 (n=18)	1.98 (0.51)	2.60 (0.37)	2.19 (0.64)	2.41 (0.50)	2.81 (0.33)	Ward 34 (n=6)	2.10 (0.38)	2.47 (0.51)	2.56 (0.55)	2.16 (0.65)	2.48 (0.47)
Total (n=36)	2.08 (0.53)	2.68 (0.44)	2.38 (0.61)	2.53 (0.48)	2.86 (0.34)	Total (n=14)	2.44 (0.69)	2.85 (0.55)	2.77 (0.71)	2.62 (0.71)	2.88 (0.51)
Overall total (n=444)	2.12 (0.61)	2.87 (0.50)	2.70 (0.58)	2.55 (0.47)	2.88 (0.40)	*Overall total (n=308)*	2.02 (0.64)	2.86 (0.53)	2.73 (0.58)	2.55 (0.49)	2.87 (0.41)

4.4.4 Time available 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. Responses to these items at the three time-points are detailed in Tables 4.4.3.1, 4.4.3.2, 4.4.3.3, 4.4.3.4, and 4.4.4.5. The majority of respondents (53.6% in Time 1, 53.9% in Time 2) stated that they had about the same amount of time as usual, and that they required, on average, an additional 15 to 30 minutes to deliver care (31.3% in Time 1, 31.2% in Time 2). When examined at a hospital and ward level, it is apparent that a large proportion of staff in Hospital 1 (25.4% in Time 1, 29.9% in Time 2) responded that they required greater than 60 minutes' additional time to deliver care. Comparing wards which received uplifts in Time 2 to those who did not, it is evident that those wards where no uplift was received (i.e. Ward 8, Ward 11, Ward 19 and Ward 21) cited requiring the most additional time. While those receiving changes to their staffing are not stating they require no additional time in Time 2, they amount of extra time required had reduced with fewer wards reporting they require an additional 60 minutes or greater of extra time.

Table 4.4.4.2 shows the reported quality of care delivered to patients and overall. The majority of staff reported quality of care given on their ward as either 'good' or 'excellent' in both Time 1 and Time 2; 74.1% and 69.6% respectively. However, variability existed between wards and hospitals. Hospital 1 saw an increase in staff reporting care as 'excellent' from 19.1% to 20% between time periods, while Hospital 2 (where no uplift was put in place) reported a decrease in 'excellent' care from 26.1% to 18.1%. Two wards where uplifts were enacted, Ward 7 and Ward 10 reported improvements in 'good' or 'excellent' care, increasing from 84.6% and 68.8% in Time 1 to 92.3% and 71.4% in Time 2. Similarly, Hospital 3 reported an overall increase in 'good' and 'excellent' care from 77.1% in Time 1 to 78.6% in Time 2.

When asked if the quality of care in the ward had changed over the last six months, 71.8% of overall staff stated care had either remained the same or improved in Time 1, increasing to 78.6% in Time 2. However, on many of the wards where no uplift was received (i.e. Ward 8, Ward 11 and Ward 27) over 60% of respondents reported a deterioration in quality of care in the last 6 months of Time 2.

Table: 4.4.4.1 Quality of care during last shift

Time 1				Time 2			
Time available to deliver care	Less time than usual	About the same amount of time	More time than usual	Time available to deliver care	Less time than usual	About the same amount of time	More time than usual
Hospital 1				*Hospital 1*			
Ward 4 (n = 12)	7 (58.3)	4 (33.3)	1 (8.3)	Ward 4 (n = 12)	2 (16.7)	10 (83.3)	0 (0.0)
Ward 5 (n = 26)	3 (12.0)	18 (72.0)	4 (16.0)	Ward 5 (n = 15)	7 (46.7)	6 (40.0)	2 (13.3)
Ward 6 (n = 10)	6 (60.0)	3 (30.0)	1 (10.0)	Ward 6 (n = 9)	1 (11.1)	6 (66.7)	2 (22.2)
Ward 7 (n = 13)	2 (15.4)	7 (53.8)	4 (30.8)	Ward 7 (n = 13)	1 (7.7)	7 (53.8)	5 (38.5)
Ward 8 (n = 6)	2 (33.3)	4 (66.7)	0 (0.0)	Ward 8 (n = 6)	2 (40.0)	1 (20.0)	2 (40.0)
Ward 9 (n = 13)	5 (38.5)	5 (38.5)	3 (23.1)	Ward 9 (n= 9)	3 (33.3)	6 (66.7)	0 (0.0)
Ward 10 (n = 17)	9 (52.9)	7 (41.2)	1 (5.9)	Ward 10 (n =8)	3 (37.5)	4 (50.0)	1 (12.5)
Ward 11 (n = 13)	8 (61.5)	1 (7.7)	4 (30.8)	Ward 11 (n = 10)	7 (70.0)	2 (20.0)	1 (10.0)
Ward 12 (n = 13)	6 (46.2)	4 (30.8)	3 (23.1)	Ward 12 (n = 16)	4 (25.0)	9 (56.3)	3 (18.8)
Ward 13 (n = 36)	1 (2.9)	23 (65.7)	11 (31.4)	Ward 13 (n = 22)	6 (28.6)	14 (66.7)	1 (4.8)
Ward 14 (n = 11)	7 (63.6)	3 (27.3)	1 (9.1)	Ward 14 (n = 12)	8 (66.7)	4 (33.3)	0 (0.0)
Ward 15 (n = 12)	1 (8.3)	11 (91.7)	0 (0.0)	Ward 15 (n = 11)	4 (36.4)	7 (63.6)	0 (0.0)
Ward 16 (n = 23)	9 (39.1)	11 (47.8)	3 (13.0)	Ward 16 (n = 10)	3 (30.0)	4 (40.0)	3 (30.0)
Ward 17 (n = 27)	4 (14.8)	17 (63.0)	6 (22.2)	Ward 17 (n = 13)	6 (46.2)	7 (53.8)	0 (0.0)
Ward 18 (n = 15)	8 (53.3)	3 (20.0)	4 (26.7)	Ward 18 (n = 2)	1 (50.0)	0 (0.0)	1 (50.0)
Ward 19 (n = 14)	7 (50.0)	6 (42.9)	1 (7.1)	Ward 19 (n = 10)	3 (30.0)	5 (50.0)	2 (20.0)
Ward 20 (n = 17)	6 (35.3)	8 (47.1)	3 (17.6)	Ward 20 (n = 10)	2 (20.0)	7 (70.0)	1 (10.0)
Ward 21 (n = 8)	4 (50.0)	3 (37.5)	1 (12.5)	Ward 21 (n = 8)	2 (25.0)	6 (75.0)	0 (0.0)
Total (n = 286)	95 (33.5)	138 (48.6)	51 (18.0)	Total (n = 196)	66 (33.7)	106 (54.1)	24 (12.2)
Hospital 2				*Hospital 2*			
Ward 24 (n = 16)	7 (43.8)	4 (25.0)	5 (31.3)	Ward 24 (n =17)	5 (29.4)	9 (52.9)	3 (17.6)
Ward 25 (n = 15)	1 (6.7)	14 (93.3)	0 (0.0)	Ward 25 (n = 2)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	9 (37.5)	13 (54.2)	2 (8.3)	Ward 26 (n = 18)	10 (55.6)	7 (38.9)	1 (5.6)
Ward 27 (n = 22)	8 (36.4)	13 (59.1)	1 (4.5)	Ward 27 (n = 8)	4 (50.0)	3 (37.5)	1 (12.5)
Ward 28 (n = 22)	4 (18.2)	17 (77.3)	1 (4.5)	Ward 28 (n = 18)	3 (16.7)	10 (55.6)	5 (27.8)
Ward 29 (n = 10)	3 (30.0)	6 (60.0)	1 (10.0)	Ward 29 (n= 11)	2 (18.2)	6 (54.5)	3 (27.3)
Ward 30 (n = 12)	3 (25.0)	8 (66.7)	1 (8.3)	Ward 30 (n = 12)	5 (41.7)	3 (25.0)	4 (33.3)
-	-	-	-	Ward 35 (n= 12)	1 (8.3)	9 (75.0)	2 (16.7)
Total (n = 122)	35 (28.9)	74 (62.0)	11 (9.1)	Total (n = 98)	29 (30.2)	48 (50.0)	19 (19.8)
Hospital 3				*Hospital 3*			
Ward 32 (n = 11)	3 (30.0)	6 (60.0)	1 (10.0)	Ward 32 (n = 3)	1 (33.3)	2 (66.7)	0 (0.0)
Ward 33 (n = 7)	1 (14.3)	5 (71.4)	1 (14.3)	Ward 33 (n = 5)	0 (0.0)	5 (100.0)	0 (0.0)
Ward 34 (n = 18)	1 (5.6)	12 (66.7)	5 (27.8)	Ward 34 (n = 6)	0 (0.0)	4 (66.7)	2 (33.3)
Total (n = 36)	5 (14.3)	23 (65.7)	7 (20.0)	Total (n =14)	1 (7.1)	11 (78.6)	2 (14.3)
Overall total (n = 444)	135 (30.7)	236 (53.6)	69 (15.7)	*Overall total (n= 308)*	96 (31.4)	165 (53.9)	45 (14.7)

Table: 4.4.4.2 Amount of extra time required from perspective of participant

	Time 1							Time 2						
How much more time required	No more time needed	Less than 15 minutes	15 to 30 minutes	31 to 45 minutes	46 to 60 minutes	Greater than 60 minutes		How much more time required	No more time needed	Less than 15 minutes	15 to 30 minutes	31 to 45 minutes	46 to 60 minutes	Greater than 60 minutes
Hospital 1								*Hospital 1*						
Ward 4 (n=12)	0 (0.0)	0 (0.0)	5 (41.7)	4 (33.3)	1 (8.3)	2 (16.7)		Ward 4 (n=12)	1 (8.3)	1 (8.3)	5 (41.7)	0 (0.0)	1 (8.3)	4 (33.3)
Ward 5 (n=26)	3 (12.5)	2 (8.3)	9 (37.5)	2 (8.3)	2 (8.3)	6 (25.0)		Ward 5 (n=15)	0 (0.0)	1 (6.7)	7 (46.7)	1 (6.7)	1 (6.7)	5 (33.3)
Ward 6 (n=10)	1 (10.0)	0 (0.0)	4 (40.0)	1 (10.0)	1 (10.0)	3 (30.0)		Ward 6 (n=9)	1 (12.5)	0 (0.0)	2 (25.0)	3 (37.5)	1 (12.5)	1 (12.5)
Ward 7 (n=13)	2 (15.4)	1 (7.7)	3 (23.1)	3 (23.1)	2 (15.4)	2 (15.4)		Ward 7 (n=13)	0 (0.0)	1 (7.7)	7 (53.8)	1 (7.7)	3 (23.1)	1 (7.7)
Ward 8 (n=6)	0 (0.0)	0 (0.0)	2 (33.3)	0 (0.0)	1 (16.7)	3 (50.0)		Ward 8 (n=6)	0 (0.0)	0 (0.0)	1 (20.0)	0 (0.0)	3 (60.0)	1 (20.0)
Ward 9 (n=13)	3 (23.1)	1 (7.7)	3 (23.1)	1 (7.7)	2 (15.4)	3 (23.1)		Ward 9 (n=9)	1 (11.1)	0 (0.0)	1 (11.1)	3 (33.3)	1 (11.1)	3 (33.3)
Ward 10 (n=17)	2 (12.5)	1 (6.3)	3 (18.8)	2 (12.5)	5 (31.3)	3 (18.8)		Ward 10 (n=8)	1 (12.5)	0 (0.0)	2 (25.0)	2 (25.0)	1 (12.5)	2 (25.0)
Ward 11 (n=13)	0 (0.0)	0 (0.0)	1 (8.3)	3 (25.0)	2 (16.7)	6 (50.0)		Ward 11 (n=10)	0 (0.0)	0 (0.0)	2 (20.0)	2 (20.0)	0 (0.0)	6 (60.0)
Ward 12 (n=13)	0 (0.0)	0 (0.0)	4 (30.8)	3 (23.1)	4 (30.8)	2 (15.4)		Ward 12 (n=16)	0 (0.0)	1 (6.3)	4 (25.0)	5 (31.3)	2 (12.5)	4 (25.0)
Ward 13 (n=36)	7 (20.0)	2 (5.7)	10 (28.6)	4 (11.4)	6 (17.1)	6 (17.1)		Ward 13 (n=22)	0 (0.0)	2 (9.5)	6 (28.6)	5 (23.8)	2 (9.5)	6 (28.6)
Ward 14 (n=11)	1 (9.1)	0 (0.0)	2 (18.2)	2 (18.2)	4 (36.4)	2 (18.2)		Ward 14 (n=12)	0 (0.0)	1 (8.3)	2 (16.7)	1 (8.3)	3 (25.0)	5 (41.7)
Ward 15 (n=12)	0 (0.0)	0 (0.0)	3 (25.0)	4 (33.3)	2 (16.7)	3 (25.0)		Ward 15 (n=11)	1 (9.1)	1 (9.1)	1 (9.1)	2 (18.2)	1 (9.1)	5 (45.5)
Ward 16 (n=23)	3 (13.6)	0 (0.0)	10 (45.5)	5 (22.7)	3 (13.6)	1 (4.5)		Ward 16 (n=10)	0 (0.0)	0 (0.0)	3 (30.0)	4 (40.0)	2 (20.0)	1 (10.0)
Ward 17 (n=27)	3 (11.1)	0 (0.0)	4 (14.8)	4 (14.8)	5 (18.5)	11 (40.7)		Ward 17 (n=13)	0 (0.0)	0 (0.0)	5 (38.5)	4 (30.8)	2 (15.4)	2 (15.4)
Ward 18 (n=15)	0 (0.0)	1 (6.7)	4 (26.7)	5 (33.3)	2 (13.3)	3 (20.0)		Ward 18 (n=2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
Ward 19 (n=14)	1 (7.1)	0 (0.0)	4 (28.6)	2 (14.3)	0 (0.0)	7 (50.0)		Ward 19 (n=10)	1 (10.0)	0 (0.0)	1 (10.0)	1 (10.0)	3 (30.0)	4 (40.0)
Ward 20 (n=17)	3 (17.6)	0 (0.0)	7 (41.2)	1 (5.9)	3 (17.6)	3 (17.6)		Ward 20 (n=10)	1 (10.0)	0 (0.0)	4 (40.0)	1 (10.0)	1 (10.0)	3 (30.0)
Ward 21 (n=8)	0 (0.0)	0 (0.0)	0 (0.0)	2 (25.0)	1 (12.5)	5 (62.5)		Ward 21 (n=8)	2 (28.6)	0 (0.0)	1 (14.3)	0 (0.0)	0 (0.0)	4 (57.1)
Total (n=286)	29 (10.4)	8 (2.9)	78 (27.9)	48 (17.1)	46 (16.4)	71 (25.4)		Total (n=196)	10 (5.2)	8 (4.1)	56 (28.9)	35 (18.0)	27 (13.9)	58 (29.9)
Hospital 2								*Hospital 2*						
Ward 24 (n=16)	1 (6.3)	2 (12.5)	7 (43.8)	1 (6.3)	3 (18.8)	2 (12.5)		Ward 24 (n=17)	1 (6.3)	0 (0.0)	8 (50.0)	1 (6.3)	1 (6.3)	5 (31.3)
Ward 25 (n=15)	6 (40.0)	0 (0.0)	7 (46.7)	1 (6.7)	0 (0.0)	1 (6.7)		Ward 25 (n=2)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)
Ward 26 (n=25)	3 (12.5)	0 (0.0)	12 (50.0)	1 (4.2)	4 (16.7)	4 (16.7)		Ward 26 (n=18)	0 (0.0)	0 (0.0)	8 (44.4)	3 (16.7)	4 (22.2)	3 (16.7)
Ward 27 (n=22)	1 (4.5)	2 (9.1)	7 (31.8)	6 (27.3)	0 (0.0)	6 (27.3)		Ward 27 (n=8)	0 (0.0)	0 (0.0)	2 (25.0)	2 (25.0)	1 (12.5)	3 (37.5)
Ward 28 (n=22)	2 (9.1)	1 (4.5)	6 (27.3)	7 (31.8)	3 (13.6)	3 (13.6)		Ward 28 (n=18)	1 (5.6)	2 (11.1)	4 (22.2)	0 (0.0)	2 (11.1)	9 (50.0)
Ward 29 (n=10)	3 (33.3)	2 (22.2)	1 (11.1)	1 (11.1)	2 (22.2)	0 (0.0)		Ward 29 (n=11)	1 (9.1)	1 (9.1)	6 (54.5)	3 (27.3)	0 (0.0)	0 (0.0)
Ward 30 (n=12)	1 (8.3)	2 (16.7)	5 (41.7)	1 (8.3)	2 (16.7)	1 (8.3)		Ward 30 (n=12)	1 (9.1)	1 (9.1)	1 (9.1)	5 (45.5)	2 (18.2)	1 (9.1)
-	-	-	-	-	-	-		Ward 35 (n=12)	2 (16.7)	1 (8.3)	4 (33.3)	2 (16.7)	1 (8.3)	2 (16.7)
Total (n=122)	17 (14.2)	9 (7.5)	45 (37.5)	18 (15.0)	14 (1178)	17 (14.2)		Total (n=98)	6 (6.4)	5 (5.3)	33 (35.1)	16 (17.0)	12 (12.8)	22 (23.4)
Hospital 3								*Hospital 3*						
Ward 32 (n=11)	2 (20.0)	1 (10.0)	2 (20.0)	2 (20.0)	2 (20.0)	1 (10.0)		Ward 32 (n=3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)
Ward 33 (n=7)	0 (0.0)	0 (0.0)	3 (50.0)	0 (0.0)	2 (33.3)	1 (16.7)		Ward 33 (n=5)	0 (0.0)	0 (0.0)	4 (80.0)	1 (20.0)	0 (0.0)	0 (0.0)
Ward 34 (n=18)	1 (5.6)	1 (5.6)	8 (44.4)	2 (11.1)	0 (0.0)	6 (33.3)		Ward 34 (n=6)	0 (0.0)	2 (40.0)	1 (20.0)	2 (40.0)	0 (0.0)	0 (0.0)
Total (n=36)	3 (8.8)	2 (5.9)	13 (38.2)	4 (11.8)	4 (11.8)	8 (23.5)		Total (n=14)	0 (0.0)	2 (15.4)	5 (38.5)	3 (23.1)	3 (23.1)	0 (0.0)
Overall total (n=444)	49 (11.3)	19 (4.4)	136 (31.3)	70 (16.1)	64 (14.7)	96 (22.1)		*Overall total (n=308)*	16 (5.3)	15 (5.0)	94 (31.2)	54 (17.9)	42 (14.0)	80 (26.6)

Table: 4.4.4.3 Quality of care delivered

	Time 1					Time 2				
Quality of care delivered	Poor	Fair	Good	Excellent		Quality of care delivered	Poor	Fair	Good	Excellent
Hospital 1						*Hospital 1*				
Ward 4 (n = 12)	0 (0.0)	6 (50.0)	5 (41.7)	1 (8.3)		Ward 4 (n = 12)	0 (0.0)	1 (8.3)	8 (66.7)	3 (25.0)
Ward 5 (n = 26)	0 (0.0)	8 (32.0)	12 (48.0)	5 (20.0)		Ward 5 (n = 15)	2 (13.3)	8 (53.3)	4 (26.7)	1 (6.7)
Ward 6 (n = 10)	2 (20.0)	3 (30.0)	5 (50.0)	0 (0.0)		Ward 6 (n = 9)	0 (0.0)	2 (22.2)	6 (66.7)	1 (11.1)
Ward 7 (n = 13)	0 (0.0)	2 (15.4)	8 (61.5)	3 (23.1)		Ward 7 (n = 13)	0 (0.0)	1 (7.7)	7 (53.8)	5 (38.5)
Ward 8 (n = 6)	0 (0.0)	1 (16.7)	5 (83.3)	0 (0.0)		Ward 8 (n = 6)	0 (0.0)	3 (60.0)	2 (40.0)	0 (0.0)
Ward 9 (n = 13)	0 (0.0)	2 (15.4)	4 (30.8)	7 (53.8)		Ward 9 (n= 9)	0 (0.0)	2 (22.2)	6 (66.7)	1 (11.1)
Ward 10 (n = 17)	1 (6.3)	4 (25.0)	10 (62.5)	1 (6.3)		Ward 10 (n =8)	1 (14.3)	1 (14.3)	4 (57.1)	1 (14.3)
Ward 11 (n = 13)	6 (46.2)	4 (30.8)	3 (23.1)	0 (0.0)		Ward 11 (n = 10)	2 (20.0)	7 (70.0)	1 (10.0)	0 (0.0)
Ward 12 (n = 13)	0 (0.0)	2 (15.4)	9 (69.2)	2 (15.4)		Ward 12 (n = 16)	0 (0.0)	3 (18.8)	8 (50.0)	5 (31.3)
Ward 13 (n = 36)	0 (0.0)	2 (5.6)	19 (52.8)	15 (41.7)		Ward 13 (n = 22)	0 (0.0)	6 (28.6)	9 (42.9)	6 (28.6)
Ward 14 (n = 11)	2 (18.2)	3 (27.3)	5 (45.5)	1 (9.1)		Ward 14 (n = 12)	0 (0.0)	7 (58.3)	5 (41.7)	0 (0.0)
Ward 15 (n = 12)	0 (0.0)	1 (8.3)	6 (50.0)	5 (41.7)		Ward 15 (n = 11)	0 (0.0)	1 (9.1)	6 (54.5)	4 (36.4)
Ward 16 (n = 23)	0 (0.0)	5 (21.7)	14 (60.9)	4 (17.4)		Ward 16 (n = 10)	1 (10.0)	3 (30.0)	3 (30.0)	3 (30.0)
Ward 17 (n = 27)	2 (7.7)	10 (38.5)	10 (38.5)	4 (15.4)		Ward 17 (n = 13)	0 (0.0)	7 (53.8)	5 (38.5)	1 (7.7)
Ward 18 (n = 15)	0 (0.0)	2 (14.3)	10 (71.4)	2 (14.3)		Ward 18 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 19 (n = 14)	0 (0.0)	3 (21.4)	10 (71.4)	1 (7.1)		Ward 19 (n = 10)	0 (0.0)	1 (10.0)	4 (40.0)	5 (50.0)
Ward 20 (n = 17)	0 (0.0)	5 (29.4)	10 (58.8)	2 (11.8)		Ward 20 (n = 10)	0 (0.0)	2 (20.0)	7 (70.0)	1 (10.0)
Ward 21 (n = 8)	0 (0.0)	1 (12.5)	6 (75.0)	1 (12.5)		Ward 21 (n = 8)	0 (0.0)	2 (25.0)	5 (62.5)	1 (12.5)
Total (n = 286)	13 (4.6)	64 (22.7)	151 (53.5)	54 (19.1)		Total (n = 196)	6 (3.1)	58 (29.7)	92 (47.2)	39 (20.0)
Hospital 2						*Hospital 2*				
Ward 24 (n = 16)	0 (0.0)	5 (31.3)	9 (56.3)	2 (12.5)		Ward 24 (n =17)	0 (0.0)	5 (29.4)	10 (58.8)	2 (11.8)
Ward 25 (n = 15)	0 (0.0)	1 (6.7)	8 (53.3)	6 (40.0)		Ward 25 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	2 (8.3)	6 (25.0)	10 (41.7)	6 (25.0)		Ward 26 (n = 18)	1 (5.6)	6 (33.3)	7 (38.9)	4 (22.2)
Ward 27 (n = 22)	0 (0.0)	3 (13.6)	18 (81.8)	1 (4.5)		Ward 27 (n = 8)	2 (28.6)	1 (14.3)	4 (57.1)	0 (0.0)
Ward 28 (n = 22)	1 (5.0)	3 (15.0)	10 (50.0)	6 (30.0)		Ward 28 (n = 18)	1 (5.9)	1 (5.9)	12 (70.6)	3 (17.6)
Ward 29 (n = 10)	0 (0.0)	2 (20.0)	3 (30.0)	5 (50.0)		Ward 29 (n= 11)	0 (0.0)	2 (18.2)	6 (54.5)	3 (27.3)
Ward 30 (n = 12)	0 (0.0)	5 (41.7)	2 (16.7)	5 (41.7)		Ward 30 (n = 12)	1 (8.3)	3 (25.0)	4 (33.3)	4 (33.3)
-	-	-	-	-		Ward 35 (n= 12)	1 (8.3)	2 (16.7)	7 (58.3)	2 (16.7)
Total (n = 122)	3 (2.5)	25 (21.0)	60 (50.4)	31 (26.1)		Total (n = 98)	6 (6.4)	19 (20.2)	52 (55.3)	17 (18.1)
Hospital 3						*Hospital 3*				
Ward 32 (n = 11)	0 (0.0)	3 (27.3)	7 (63.6)	1 (9.1)		Ward 32 (n = 3)	0 (0.0)	1 (33.3)	2 (66.7)	0 (0.0)
Ward 33 (n = 7)	0 (0.0)	1 (16.7)	3 (50.0)	2 (33.3)		Ward 33 (n = 5)	0 (0.0)	0 (0.0)	2 (40.0)	3 (60.0)
Ward 34 (n = 18)	1 (5.6)	3 (16.7)	11 (61.1)	3 (16.7)		Ward 34 (n = 6)	0 (0.0)	2 (33.3)	3 (50.0)	1 (16.7)
Total (n = 36)	1 (2.9)	7 (20.0)	21 (60.0)	6 (17.1)		Total (n =14)	0 (0.0)	3 (21.4)	7 (50.0)	4 (28.6)
Overall total (n = 444)	17 (3.9)	96 (22.0)	231 (53.2)	91 (20.9)		*Overall total (n= 308)*	12 (4.0)	80 (26.4)	151 (49.8)	60 (19.8)

Table: 4.4.4.4 Quality of care – patient safety on ward

Time 1						Time 2					
Overall grade on patient safety	Failing	Poor	Acceptable	Very good	Excellent	Overall grade on patient safety	Failing	Poor	Acceptable	Very good	Excellent
Hospital 1						*Hospital 1*					
Ward 4 (n = 12)	1 (8.3)	0 (0.0)	6 (50.0)	5 (41.7)	0 (0.0)	Ward 4 (n = 12)	0 (0.0)	1 (8.3)	3 (25.0)	7 (58.3)	1 (8.3)
Ward 5 (n = 26)	0 (0.0)	0 (0.0)	7 (29.2)	15 (62.5)	2 (8.3)	Ward 5 (n = 15)	0 (0.0)	4 (26.7)	7 (46.7)	4 (26.7)	0 (0.0)
Ward 6 (n = 10)	1 (10.0)	3 (30.0)	4 (40.0)	2 (20.0)	0 (0.0)	Ward 6 (n = 9)	0 (0.0)	0 (0.0)	6 (66.7)	3 (33.3)	0 (0.0)
Ward 7 (n = 13)	0 (0.0)	0 (0.0)	4 (30.8)	6 (46.2)	3 (23.1)	Ward 7 (n = 13)	0 (0.0)	0 (0.0)	1 (7.7)	6 (46.2)	6 (46.2)
Ward 8 (n = 6)	0 (0.0)	1 (16.7)	0 (0.0)	5 (83.3)	0 (0.0)	Ward 8 (n = 6)	1 (20.0)	1 (20.0)	2 (40.0)	0 (0.0)	1 (20.0)
Ward 9 (n = 13)	0 (0.0)	2 (15.4)	1 (7.7)	6 (46.2)	4 (30.8)	Ward 9 (n= 9)	0 (0.0)	0 (0.0)	2 (22.2)	5 (55.6)	2 (22.2)
Ward 10 (n = 17)	0 (0.0)	2 (11.8)	8 (47.1)	6 (35.3)	1 (5.9)	Ward 10 (n =8)	0 (0.0)	2 (25.0)	3 (37.5)	3 (37.5)	0 (0.0)
Ward 11 (n = 13)	4 (30.8)	4 (30.8)	5 (38.5)	0 (0.0)	0 (0.0)	Ward 11 (n = 10)	3 (30.0)	4 (40.0)	3 (30.0)	0 (0.0)	0 (0.0)
Ward 12 (n = 13)	0 (0.0)	0 (0.0)	5 (41.7)	6 (50.0)	1 (8.3)	Ward 12 (n = 16)	0 (0.0)	1 (6.3)	8 (50.0)	4 (25.0)	3 (18.8)
Ward 13 (n = 36)	0 (0.0)	1 (2.8)	11 (30.6)	20 (55.6)	4 (11.1)	Ward 13 (n = 22)	1 (4.8)	2 (9.5)	7 (33.3)	10 (47.6)	1 (4.8)
Ward 14 (n = 11)	0 (0.0)	2 (18.2)	9 (81.8)	0 (0.0)	0 (0.0)	Ward 14 (n = 12)	1 (8.3)	3 (25.0)	3 (25.0)	4 (33.3)	1 (8.3)
Ward 15 (n = 12)	0 (0.0)	2 (16.7)	0 (0.0)	5 (41.7)	5 (41.7)	Ward 15 (n = 11)	0 (0.0)	0 (0.0)	2 (18.2)	7 (63.6)	2 (18.2)
Ward 16 (n = 23)	1 (4.3)	0 (0.0)	8 (34.8)	13 (56.5)	1 (4.3)	Ward 16 (n = 10)	0 (0.0)	1 (10.0)	5 (50.0)	3 (30.0)	1 (10.0)
Ward 17 (n = 27)	0 (0.0)	5 (18.5)	11 (40.7)	9 (33.3)	2 (7.4)	Ward 17 (n = 13)	0 (0.0)	2 (15.4)	4 (30.8)	7 (53.8)	0 (0.0)
Ward 18 (n = 15)	0 (0.0)	4 (26.7)	6 (40.0)	3 (20.0)	2 (13.3)	Ward 18 (n = 2)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)
Ward 19 (n = 14)	0 (0.0)	1 (7.7)	3 (23.1)	6 (46.2)	3 (23.1)	Ward 19 (n = 10)	0 (0.0)	0 (0.0)	2 (20.0)	7 (70.0)	1 (10.0)
Ward 20 (n = 17)	0 (0.0)	0 (0.0)	6 (35.3)	10 (58.8)	1 (5.9)	Ward 20 (n = 10)	0 (0.0)	1 (10.0)	6 (60.0)	3 (30.0)	0 (0.0)
Ward 21 (n = 8)	0 (0.0)	1 (12.5)	3 (37.5)	4 (50.0)	0 (0.0)	Ward 21 (n = 8)	0 (0.0)	0 (0.0)	3 (37.5)	3 (37.5)	2 (25.0)
Total (n = 286)	7 (2.5)	28 (9.9)	97 (34.4)	121 (42.9)	29 (10.3)	Total (n = 196)	6 (3.1)	24 (12.2)	68 (34.7)	77 (39.3)	21 (10.7)
Hospital 2						*Hospital 2*					
Ward 24 (n = 16)	0 (0.0)	1 (6.3)	3 (18.8)	8 (50.0)	4 (25.0)	Ward 24 (n =17)	0 (0.0)	0 (0.0)	9 (52.9)	6 (35.3)	2 (11.8)
Ward 25 (n = 15)	0 (0.0)	0 (0.0)	1 (6.7)	10 (66.7)	4 (26.7)	Ward 25 (n = 2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)
Ward 26 (n = 25)	4 (17.4)	6 (26.1)	8 (34.8)	4 (17.4)	1 (4.3)	Ward 26 (n = 18)	2 (11.1)	1 (5.6)	9 (50.0)	6 (33.3)	0 (0.0)
Ward 27 (n = 22)	0 (0.0)	0 (0.0)	7 (31.8)	13 (59.1)	2 (9.1)	Ward 27 (n = 8)	1 (12.5)	2 (25.0)	5 (62.5)	0 (0.0)	0 (0.0)
Ward 28 (n = 22)	2 (9.1)	0 (0.0)	6 (27.3)	11 (50.0)	3 (13.6)	Ward 28 (n = 18)	0 (0.0)	1 (5.6)	6 (33.3)	10 (55.6)	1 (5.6)
Ward 29 (n = 10)	1 (10.0)	1 (10.0)	3 (30.0)	3 (30.0)	2 (20.0)	Ward 29 (n= 11)	0 (0.0)	0 (0.0)	4 (36.4)	5 (45.5)	2 (18.2)
Ward 30 (n = 12)	3 (25.0)	2 (16.7)	4 (33.3)	2 (16.7)	1 (8.3)	Ward 30 (n = 12)	1 (8.3)	1 (8.3)	7 (58.3)	1 (8.3)	2 (16.7)
-	-	-	-	-	-	Ward 35 (n= 12)	1 (8.3)	3 (25.0)	5 (41.7)	2 (16.7)	1 (8.3)
Total (n = 122)	10 (8.3)	10 (8.3)	32 (26.7)	51 (42.5)	17 (14.2)	Total (n = 98)	5 (5.2)	7 (7.3)	45 (46.9)	30 (31.3)	9 (9.4)
Hospital 3						*Hospital 3*					
Ward 32 (n = 11)	0 (0.0)	0 (0.0)	8 (72.7)	3 (27.3)	0 (0.0)	Ward 32 (n = 3)	0 (0.0)	1 (33.3)	1 (33.3)	1 (33.3)	0 (0.0)
Ward 33 (n = 7)	0 (0.0)	0 (0.0)	2 (28.6)	4 (57.1)	1 (14.3)	Ward 33 (n = 5)	0 (0.0)	0 (0.0)	0 (0.0)	2 (40.0)	3 (60.0)
Ward 34 (n = 18)	1 (5.6)	4 (22.2)	6 (33.3)	7 (38.9)	0 (0.0)	Ward 34 (n = 6)	1 (16.7)	1 (16.7)	2 (33.3)	2 (33.3)	0 (0.0)
Total (n = 36)	1 (2.8)	4 (11.1)	16 (44.4)	14 (38.9)	1 (2.8)	Total (n =14)	1 (7.1)	2 (14.3)	3 (21.4)	5 (35.7)	3 (21.4)
Overall total (n = 444)	18 (4.2)	42 (9.6)	145 (33.1)	186 (42.5)	47 (10.7)	*Overall total (n= 308)*	12 (3.9)	33 (10.8)	116 (37.9)	112 (36.6)	33 (10.8)

Table: 4.4.4.5 Quality of care in the past six months

	Time 1				Time 2		
Quality of care in past 6 months	Deteriorated	Remained the same	Improved	Quality of care in past 6 months	Deteriorated	Remained the same	Improved
Hospital 1				*Hospital 1*			
Ward 4 (n = 12)	5 (41.7)	6 (50.0)	1 (8.3)	Ward 4 (n = 12)	0 (0.0)	8 (66.7)	4 (33.3)
Ward 5 (n = 26)	5 (20.0)	16 (64.0)	4 (16.0)	Ward 5 (n = 15)	4 (26.7)	9 (60.0)	2 (13.3)
Ward 6 (n = 10)	2 (20.0)	7 (70.0)	1 (10.0)	Ward 6 (n = 9)	0 (0.0)	3 (33.3)	6 (66.7)
Ward 7 (n = 13)	0 (0.0)	8 (66.7)	4 (33.3)	Ward 7 (n = 13)	1 (7.7)	10 (76.9)	2 (15.4)
Ward 8 (n = 6)	0 (0.0)	4 (66.7)	2 (33.3)	Ward 8 (n = 6)	3 (60.0)	2 (40.0)	0 (0.0)
Ward 9 (n = 13)	10 (76.9)	1 (7.7)	2 (15.4)	Ward 9 (n= 9)	4 (44.4)	4 (44.4)	1 (11.1)
Ward 10 (n = 17)	0 (0.0)	11 (68.8)	5 (31.3)	Ward 10 (n =8)	2 (25.0)	6 (75.0)	0 (0.0)
Ward 11 (n = 13)	11 (84.6)	1 (7.7)	1 (7.7)	Ward 11 (n = 10)	9 (90.0)	1 (10.0)	0 (0.0)
Ward 12 (n = 13)	2 (15.4)	10 (76.9)	1 (7.7)	Ward 12 (n = 16)	1 (6.3)	14 (87.5)	1 (6.3)
Ward 13 (n = 36)	3 (8.3)	25 (69.4)	8 (22.2)	Ward 13 (n = 22)	7 (33.3)	10 (47.6)	4 (19.0)
Ward 14 (n = 11)	6 (54.5)	4 (36.4)	1 (9.1)	Ward 14 (n = 12)	3 (25.0)	9 (75.0)	0 (0.0)
Ward 15 (n = 12)	4 (33.3)	5 (41.7)	3 (25.0)	Ward 15 (n = 11)	1 (9.1)	9 (81.8)	1 (9.1)
Ward 16 (n = 23)	1 (4.3)	13 (56.5)	9 (39.1)	Ward 16 (n = 10)	4 (40.0)	5 (50.0)	1 (10.0)
Ward 17 (n = 27)	6 (23.1)	15 (57.7)	5 (19.2)	Ward 17 (n = 13)	2 (15.4)	8 (61.5)	3 (23.1)
Ward 18 (n = 15)	9 (69.2)	3 (23.1)	1 (7.7)	Ward 18 (n = 2)	1 (50.0)	1 (50.0)	0 (0.0)
Ward 19 (n = 14)	3 (21.4)	6 (42.9)	5 (35.7)	Ward 19 (n = 10)	2 (20.0)	7 (70.0)	1 (10.0)
Ward 20 (n = 17)	8 (47.1)	7 (41.2)	2 (11.8)	Ward 20 (n = 10)	4 (40.0)	4 (40.0)	2 (20.0)
Ward 21 (n = 8)	0 (0.0)	7 (87.5)	1 (12.5)	Ward 21 (n = 8)	1 (14.3)	3 (42.9)	3 (42.9)
Total (n = 286)	75 (26.8)	149 (53.2)	56 (20.0)	Total (n = 196)	51 (26.2)	113 (57.9)	31 (15.9)
Hospital 2				*Hospital 2*			
Ward 24 (n = 16)	8 (50.0)	5 (31.3)	3 (18.8)	Ward 24 (n =17)	2 (11.8)	7 (41.2)	8 (47.1)
Ward 25 (n = 15)	0 (0.0)	6 (40.0)	9 (60.0)	Ward 25 (n = 2)	1 (50.0)	0 (0.0)	1 (50.0)
Ward 26 (n = 25)	8 (33.3)	13 (54.2)	3 (12.5)	Ward 26 (n = 18)	9 (50.0)	6 (33.3)	3 (16.7)
Ward 27 (n = 22)	5 (22.7)	14 (63.6)	3 (13.6)	Ward 27 (n = 8)	8 (100.0)	0 (0.0)	0 (0.0)
Ward 28 (n = 22)	3 (13.6)	12 (54.5)	7 (31.8)	Ward 28 (n = 18)	3 (18.8)	9 (56.3)	4 (25.0)
Ward 29 (n = 10)	4 (44.4)	2 (22.2)	3 (33.3)	Ward 29 (n= 11)	0 (0.0)	8 (72.7)	3 (27.3)
Ward 30 (n = 12)	8 (66.7)	4 (33.3)	0 (0.0)	Ward 30 (n = 12)	6 (50.0)	4 (33.3)	2 (16.7)
-	-	-	-	Ward 35 (n= 12)	1 (8.3)	9 (75.0)	2 (16.7)
Total (n = 122)	36 (30.0)	56 (46.7)	28 (23.3)	Total (n = 98)	28 (29.8)	43 (45.7)	23 (24.5)
Hospital 3				*Hospital 3*			
Ward 32 (n = 11)	5 (45.5)	4 (36.4)	2 (18.2)	Ward 32 (n = 3)	1 (33.3)	1 (33.3)	1 (33.3)
Ward 33 (n = 7)	0 (0.0)	2 (28.6)	5 (71.4)	Ward 33 (n = 5)	0 (0.0)	0 (0.0)	5 (100.0)
Ward 34 (n = 18)	7 (38.9)	9 (50.0)	2 (11.1)	Ward 34 (n = 6)	2 (33.3)	3 (50.0)	1 (16.7)
Total (n = 36)	12 (33.3)	15 (41.7)	9 (25.0)	Total (n =14)	3 (21.4)	4 (28.6)	7 (50.0)
Overall total (n = 444)	123 (28.2)	220 (50.5)	93 (21.3)	*Overall total (n= 308)*	82 (21.4)	160(28.6)	61 (50.0)

4.4.5 Care Left Undone and Delayed

Table 4.4.5.1 below summaries staff responses in relation to number of items left undone or delayed due to a lack of time. Overall the average numbers of 'items left undone' remained low through both time periods (1.27 in Time 1, 1.40 in Time 2). Hospital 1 reported shifts with 'at least one item undone' decreased from 55.4% in Time 1 to 53.3% in Time 2. Variations were seen with individual wards in Hospital 1 reporting lower levels of items left undone at Time 2; Ward 7 decreased from 1.73 items to 0.30 items at Time 2; Ward 13 decreased from 1.45 to 1.06, Ward 14 went from 2.63 to 1.89, Wad 16 fell from 2.47 to 1.56, Ward 17 decreased from 2.50 to 2.36, Ward 20 fell to 0.71 from 1.69 in Time 1. Each of these wards received changes to their staffing levels. While other wards in Hospital 1 and 2 also reported lower items left undone at Time 2, the large majority increased or remained unchanged. All three wards in hospital 3 increase in reported care left undone at Time 2.

Care delayed generally increased from Time 1 to Time 2, in all wards regardless of staffing changes. However, in those that received staffing changes it may be posited that with additional time to deliver care, less items are left undone however, there it remains the case that there is not enough time to deliver this care "on time" and thus more items are delayed but not left undone.

Meal breaks missed and meal breaks delayed in Hospital 1 fell from 29.4% and 48.9% to 26.7% and 48.0% in Time 2 respectively. For each of the wards that received changes, except Wards 16 and 17, there were fewer reported of missed meal breaks, however many of the wards had an increase in delayed meal breaks. However, Hospital 2 saw a 14.6% increase in missed meal breaks at Time 2, while Hospital 2 saw a 2% increase. Hospitals 2 and 3 reported fewer delayed meal breaks (Hospital 2: 41.4% to 32.0%; Hospital 3: 47.8% to 43.5%).

Table 4.4.5.1 Care Left Undone and Care Delayed

CLUEs	Time 1 Number of activities undone	Shifts with at least one item undone	Number of activities delayed	Shifts with at least one item delayed	Meal breaks missed	Meal breaks delayed	CLUEs	Time 2 Number of activities undone	Shifts with at least one item undone	Number of activities delayed	Shifts with at least one item delayed	Meal breaks missed	Meal breaks delayed
Hospital 1							*Hospital 1*						
Ward 4 (n=12)	0.56 (0.88)	3 (33.3)	8.56 (3.21)	9 (100.0)	0 (0.0)	8 (88.9)	Ward 4 (n=12)	1.25 (1.58)	4 (50.0)	4.88 (2.95)	8 (100.0)	2 (25.0)	4 (50.0)
Ward 5 (n=26)	0.94 (1.66)	7 (38.9)	4.11 (2.37)	17 (94.4)	2 (11.1)	10 (55.6)	Ward 5 (n=15)	2.36 (2.20)	8 (72.7)	7.73 (3.55)	11 (100.0)	1 (9.1)	9 (81.8)
Ward 6 (n=10)	2.50 (3.27)	4 (66.7)	3.83 (2.93)	5 (83.3)	3 (50.0)	2 (33.3)	Ward 6 (n=9)	0.86 (0.90)	4 (57.1)	3.71 (4.42)	6 (85.7)	2 (28.6)	4 (57.1)
Ward 7 (n=13)	1.73 (1.74)	8 (72.7)	5.27 (3.32)	11 (100.0)	2 (18.2)	8 (72.7)	Ward 7 (n=13)	0.30 (0.95)	1 (10.0)	3.50 (3.75)	8 (80.0)	0 (0.0)	4 (40.0)
Ward 8 (n=6)	1.33 (1.37)	4 (66.7)	7.33 (3.88)	6 (100.0)	4 (66.7)	2 (33.3)	Ward 8 (n=6)	3.40 (2.61)	4 (80.0)	9.20 (2.86)	5 (100.0)	3 (60.0)	1 (20.0)
Ward 9 (n=13)	0.70 (1.57)	3 (30.0)	4.80 (3.52)	9 (90.0)	2 (20.0)	5 (50.0)	Ward 9 (n=9)	0.71 (0.76)	4 (57.1)	6.71 (5.22)	6 (85.7)	4 (50.0)	1 (12.5)
Ward 10 (n=17)	1.42 (1.31)	8 (66.7)	4.58 (2.43)	12 (100.0)	4 (33.3)	5 (41.7)	Ward 10 (n=8)	2.50 (2.39)	5 (62.5)	5.25 (3.62)	7 (87.5)	2 (25.0)	5 (62.5)
Ward 11 (n=13)	1.89 (2.15)	5 (55.6)	7.78 (3.77)	9 (100.0)	7 (77.8)	2 (22.2)	Ward 11 (n=10)	1.29 (1.60)	4 (57.1)	10.43 (3.64)	7 (100.0)	5 (71.4)	2 (28.6)
Ward 12 (n=13)	1.50 (2.39)	6 (50.0)	5.42 (4.94)	11 (91.7)	3 (25.0)	7 (58.3)	Ward 12 (n=16)	1.89 (2.42)	5 (55.6)	7.22 (4.21)	9 (100.0)	2 (22.2)	4 (44.4)
Ward 13 (n=36)	1.45 (1.76)	16 (55.2)	3.72 (3.84)	23 (79.3)	4 (13.8)	18 (62.1)	Ward 13 (n=22)	1.06 (1.73)	7 (43.8)	5.88 (2.55)	16 (100.0)	2 (12.5)	10 (62.5)
Ward 14 (n=11)	2.63 (2.26)	6 (75.0)	8.38 (3.78)	7 (87.5)	4 (50.0)	3 (37.5)	Ward 14 (n=12)	1.89 (0.78)	9 (100.0)	7.33 (3.04)	9 (100.0)	3 (33.3)	5 (55.6)
Ward 15 (n=12)	1.37 (1.68)	5 (62.5)	4.62 (4.03)	7 (87.5)	2 (25.0)	5 (62.5)	Ward 15 (n=11)	1.00 (1.73)	2 (28.6)	6.00 (3.92)	7 (100.0)	0 (0.0)	6 (85.7)
Ward 16 (n=23)	2.47 (2.24)	13 (76.5)	4.35 (2.57)	16 (94.1)	4 (23.5)	9 (52.9)	Ward 16 (n=10)	1.56 (2.35)	4 (44.4)	4.22 (3.90)	7 (77.8)	4 (44.4)	3 (33.3)
Ward 17 (n=27)	2.50 (2.06)	19 (73.1)	6.12 (3.08)	25 (96.2)	12 (46.2)	10 (38.5)	Ward 17 (n=13)	2.36 (2.34)	7 (63.6)	3.91 (3.02)	10 (90.9)	6 (54.5)	1 (9.1)
Ward 18 (n=15)	0.75 (1.22)	5 (41.7)	5.75 (5.36)	8 (66.7)	2 (16.7)	7 (58.3)	Ward 18 (n=2)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)
Ward 19 (n=14)	1.50 (1.56)	8 (57.1)	5.43 (3.82)	13 (92.9)	7 (50.0)	4 (28.6)	Ward 19 (n=10)	0.90 (1.29)	4 (40.0)	6.10 (4.48)	9 (90.0)	1 (10.0)	3 (30.0)
Ward 20 (n=17)	1.69 (2.65)	9 (56.3)	4.38 (3.70)	14 (87.5)	1 (6.3)	7 (43.8)	Ward 20 (n=10)	0.71 (0.95)	3 (42.9)	5.43 (2.51)	7 (100.0)	0 (0.0)	5 (83.3)
Ward 21 (n=8)	1.87 (1.64)	4 (50.0)	4.25 (3.49)	6 (75.0)	5 (62.5)	1 (12.5)	Ward 21 (n=8)	1.43 (1.81)	4 (57.1)	5.14 (3.76)	6 (85.7)	3 (42.9)	3 (42.9)
Total (n=286)	1.60 (1.86)	128 (55.4)	5.48 (3.56)	207 (89.6)	68 (29.4)	113 (48.9)	Total (n=196)	1.47 (1.84)	80 (53.3)	5.94 (3.83)	140 (93.3)	40 (26.7)	72 (48.0)
Hospital 2							*Hospital 2*						
Ward 24 (n=16)	0.92 (1.51)	5 (41.7)	7.50 (4.96)	11 (91.7)	5 (41.7)	3 (25.0)	Ward 24 (n=17)	0.91 (1.22)	5 (45.5)	6.55 (3.91)	11 (100.0)	2 (18.2)	5 (45.5)
Ward 25 (n=15)	0.25 (0.62)	2 (16.7)	1.83 (1.59)	8 (66.7)	1 (8.3)	3 (25.0)	Ward 25 (n=2)	0.50 (0.71)	1 (50.0)	6.50 (2.12)	2 (100.0)	1 (50.0)	1 (50.0)
Ward 26 (n=25)	1.23 (2.05)	11 (50.0)	8.55 (3.94)	21 (100.0)	10 (45.5)	11 (50.0)	Ward 26 (n=18)	0.87 (1.30)	6 (40.0)	9.47 (3.85)	15 (100.0)	8 (53.3)	2 (13.3)
Ward 27 (n=22)	0.21 (0.54)	3 (15.8)	6.16 (4.71)	17 (89.5)	5 (26.3)	11 (57.9)	Ward 27 (n=8)	1.17 (1.17)	4 (66.7)	7.83 (4.07)	6 (100.0)	1 (16.7)	3 (50.0)
Ward 28 (n=22)	0.33 (0.59)	5 (27.8)	5.39 (4.86)	15 (83.3)	8 (44.4)	6 (33.3)	Ward 28 (n=18)	1.43 (2.10)	7 (50.0)	7.07 (3.50)	14 (100.0)	10 (71.4)	3 (21.4)
Ward 29 (n=10)	1.14 (1.68)	3 (42.9)	4.00 (4.32)	5 (71.4)	3 (42.9)	3 (42.9)	Ward 29 (n=11)	1.63 (1.77)	5 (62.5)	1.63 (1.69)	5 (62.5)	3 (37.5)	4 (50.0)
Ward 30 (n=12)	0.56 (0.88)	3 (33.3)	3.00 (2.06)	7 (77.8)	2 (22.2)	4 (44.4)	Ward 30 (n=12)	0.50 (1.07)	2 (25.0)	6.00 (5.01)	6 (75.0)	2 (25.0)	3 (37.5)
-	-	-	-	-	-	-	Ward 35 (n=12)	1.50 (1.38)	8 (66.7)	4.00 (2.98)	10 (83.3)	4 (33.3)	4 (33.3)
Total (n=122)	0.65 (1.32)	32 (32.7)	5.77 (4.60)	84 (85.7)	34 (34.7)	41 (41.4)	Total (n=98)	1.11 (1.48)	37 (49.3)	6.29 (4.19)	68 (90.7)	31 (41.3)	24 (32.0)
Hospital 3							*Hospital 3*						
Ward 32 (n=11)	0.55 (1.04)	3 (27.3)	3.00 (3.00)	8 (72.7)	0 (0.0)	5 (45.5)	Ward 32 (n=3)	1.67 (2.08)	2 (66.7)	5.33 (4.16)	3 (100.0)	0 (0.0)	3 (100.0)
Ward 33 (n=7)	1.00 (1.41)	2 (40.0)	6.60 (4.98)	5 (100.0)	1 (20.0)	3 (60.0)	Ward 33 (n=5)	3.25 (6.50)	1 (25.0)	2.60 (5.27)	2 (40.0)	0 (0.0)	1 (20.0)
Ward 34 (n=18)	0.63 (1.09)	5 (31.3)	4.50 (4.47)	14 (87.5)	1 (6.3)	11 (68.8)	Ward 34 (n=6)	2.25 (2.63)	2 (50.0)	8.75 (3.77)	4 (100.0)	1 (25.0)	3 (75.0)
Total (n=36)	0.66 (1.10)	10 (31.3)	4.31 (4.15)	27 (84.4)	2 (6.3)	19 (59.4)	Total (n=14)	2.45 (4.01)	5 (45.5)	5.33 (4.98)	9 (75.0)	1 (8.3)	7 (58.3)
Overall total (n=444)	1.27 (1.80)	169 (46.7)	5.29 (4.04)	319 (88.1)	104 (28.7)	173 (47.8)	*Overall total (n=308)*	1.40 (1.90)	122 (51.7)	6.02 (4.00)	217 (91.6)	72 (30.4)	103 (43.5)

4.4.6 Job Satisfaction and Intention to Stay/Leave

The respondents' intention to leave is reported for all Phases in Tables 3.4.5.1, 3.4.5.2, 3.4.5.3, 3.4.5.4. Overall, levels of respondents reporting being either 'satisfied' or 'very satisfied' with their current job remained at a sustained level same across Time 1 (66.6%) and Time 2 (65.8%). Some wards receiving changes to staffing appear to have reported slightly lower levels of job dissatisfaction at Time 2 compared to Time 1. Similarly, the majority of staff indicated a willingness to recommend their ward to colleagues with 69.1% answering 'probably yes' or 'definitely yes' in Time 1 and 70.6% in Time 2. Notably, wards where no uplift was given predominantly responded 'probably no' or 'definitely no' to this domain with staff on Ward 11 (77.8%), Ward 27 (75.0%) and Ward 6 (55.6%) stating they would probably/definitely not recommend their ward to colleagues in Time 2.

Both time periods saw over 50% of staff highlighting an intention to leave with 51.4% selecting either 'probably' or 'definitely' leave in Time 1 and 51.9% in Time 2. This appears relatively consistent regardless of receiving changes to staffing. However, an additional question asked respondents to state their reason for answering probably/definitely will leave and a decrease was found in those leaving due to job dissatisfaction between Time 1 (52.8%) and Time 2 (47.4%) and for each Hospital with most wards receiving an increase in staff also decreasing on this measure.

Table: 4.4.6.1 Attitudes towards your work – satisfaction with current job

Time 1					Time 2				
Satisfaction with current job	Very dissatisfied	Dissatisfied	Satisfied	Very Satisfied	Satisfaction with current job	Very dissatisfied	Dissatisfied	Satisfied	Very Satisfied
Hospital 1					*Hospital 1*				
Ward 4 (n = 12)	2 (18.2)	5 (45.5)	4 (36.4)	0 (0.0)	Ward 4 (n = 12)	2 (16.7)	3 (25.0)	5 (41.7)	2 (16.7)
Ward 5 (n = 26)	0 (0.0)	1 (4.0)	23 (92.0)	1 (4.0)	Ward 5 (n = 15)	1 (6.7)	4 (26.7)	10 (66.7)	0 (0.0)
Ward 6 (n = 10)	3 (30.0)	3 (30.0)	3 (30.0)	1 (10.0)	Ward 6 (n = 9)	0 (0.0)	2 (22.2)	7 (77.8)	0 (0.0)
Ward 7 (n = 13)	0 (0.0)	1 (7.7)	11 (84.6)	1 (7.7)	Ward 7 (n = 13)	1 (7.7)	2 (15.4)	8 (61.5)	2 (15.4)
Ward 8 (n = 6)	2 (33.3)	0 (0.0)	3 (50.0)	1 (16.7)	Ward 8 (n = 6)	0 (0.0)	3 (75.0)	1 (25.0)	0 (0.0)
Ward 9 (n = 13)	1 (7.7)	5 (38.5)	7 (53.8)	0 (0.0)	Ward 9 (n= 9)	0 (0.0)	1 (11.1)	8 (88.9)	0 (0.0)
Ward 10 (n = 17)	1 (5.9)	3 (17.6)	12 (70.6)	1 (5.9)	Ward 10 (n =8)	1 (12.5)	1 (12.5)	6 (75.0)	0 (0.0)
Ward 11 (n = 13)	7 (58.3)	4 (30.8)	2 (15.4)	0 (0.0)	Ward 11 (n = 10)	1 (10.0)	6 (60.0)	3 (30.0)	0 (0.0)
Ward 12 (n = 13)	0 (0.0)	4 (30.8)	7 (53.8)	2 (15.4)	Ward 12 (n = 16)	2 (12.5)	4 (25.0)	8 (50.0)	2 (12.5)
Ward 13 (n = 36)	0 (0.0)	5 (13.9)	23 (63.9)	8 (22.2)	Ward 13 (n = 22)	1 (4.5)	5 (22.7)	13 (59.1)	3 (13.6)
Ward 14 (n = 11)	3 (27.3)	4 (36.4)	3 (27.3)	1 (9.1)	Ward 14 (n = 12)	1 (8.3)	6 (50.0)	4 (33.3)	1 (8.3)
Ward 15 (n = 12)	2 (16.7)	0 (0.0)	8 (66.7)	2 (16.7)	Ward 15 (n = 11)	0 (0.0)	1 (9.1)	8 (72.7)	2 (18.2)
Ward 16 (n = 23)	0 (0.0)	5 (21.7)	17 (73.9)	1 (4.3)	Ward 16 (n = 10)	0 (0.0)	4 (40.0)	5 (50.0)	1 (10.0)
Ward 17 (n = 27)	5 (18.5)	9 (33.3)	11 (40.7)	2 (7.4)	Ward 17 (n = 13)	1 (8.3)	6 (50.0)	4 (33.3)	1 (8.3)
Ward 18 (n = 15)	1 (6.7)	6 (40.0)	8 (53.3)	0 (0.0)	Ward 18 (n = 2)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)
Ward 19 (n = 14)	0 (0.0)	4 (28.6)	8 (57.1)	2 (14.3)	Ward 19 (n = 10)	0 (0.0)	2 (20.0)	7 (70.0)	1 (10.0)
Ward 20 (n = 17)	4 (23.5)	6 (35.3)	7 (41.2)	0 (0.0)	Ward 20 (n = 10)	0 (0.0)	4 (40.0)	5 (50.0)	1 (10.0)
Ward 21 (n = 8)	0 (0.0)	2 (28.6)	4 (57.1)	1 (14.3)	Ward 21 (n = 8)	0 (0.0)	2 (25.0)	6 (75.0)	0 (0.0)
Total (n = 286)	31 (11.0)	67 (23.7)	161 (56.9)	24 (8.5)	Total (n = 196)	11 (5.6)	58 (29.7)	109 (55.9)	17 (8.7)
Hospital 2					*Hospital 2*				
Ward 24 (n = 16)	0 (0.0)	2 (12.5)	14 (87.5)	0 (0.0)	Ward 24 (n =17)	0 (0.0)	0 (0.0)	14 (82.4)	3 (17.6)
Ward 25 (n = 15)	0 (0.0)	0 (0.0)	9 (60.0)	6 (40.0)	Ward 25 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	2 (8.0)	11 (44.0)	11 (44.0)	1 (4.0)	Ward 26 (n = 18)	1 (5.6)	10 (55.6)	6 (33.3)	1 (5.6)
Ward 27 (n = 22)	0 (0.0)	10 (45.5)	11 (50.0)	1 (4.5)	Ward 27 (n = 8)	1 (12.5)	5 (62.5)	2 (25.0)	0 (0.0)
Ward 28 (n = 22)	0 (0.0)	3 (14.3)	10 (47.6)	8 (38.1)	Ward 28 (n = 18)	1 (5.6)	3 (16.7)	12 (66.7)	2 (11.1)
Ward 29 (n = 10)	1 (10.0)	4 (40.0)	4 (40.0)	1 (10.0)	Ward 29 (n= 11)	0 (0.0)	2 (18.2)	6 (54.5)	3 (27.3)
Ward 30 (n = 12)	1 (8.3)	4 (33.3)	7 (58.3)	0 (0.0)	Ward 30 (n = 12)	2 (16.7)	3 (25.0)	7 (58.3)	0 (0.0)
-	-	-	-	-	Ward 35 (n= 12)	1 (8.3)	3 (25.0)	6 (50.0)	2 (16.7)
Total (n = 122)	4 (3.3)	34 (28.1)	66 (54.5)	17 (14.0)	Total (n = 98)	6 (6.3)	25 (26.0)	55 (57.3)	10 (10.4)
Hospital 3					*Hospital 3*				
Ward 32 (n = 11)	0 (0.0)	6 (54.5)	5 (45.5)	0 (0.0)	Ward 32 (n = 3)	0 (0.0)	1 (33.3)	2 (66.7)	0 (0.0)
Ward 33 (n = 7)	0 (0.0)	0 (0.0)	3 (60.0)	2 (40.0)	Ward 33 (n = 5)	0 (0.0)	0 (0.0)	3 (75.0)	1 (25.0)
Ward 34 (n = 18)	1 (5.9)	3 (17.6)	12 (70.6)	1 (5.9)	Ward 34 (n = 6)	2 (33.3)	1 (16.7)	3 (50.0)	0 (0.0)
Total (n = 36)	1 (3.0)	9 (27.3)	20 (60.6)	3 (9.1)	Total (n =14)	2 (15.4)	2 (15.4)	8 (61.5)	1 (7.7)
Overall total (n = 444)	36 (8.2)	110 (25.2)	247 (56.5)	44 (10.1)	*Overall total (n= 308)*	19 (6.3)	85 (28.0)	172 (56.6)	28 (9.2)

Table: 4.4.6.2 Attitudes towards your work – satisfaction with nursing

Time 1					Time 2				
Satisfaction with nursing	Very dissatisfied	Dissatisfied	Satisfied	Very Satisfied	Satisfaction with nursing	Very dissatisfied	Dissatisfied	Satisfied	Very Satisfied
Hospital 1					*Hospital 1*				
Ward 4 (n = 12)	3 (27.3)	2 (18.2)	5 (45.5)	1 (9.1)	Ward 4 (n = 12)	0 (0.0)	2 (16.7)	6 (50.0)	4 (33.3)
Ward 5 (n = 26)	0 (0.0)	3 (12.0)	17 (68.0)	5 (20.0)	Ward 5 (n = 15)	0 (0.0)	2 (13.3)	11 (73.3)	2 (13.3)
Ward 6 (n = 10)	2 (20.0)	1 (10.0)	3 (30.0)	4 (40.0)	Ward 6 (n = 9)	1 (11.1)	1 (11.1)	4 (44.4)	3 (33.3)
Ward 7 (n = 13)	1 (8.3)	2 (16.7)	4 (33.3)	5 (41.7)	Ward 7 (n = 13)	0 (0.0)	3 (23.1)	7 (53.8)	3 (23.1)
Ward 8 (n = 6)	1 (16.7)	0 (0.0)	3 (50.0)	2 (33.3)	Ward 8 (n = 6)	0 (0.0)	1 (20.0)	2 (40.0)	2 (40.0)
Ward 9 (n = 13)	4 (30.8)	1 (7.7)	6 (46.2)	2 (15.4)	Ward 9 (n= 9)	0 (0.0)	5 (55.6)	3 (33.3)	1 (11.1)
Ward 10 (n = 17)	0 (0.0)	4 (23.5)	5 (29.4)	8 (47.1)	Ward 10 (n =8)	0 (0.0)	3 (37.5)	3 (37.5)	2 (25.0)
Ward 11 (n = 13)	1 (7.7)	3 (23.1)	6 (46.2)	3 (23.1)	Ward 11 (n = 10)	0 (0.0)	2 (20.0)	5 (50.0)	3 (30.0)
Ward 12 (n = 13)	1 (8.3)	1 (8.3)	6 (50.0)	4 (33.3)	Ward 12 (n = 16)	0 (0.0)	4 (25.0)	10 (62.5)	2 (12.5)
Ward 13 (n = 36)	1 (2.8)	5 (13.9)	17 (47.2)	13 (36.1)	Ward 13 (n = 22)	0 (0.0)	3 (13.6)	13 (59.1)	6 (27.3)
Ward 14 (n = 11)	0 (0.0)	2 (18.2)	5 (45.5)	4 (36.4)	Ward 14 (n = 12)	1 (9.1)	3 (27.3)	6 (54.5)	1 (9.1)
Ward 15 (n = 12)	1 (8.3)	0 (0.0)	7 (58.3)	4 (33.3)	Ward 15 (n = 11)	1 (9.1)	3 (27.3)	5 (45.5)	2 (18.2)
Ward 16 (n = 23)	1 (4.3)	3 (13.0)	14 (60.9)	5 (21.7)	Ward 16 (n = 10)	0 (0.0)	3 (30.0)	5 (50.0)	2 (20.0)
Ward 17 (n = 27)	2 (7.4)	4 (14.8)	10 (37.0)	11 (40.7)	Ward 17 (n = 13)	0 (0.0)	2 (16.7)	6 (50.0)	4 (33.3)
Ward 18 (n = 15)	1 (6.7)	3 (20.0)	9 (60.0)	2 (13.3)	Ward 18 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 19 (n = 14)	0 (0.0)	6 (42.9)	5 (35.7)	3 (21.4)	Ward 19 (n = 10)	1 (10.0)	4 (40.0)	3 (30.0)	2 (20.0)
Ward 20 (n = 17)	1 (5.9)	7 (41.2)	7 (41.2)	2 (11.8)	Ward 20 (n = 10)	0 (0.0)	1 (10.0)	8 (80.0)	1 (10.0)
Ward 21 (n = 8)	0 (0.0)	0 (0.0)	5 (71.4)	2 (28.6)	Ward 21 (n = 8)	0 (0.0)	2 (25.0)	4 (50.0)	2 (25.0)
Total (n = 286)	20 (7.1)	47 (16.7)	134 (47.1)	80 (28.5)	Total (n = 196)	4 (2.1)	44 (22.6)	104 (53.3)	43 (22.1)
Hospital 2					*Hospital 2*				
Ward 24 (n = 16)	1 (6.3)	2 (12.5)	9 (56.3)	4 (25.0)	Ward 24 (n =17)	0 (0.0)	0 (0.0)	9 (52.9)	8 (47.1)
Ward 25 (n = 15)	0 (0.0)	0 (0.0)	9 (60.0)	6 (40.0)	Ward 25 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	1 (4.0)	4 (16.0)	15 (60.0)	5 (20.0)	Ward 26 (n = 18)	1 (5.6)	9 (50.0)	7 (38.9)	1 (5.6)
Ward 27 (n = 22)	0 (0.0)	6 (27.3)	13 (59.1)	3 (13.6)	Ward 27 (n = 8)	2 (25.0)	1 (12.5)	4 (50.0)	1 (12.5)
Ward 28 (n = 22)	0 (0.0)	1 (4.5)	10 (45.5)	11 (50.0)	Ward 28 (n = 18)	0 (0.0)	2 (11.1)	9 (50.0)	7 (38.9)
Ward 29 (n = 10)	0 (0.0)	2 (20.0)	5 (50.0)	3 (30.0)	Ward 29 (n= 11)	0 (0.0)	1 (9.1)	4 (36.4)	6 (54.5)
Ward 30 (n = 12)	0 (0.0)	1 (8.3)	5 (41.7)	6 (50.0)	Ward 30 (n = 12)	1 (8.3)	2 (16.7)	2 (16.7)	7 (58.3)
Ward 35	-	-	-	-	Ward 35 (n= 12)	1 (8.3)	3 (25.0)	6 (50.0)	2 (16.7)
Total (n = 122)	2 (1.6)	16 (13.1)	66 (54.1)	38 (31.4)	Total (n = 98)	5 (5.2)	18 (18.8)	42 (43.8)	31 (32.3)
Hospital 3					*Hospital 3*				
Ward 32 (n = 11)	0 (0.0)	2 (18.2)	7 (63.6)	2 (18.2)	Ward 32 (n = 3)	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)
Ward 33 (n = 7)	1 (20.0)	0 (0.0)	2 (40.0)	2 (40.0)	Ward 33 (n = 5)	0 (0.0)	0 (0.0)	2 (50.0)	2 (50.0)
Ward 34 (n = 18)	1 (5.9)	2 (11.8)	9 (52.9)	5 (29.4)	Ward 34 (n = 6)	0 (0.0)	2 (33.3)	3 (50.0)	1 (16.7)
Total (n = 36)	2 (6.1)	4 (12.1)	18 (54.5)	9 (27.3)	Total (n =14)	0 (0.0)	2 (15.4)	8 (61.5)	3 (23.1)
Overall total (n = 444)	24 (5.5)	67 (15.4)	218 (50.0)	127 (29.1)	Overall total (n= 308)	9 (3.0)	64 (21.1)	154 (50.7)	77 (25.3)

Table: 4.4.6.3 Attitudes towards your work – recommend ward to colleague

Time 1					Time 2				
Recommend ward to colleague	Definitely no	Probably no	Probably yes	Definitely yes	Recommend ward to colleague	Definitely no	Probably no	Probably yes	Definitely yes
Hospital 1					*Hospital 1*				
Ward 4 (n = 12)	2 (18.2)	3 (27.3)	6 (54.5)	0 (0.0)	Ward 4 (n = 12)	1 (8.3)	2 (16.7)	7 (58.3)	2 (16.7)
Ward 5 (n = 26)	1 (4.0)	2 (8.0)	11 (44.0)	11 (44.0)	Ward 5 (n = 15)	1 (7.1)	5 (35.7)	8 (57.1)	0 (0.0)
Ward 6 (n = 10)	2 (20.0)	5 (50.0)	2 (20.0)	1 (10.0)	Ward 6 (n = 9)	0 (0.0)	5 (55.6)	2 (22.2)	2 (22.2)
Ward 7 (n = 13)	0 (0.0)	0 (0.0)	11 (84.6)	2 (15.4)	Ward 7 (n = 13)	0 (0.0)	0 (0.0)	4 (30.8)	9 (69.2)
Ward 8 (n = 6)	0 (0.0)	0 (0.0)	4 (66.7)	2 (33.3)	Ward 8 (n = 6)	1 (20.0)	1 (20.0)	2 (40.0)	1 (20.0)
Ward 9 (n = 13)	1 (7.7)	2 (15.4)	6 (46.2)	4 (30.8)	Ward 9 (n= 9)	0 (0.0)	1 (11.1)	4 (44.4)	4 (44.4)
Ward 10 (n = 17)	3 (17.6)	6 (35.3)	5 (29.4)	3 (17.6)	Ward 10 (n =8)	2 (25.0)	2 (25.0)	4 (50.0)	0 (0.0)
Ward 11 (n = 13)	7 (53.8)	5 (38.5)	1 (7.7)	0 (0.0)	Ward 11 (n = 10)	1 (11.1)	6 (66.7)	2 (22.2)	0 (0.0)
Ward 12 (n = 13)	1 (7.7)	3 (23.1)	7 (53.8)	2 (15.4)	Ward 12 (n = 16)	0 (0.0)	3 (18.8)	11 (68.8)	2 (12.5)
Ward 13 (n = 36)	0 (0.0)	3 (8.3)	12 (33.3)	21 (58.3)	Ward 13 (n = 22)	1 (4.5)	2 (9.1)	14 (63.6)	5 (22.7)
Ward 14 (n = 11)	2 (18.2)	4 (36.4)	4 (36.4)	1 (9.1)	Ward 14 (n = 12)	1 (8.3)	4 (33.3)	6 (50.0)	1 (8.3)
Ward 15 (n = 12)	0 (0.0)	1 (8.3)	5 (41.7)	6 (50.0)	Ward 15 (n = 11)	0 (0.0)	0 (0.0)	7 (63.6)	4 (36.4)
Ward 16 (n = 23)	0 (0.0)	1 (4.3)	16 (69.6)	6 (26.1)	Ward 16 (n = 10)	0 (0.0)	3 (30.0)	4 (40.0)	3 (30.0)
Ward 17 (n = 27)	6 (22.2)	11 (40.7)	7 (25.9)	3 (11.1)	Ward 17 (n = 13)	4 (33.3)	2 (16.7)	5 (41.7)	1 (8.3)
Ward 18 (n = 15)	2 (14.3)	4 (28.6)	5 (35.7)	3 (21.4)	Ward 18 (n = 2)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)
Ward 19 (n = 14)	0 (0.0)	2 (14.3)	7 (50.0)	5 (35.7)	Ward 19 (n = 10)	1 (10.0)	1 (10.0)	4 (40.0)	4 (40.0)
Ward 20 (n = 17)	0 (0.0)	5 (29.4)	10 (58.8)	2 (11.8)	Ward 20 (n = 10)	0 (0.0)	2 (20.0)	8 (80.0)	0 (0.0)
Ward 21 (n = 8)	0 (0.0)	1 (14.3)	3 (42.9)	3 (42.9)	Ward 21 (n = 8)	0 (0.0)	0 (0.0)	4 (50.0)	4 (50.0)
Total (n = 286)	27 (9.6)	58 (20.6)	122 (43.3)	75 (26.6)	Total (n = 196)	13 (6.7)	41 (21.1)	96 (49.5)	44 (22.7)
Hospital 2					*Hospital 2*				
Ward 24 (n = 16)	0 (0.0)	2 (12.5)	9 (56.3)	5 (31.3)	Ward 24 (n =17)	0 (0.0)	2 (11.8)	7 (41.2)	8 (47.1)
Ward 25 (n = 15)	0 (0.0)	0 (0.0)	4 (26.7)	11 (73.3)	Ward 25 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	3 (12.5)	15 (62.5)	4 (16.7)	2 (8.3)	Ward 26 (n = 18)	2 (11.1)	7 (38.9)	8 (44.4)	1 (5.6)
Ward 27 (n = 22)	0 (0.0)	4 (19.0)	14 (66.7)	3 (14.3)	Ward 27 (n = 8)	2 (25.0)	4 (50.0)	2 (25.0)	0 (0.0)
Ward 28 (n = 22)	0 (0.0)	2 (9.1)	10 (45.5)	10 (45.5)	Ward 28 (n = 18)	1 (5.9)	2 (11.8)	10 (58.8)	4 (23.5)
Ward 29 (n = 10)	3 (30.0)	2 (20.0)	4 (40.0)	1 (10.0)	Ward 29 (n= 11)	0 (0.0)	2 (18.2)	4 (36.4)	5 (45.5)
Ward 30 (n = 12)	5 (41.7)	3 (25.0)	4 (33.3)	0 (0.0)	Ward 30 (n = 12)	2 (16.7)	4 (33.3)	4 (33.3)	2 (16.7)
-	-	-	-	-	Ward 35 (n= 12)	0 (0.0)	4 (33.3)	6 (50.0)	2 (16.7)
Total (n = 122)	11 (9.1)	29 (24.0)	49 (40.5)	32 (26.4)	Total (n = 98)	7 (7.4)	24 (25.3)	43 (45.3)	21 (22.1)
Hospital 3					*Hospital 3*				
Ward 32 (n = 11)	0 (0.0)	5 (45.5)	5 (45.5)	1 (9.1)	Ward 32 (n = 3)	0 (0.0)	1 (33.3)	1 (33.3)	1 (33.3)
Ward 33 (n = 7)	0 (0.0)	0 (0.0)	2 (40.0)	3 (60.0)	Ward 33 (n = 5)	0 (0.0)	0 (0.0)	2 (40.0)	3 (60.0)
Ward 34 (n = 18)	1 (5.9)	4 (23.5)	8 (47.1)	4 (23.5)	Ward 34 (n = 6)	3 (50.0)	0 (0.0)	2 (33.3)	1 (16.7)
Total (n = 36)	1 (3.0)	9 (27.3)	15 (45.5)	8 (24.2)	Total (n =14)	3 (21.4)	1 (7.1)	5 (35.7)	5 (35.7)
Overall total (n = 444)	39 (8.9)	96 (22.0)	186 (42.7)	115 (26.4)	*Overall total (n= 308)*	23 (7.6)	66 (21.8)	144 (47.5)	70 (23.1)

Table: 4.4.6.4 Attitudes towards your work – recommend ward to family/friends

Time 1					Time 2				
Recommend ward family/friends	Definitely no	Probably no	Probably yes	Definitely yes	Recommend ward family/friends	Definitely no	Probably no	Probably yes	Definitely yes
Hospital 1					*Hospital 1*				
Ward 4 (n = 12)	1 (9.1)	2 (18.2)	7 (63.6)	1 (9.1)	Ward 4 (n = 12)	1 (8.3)	2 (16.7)	7 (58.3)	2 (16.7)
Ward 5 (n = 26)	0 (0.0)	1 (4.0)	17 (68.0)	7 (28.0)	Ward 5 (n = 15)	1 (6.7)	4 (26.7)	10 (66.7)	0 (0.0)
Ward 6 (n = 10)	1 (10.0)	4 (40.0)	4 (40.0)	1 (10.0)	Ward 6 (n = 9)	0 (0.0)	3 (33.3)	5 (55.6)	1 (11.1)
Ward 7 (n = 13)	0 (0.0)	0 (0.0)	7 (53.8)	6 (46.2)	Ward 7 (n = 13)	0 (0.0)	0 (0.0)	3 (23.1)	10 (76.9)
Ward 8 (n = 6)	0 (0.0)	1 (16.7)	2 (33.3)	3 (50.0)	Ward 8 (n = 6)	1 (20.0)	1 (20.0)	3 (60.0)	0 (0.0)
Ward 9 (n = 13)	0 (0.0)	1 (7.7)	4 (30.8)	8 (61.5)	Ward 9 (n= 9)	0 (0.0)	0 (0.0)	4 (44.4)	5 (55.6)
Ward 10 (n = 17)	0 (0.0)	6 (35.3)	9 (52.9)	2 (11.8)	Ward 10 (n =8)	1 (14.3)	1 (14.3)	5 (71.4)	0 (0.0)
Ward 11 (n = 13)	4 (33.3)	3 (25.0)	6 (46.2)	0 (0.0)	Ward 11 (n = 10)	1 (10.0)	7 (70.0)	1 (10.0)	1 (10.0)
Ward 12 (n = 13)	1 (7.7)	1 (7.7)	6 (46.2)	5 (38.5)	Ward 12 (n = 16)	0 (0.0)	2 (13.3)	8 (53.3)	5 (33.3)
Ward 13 (n = 36)	0 (0.0)	2 (5.6)	11 (30.6)	23 (63.9)	Ward 13 (n = 22)	1 (4.5)	4 (18.2)	10 (45.5)	7 (31.8)
Ward 14 (n = 11)	0 (0.0)	4 (36.4)	5 (45.5)	2 (18.2)	Ward 14 (n = 12)	0 (0.0)	2 (16.7)	8 (66.7)	2 (16.7)
Ward 15 (n = 12)	0 (0.0)	1 (8.3)	2 (16.7)	9 (75.0)	Ward 15 (n = 11)	0 (0.0)	2 (18.2)	2 (18.2)	7 (63.6)
Ward 16 (n = 23)	0 (0.0)	2 (8.7)	14 (60.9)	7 (30.4)	Ward 16 (n = 10)	0 (0.0)	1 (10.0)	6 (60.0)	3 (30.0)
Ward 17 (n = 27)	2 (7.4)	1 (3.7)	18 (66.7)	6 (22.2)	Ward 17 (n = 13)	1 (8.3)	3 (25.0)	5 (41.7)	3 (25.0)
Ward 18 (n = 15)	1 (6.7)	4 (26.7)	5 (33.3)	5 (33.3)	Ward 18 (n = 2)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)
Ward 19 (n = 14)	0 (0.0)	1 (7.7)	6 (46.2)	6 (46.2)	Ward 19 (n = 10)	0 (0.0)	2 (20.0)	1 (10.0)	7 (70.0)
Ward 20 (n = 17)	0 (0.0)	0 (0.0)	12 (70.6)	5 (29.4)	Ward 20 (n = 10)	1 (10.0)	1 (10.0)	7 (70.0)	1 (10.0)
Ward 21 (n = 8)	0 (0.0)	2 (28.6)	3 (42.9)	2 (28.6)	Ward 21 (n = 8)	1 (12.5)	1 (12.5)	3 (37.5)	3 (37.5)
Total (n = 286)	10 (3.6)	36 (12.8)	138 (48.9)	98 (34.8)	Total (n = 196)	9 (4.6)	38 (19.6)	88 (45.4)	59 (30.4)
Hospital 2					*Hospital 2*				
Ward 24 (n = 16)	0 (0.0)	4 (25.0)	10 (62.5)	2 (12.5)	Ward 24 (n =17)	0 (0.0)	1 (6.3)	11 (68.8)	4 (25.0)
Ward 25 (n = 15)	0 (0.0)	0 (0.0)	1 (6.7)	14 (93.3)	Ward 25 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)
Ward 26 (n = 25)	3 (12.0)	9 (36.0)	11 (44.0)	2 (8.0)	Ward 26 (n = 18)	3 (16.7)	5 (27.8)	7 (38.9)	3 (16.7)
Ward 27 (n = 22)	1 (4.5)	2 (9.1)	10 (45.5)	9 (40.9)	Ward 27 (n = 8)	0 (0.0)	4 (50.0)	4 (50.0)	0 (0.0)
Ward 28 (n = 22)	0 (0.0)	4 (18.2)	9 (40.9)	9 (40.9)	Ward 28 (n = 18)	0 (0.0)	2 (11.1)	12 (66.7)	4 (22.2)
Ward 29 (n = 10)	1 (10.0)	1 (10.0)	4 (40.0)	4 (40.0)	Ward 29 (n= 11)	0 (0.0)	2 (18.2)	4 (36.4)	5 (45.5)
Ward 30 (n = 12)	4 (33.3)	6 (50.0)	1 (8.3)	1 (8.3)	Ward 30 (n = 12)	4 (33.3)	4 (33.3)	3 (25.0)	1 (8.3)
-	-	-	-	-	Ward 35 (n= 12)	1 (8.3)	1 (8.3)	8 (66.7)	2 (16.7)
Total (n = 122)	9 (7.4)	26 (21.3)	46 (37.7)	41 (33.6)	Total (n = 98)	8 (8.4)	18 (18.9)	51 (53.7)	18 (18.9)
Hospital 3					*Hospital 3*				
Ward 32 (n = 11)	0 (0.0)	1 (9.1)	9 (81.8)	1 (9.1)	Ward 32 (n = 3)	0 (0.0)	0 (0.0)	2 (66.7)	1 (33.3)
Ward 33 (n = 7)	0 (0.0)	0 (0.0)	2 (40.0)	3 (60.0)	Ward 33 (n = 5)	0 (0.0)	0 (0.0)	2 (40.0)	3 (60.0)
Ward 34 (n = 18)	1 (5.9)	6 (35.3)	6 (35.3)	4 (23.5)	Ward 34 (n = 6)	3 (50.0)	0 (0.0)	2 (33.3)	1 (16.7)
Total (n = 36)	1 (3.0)	7 (21.2)	17 (51.5)	8 (24.2)	Total (n =14)	3 (21.4)	0 (0.0)	6 (42.9)	5 (35.7)
Overall total (n = 444)	20 (4.6)	69 (15.8)	201 (46.0)	147 (33.6)	*Overall total (n= 308)*	20 (6.6)	56 (18.5)	145 (47.9)	82 (27.1)

Table: 4.4.6.5 Attitudes towards your work – feelings in relation to future at hospital

	Time 1						Time 2					
	Definitely will leave	Probably will leave	Probably will not leave	Definitely will not leave	Reason for leaving is job dissatisfaction		Definitely will leave	Probably will leave	Probably will not leave	Definitely will not leave	Reason for leaving is job dissatisfaction
Hospital 1						*Hospital 1*					
Ward 4 (n = 12)	1 (9.1)	7 (63.6)	3 (27.3)	0 (0.0)	6 (75.0)	Ward 4 (n = 12)	2 (16.7)	5 (41.7)	4 (33.3)	1 (8.3)	6 (50.0)
Ward 5 (n = 26)	1 (4.0)	11 (44.0)	11 (44.0)	2 (8.0)	4 (33.3)	Ward 5 (n = 15)	1 (6.7)	8 (53.3)	6 (40.0)	0 (0.0)	7 (46.7)
Ward 6 (n = 10)	3 (30.0)	3 (30.0)	3 (30.0)	1 (10.0)	4 (66.7)	Ward 6 (n = 9)	2 (25.0)	4 (50.0)	2 (25.0)	0 (0.0)	4 (50.0)
Ward 7 (n = 13)	1 (8.3)	7 (58.3)	2 (16.7)	2 (16.7)	3 (37.5)	Ward 7 (n = 13)	3 (23.1)	5 (38.5)	3 (23.1)	2 (15.4)	3 (23.1)
Ward 8 (n = 6)	1 (16.7)	2 (33.3)	3 (50.0)	0 (0.0)	1 (33.3)	Ward 8 (n = 6)	0 (0.0)	4 (80.0)	1 (20.0)	0 (0.0)	3 (60.0)
Ward 9 (n = 13)	2 (15.4)	5 (38.5)	6 (46.2)	0 (0.0)	5 (71.4)	Ward 9 (n= 9)	0 (0.0)	4 (44.4)	5 (55.6)	0 (0.0)	4 (44.4)
Ward 10 (n = 17)	1 (5.9)	6 (35.3)	8 (47.1)	2 (11.8)	6 (85.7)	Ward 10 (n =8)	0 (0.0)	4 (50.0)	4 (50.0)	0 (0.0)	4 (50.0)
Ward 11 (n = 13)	6 (46.2)	4 (30.8)	2 (15.4)	1 (7.7)	11 (100.0)	Ward 11 (n = 10)	1 (10.0)	6 (60.0)	2 (20.0)	1 (10.0)	5 (50.0)
Ward 12 (n = 13)	1 (7.7)	6 (46.2)	4 (30.8)	2 (15.4)	3 (42.9)	Ward 12 (n = 16)	1 (6.3)	5 (31.3)	8 (50.0)	2 (12.5)	4 (25.0)
Ward 13 (n = 36)	3 (8.3)	13 (36.1)	13 (36.1)	7 (19.4)	4 (25.0)	Ward 13 (n = 22)	1 (4.5)	10 (45.5)	9 (40.9)	2 (9.1)	9 (42.9)
Ward 14 (n = 11)	2 (18.2)	6 (54.5)	2 (18.2)	1 (9.1)	5 (62.5)	Ward 14 (n = 12)	1 (8.3)	4 (33.3)	7 (58.3)	0 (0.0)	4 (33.3)
Ward 15 (n = 12)	3 (25.0)	1 (8.3)	5 (41.7)	3 (25.0)	2 (50.0)	Ward 15 (n = 11)	2 (18.2)	3 (27.3)	5 (45.5)	1 (9.1)	4 (36.4)
Ward 16 (n = 23)	2 (8.7)	9 (39.1)	11 (47.8)	1 (4.3)	3 (27.3)	Ward 16 (n = 10)	0 (0.0)	5 (50.0)	5 (50.0)	0 (0.0)	9 (90.0)
Ward 17 (n = 27)	8 (29.6)	10 (37.0)	6 (22.2)	3 (11.1)	14 (77.8)	Ward 17 (n = 13)	6 (50.0)	4 (33.3)	1 (8.3)	1 (8.3)	7 (53.8)
Ward 18 (n = 15)	2 (13.3)	8 (53.3)	3 (20.0)	2 (13.3)	8 (80.0)	Ward 18 (n = 2)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	1 (50.0)
Ward 19 (n = 14)	3 (21.4)	7 (50.0)	3 (21.4)	1 (7.1)	4 (40.0)	Ward 19 (n = 10)	4 (40.0)	2 (20.0)	3 (30.0)	1 (10.0)	7 (70.0)
Ward 20 (n = 17)	3 (17.6)	9 (52.9)	5 (29.4)	0 (0.0)	9 (75.0)	Ward 20 (n = 10)	1 (10.0)	7 (70.0)	2 (20.0)	0 (0.0)	8 (80.0)
Ward 21 (n = 8)	1 (14.3)	2 (28.6)	2 (28.6)	2 (28.6)	1 (100.0)	Ward 21 (n = 8)	1 (12.5)	1 (12.5)	4 (50.0)	2 (25.0)	2 (25.0)
Total (n = 286)	44 (15.6)	116 (41.1)	92 (32.6)	30 (10.6)	93 (58.0)	Total (n = 196)	26 (13.3)	83 (42.6)	72 (36.9)	14 (7.2)	92 (46.5)
Hospital 2						*Hospital 2*					
Ward 24 (n = 16)	3 (18.8)	3 (18.8)	10 (62.5)	0 (0.0)	3 (50.0)	Ward 24 (n =17)	0 (0.0)	6 (35.3)	6 (35.3)	5 (29.4)	5 (31.3)
Ward 25 (n = 15)	1 (6.7)	1 (6.7)	8 (53.3)	5 (33.3)	1 (50.0)	Ward 25 (n = 2)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)
Ward 26 (n = 25)	3 (12.0)	17 (68.0)	5 (20.0)	0 (0.0)	16 (84.2)	Ward 26 (n = 18)	6 (33.3)	9 (50.0)	2 (11.1)	1 (5.6)	14 (77.8)
Ward 27 (n = 22)	2 (9.5)	6 (28.6)	11 (52.4)	2 (9.5)	2 (25.0)	Ward 27 (n = 8)	1 (14.3)	4 (57.1)	2 (28.6)	0 (0.0)	6 (75.0)
Ward 28 (n = 22)	0 (0.0)	2 (9.5)	11 (52.4)	8 (38.1)	1 (50.0)	Ward 28 (n = 18)	1 (5.6)	4 (22.2)	11 (61.1)	2 (11.1)	7 (38.9)
Ward 29 (n = 10)	1 (10.0)	5 (50.0)	3 (30.0)	1 (10.0)	3 (50.0)	Ward 29 (n= 11)	0 (0.0)	0 (0.0)	7 (63.6)	4 (36.4)	4 (36.4)
Ward 30 (n = 12)	2 (16.7)	5 (41.7)	5 (41.7)	0 (0.0)	4 (57.1)	Ward 30 (n = 12)	2 (16.7)	5 (41.7)	4 (33.3)	1 (8.3)	8 (66.7)
-	-	-	-	-	-	Ward 35 (n= 12)	1 (8.3)	5 (41.7)	5 (41.7)	1 (8.3)	5 (41.7)
Total (n = 122)	11 (9.2)	39 (32.8)	53 (44.5)	16 (13.4)	30 (60.0)	Total (n = 98)	11 (11.6)	32 (33.7)	39 (41.1)	13 (13.7)	48 (50.5)
Hospital 3						*Hospital 3*					
Ward 32 (n = 11)	0 (0.0)	3 (27.3)	7 (63.6)	1 (9.1)	2 (66.7)	Ward 32 (n = 3)	0 (0.0)	1 (33.3)	1 (33.3)	1 (33.3)	1 (33.3)
Ward 33 (n = 7)	1 (20.0)	1 (20.0)	2 (40.0)	1 (20.0)	1 (50.0)	Ward 33 (n = 5)	0 (0.0)	2 (40.0)	2 (40.0)	1 (20.0)	2 (40.0)
Ward 34 (n = 18)	1 (6.3)	6 (37.5)	5 (31.3)	4 (25.0)	1 (14.3)	Ward 34 (n = 6)	2 (33.3)	1 (16.7)	2 (33.3)	1 (16.7)	1 (16.7)
Total (n = 36)	2 (6.3)	10 (31.3)	14 (43.8)	6 (18.8)	4 (33.3)	Total (n =14)	2 (14.3)	4 (28.6)	5 (35.7)	3 (21.4)	4 (28.6)
Overall total (n = 444)	58 (13.4)	165 (38.0)	159 (36.6)	52 (12.0)	125 (52.8)	*Overall total (n= 308)*	39 (12.8)	119 (39.1)	116 (38.2)	30 (9.9)	144 (47.4)

4.4.7 Burnout

The human services version of the Maslach Burnout Inventory (HS-MBI; Maslach & Jackson 1996) was used to measure burnout. This is a 22-item survey with a 7-point scale (scores range from 0 to 6, see table 3.4.6.1 below). Individual items on the HS-MBI are used to create three subscales measuring three areas associated with burnout: emotional exhaustion, depersonalisation and personal accomplishment. Higher scores on the emotional exhaustion and depersonalisation subscales indicate negative outcomes; higher scores on the personal accomplishment subscale indicate better outcomes.

Overall, levels of reported emotional exhaustion remained relatively constant across time periods (2.80 in Time 1, 2.93 in Time 2). However, when examined at a micro level it is apparent that variation exists at hospital and ward level. Hospital 3 expressed a decrease in emotional exhaustion of 0.49 across time periods. Similarly, many wards where an uplift was implemented reported decreases in emotional exhaustion, with Ward 7 having a 1.02 fall and Ward 20 reporting a 0.3-point decrease. Ward 32 reported the highest level of personal achievement of 4.79 in Time 2 and Ward 8 the lowest at 3.58.

Table: 4.4.7.1 MBI human services survey scale

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

Table: 4.4.7.2 MBI human services survey

Time 1				Time 2			
MBI	Emotional Exhaustion	Depersonalisation	Personal Accomplishment	MBI	Emotional Exhaustion	Depersonalisation	Personal Accomplishment
Hospital 1				*Hospital 1*			
Ward 4 (n = 12)	3.33 (0.88)	1.38 (1.04)	4.20 (1.10)	Ward 4 (n = 12)	3.02 (1.45)	1.46 (1.12)	3.70 (1.11)
Ward 5 (n = 26)	2.41 (1.14)	1.29 (0.94)	4.29 (0.94)	Ward 5 (n = 15)	3.01 (0.91)	2.06 (1.15)	3.89 (0.88)
Ward 6 (n = 10)	4.02 (1.12)	2.00 (1.18)	3.77 (1.61)	Ward 6 (n = 9)	3.24 (1.65)	1.58 (1.21)	3.86 (1.06)
Ward 7 (n = 13)	3.19 (1.03)	1.85 (1.30)	4.19 (0.84)	Ward 7 (n = 13)	2.17 (0.96)	1.18 (0.95)	4.32 (1.17)
Ward 8 (n = 6)	2.74 (1.21)	1.10 (0.70)	4.25 (0.32)	Ward 8 (n = 6)	3.49 (1.12)	1.60 (1.56)	3.58 (1.16)
Ward 9 (n = 13)	2.95 (1.17)	1.43 (1.15)	4.07 (1.02)	Ward 9 (n= 9)	2.85 (0.74)	1.11 (1.14)	4.28 (0.85)
Ward 10 (n = 17)	2.64 (1.26)	1.56 (1.23)	4.26 (1.23)	Ward 10 (n =8)	3.35 (1.21)	1.83 (1.31)	4.11 (0.93)
Ward 11 (n = 13)	3.68 (1.60)	2.20 (1.30)	4.01 (0.68)	Ward 11 (n = 10)	3.72 (1.12)	2.33 (1.43)	4.51 (1.05)
Ward 12 (n = 13)	2.41 (1.50)	1.22 (1.28)	3.86 (1.05)	Ward 12 (n = 16)	2.77 (1.29)	1.68 (0.95)	3.86 (1.13)
Ward 13 (n = 36)	1.96 (1.21)	0.88 (0.95)	4.43 (1.04)	Ward 13 (n = 22)	2.70 (1.41)	1.52 (1.31)	4.40 (0.87)
Ward 14 (n = 11)	3.56 (1.21)	1.56 (1.08)	4.74 (0.78)	Ward 14 (n = 12)	3.68 (1.14)	1.65 (0.87)	4.23 (1.02)
Ward 15 (n = 12)	2.93 (1.30)	1.28 (1.19)	4.91 (0.63)	Ward 15 (n = 11)	3.28 (1.51)	0.88 (0.89)	4.54 (0.80)
Ward 16 (n = 23)	2.60 (1.07)	1.26 (1.05)	4.13 (0.93)	Ward 16 (n = 10)	3.32 (1.37)	1.59 (1.26)	4.08 (0.95)
Ward 17 (n = 27)	3.36 (1.21)	1.54 (1.19)	4.44 (0.82)	Ward 17 (n = 13)	3.62 (0.89)	1.62 (1.37)	4.15 (0.78)
Ward 18 (n = 15)	3.00 (1.52)	0.90 (0.90)	4.36 (1.01)	Ward 18 (n = 2)	1.78 (1.73)	1.90 (2.40)	4.63 (0.00)
Ward 19 (n = 14)	2.58 (1.14)	1.23 (0.92)	4.41 (0.70)	Ward 19 (n = 10)	3.60 (1.44)	2.14 (1.44)	4.20 (0.81)
Ward 20 (n = 17)	3.24 (1.39)	1.61 (1.36)	4.01 (1.13)	Ward 20 (n = 10)	2.94 (1.44)	1.50 (1.52)	4.24 (0.87)
Ward 21 (n = 8)	2.30 (0.87)	1.43 (0.99)	3.80 (1.20)	Ward 21 (n = 8)	2.45 (1.31)	2.23 (1.61)	4.11 (1.22)
Total (n = 286)	2.85 (1.31)	1.38 (1.12)	4.27 (0.99)	Total (n = 196)	3.06 (1.29)	1.63 (1.24)	4.15 (0.95)
Hospital 2				*Hospital 2*			
Ward 24 (n = 16)	3.01 (1.16)	1.05 (0.92)	4.31 (1.10)	Ward 24 (n =17)	1.91 (1.27)	0.90 (0.92)	4.75 (0.97)
Ward 25 (n = 15)	1.62 (1.46)	0.71 (1.33)	4.93 (1.10)	Ward 25 (n = 2)	2.67 (0.47)	1.80 (1.41)	4.56 (0.44)
Ward 26 (n = 25)	2.79 (1.39)	1.53 (1.06)	4.18 (0.99)	Ward 26 (n = 18)	3.46 (1.21)	2.09 (1.05)	4.10 (1.11)
Ward 27 (n = 22)	3.28 (1.08)	1.33 (0.95)	4.14 (1.15)	Ward 27 (n = 8)	3.54 (1.17)	1.90 (1.36)	4.01 (0.76)
Ward 28 (n = 22)	1.66 (1.07)	0.60 (0.81)	4.67 (0.96)	Ward 28 (n = 18)	2.58 (1.31)	1.13 (1.07)	4.17 (1.38)
Ward 29 (n = 10)	3.30 (1.34)	1.25 (1.32)	5.15 (0.57)	Ward 29 (n= 11)	1.46 (0.79)	0.53 (0.47)	4.17 (1.62)
Ward 30 (n = 12)	3.44 (1.63)	1.40 (1.00)	4.39 (0.73)	Ward 30 (n = 12)	3.46 (1.47)	1.54 (1.26)	4.70 (0.90)
-	-	-	-	Ward 35 (n= 12)	3.22 (1.05)	1.97 (1.46)	4.41 (0.79)
Total (n = 122)	2.66 (1.44)	1.13 (1.07)	4.47 (1.03)	Total (n = 98)	2.75 (1.37)	1.42 (1.18)	4.35 (1.13)
Hospital 3				*Hospital 3*			
Ward 32 (n = 11)	3.09 (0.74)	1.45 (1.08)	4.55 (0.90)	Ward 32 (n = 3)	2.33 (1.18)	1.07 (1.51)	4.79 (0.52)
Ward 33 (n = 7)	2.78 (1.13)	1.24 (0.94)	4.43 (0.56)	Ward 33 (n = 5)	2.02 (1.40)	0.84 (1.36)	3.80 (2.27)
Ward 34 (n = 18)	2.61 (0.89)	0.70 (0.81)	4.22 (1.36)	Ward 34 (n = 6)	2.48 (1.75)	1.52 (1.50)	3.92 (1.31)
Total (n = 36)	2.78 (0.89)	1.02 (0.96)	4.36 (1.12)	Total (n =14)	2.29 (1.43)	1.15 (1.36)	4.06 (1.56)
Overall total (n = 444)	2.80 (1.32)	1.28 (1.10)	4.34 (1.01)	*Overall total (n= 308)*	2.93 (1.33)	1.54 (1.23)	4.21 (1.05)

4.4.8 Conclusion

Overall there were 752 surveys completed by staff across the programmes extended wards over the two time periods. Time 1 and Time 2 saw little variation in relation to staff demographics. The majority of respondents were RNs with degree level education and had worked for an average of 12 years as a nurse or HCA.

Across both phases of data collection, it has been possible to gain insight into factors affecting nursing work on the study wards. There are a number of trends in the data when the time periods are compared.

Most notably, care left undone and meals missed by nursing staff saw a decrease from Time 1 to Time 2. Hospital 1 reported shifts with 'at least one item undone' decrease from 55.4% in Time 1 to 53.3% in Time 2. Also meal breaks missed fell 3% from Time 1 to Time 2. However, in Hospital 2 (where no increase in staff was given) 16.6% of staff reported 'at least one item undone' on their last shift and meal breaks missed by staff went from 34.7% in Time 1 to 49.3% in Time 2.

Measures of the nursing work environment also found favourable results with Nurse Manager Ability, Leadership and Support and Collegial Nurse-Doctor Relations improved in 2 of the 3 hospitals. Wards where no uplift was given appeared to report the lowest Staffing and Resource Adequacy levels (e.g. Ward 4, Ward 5). A third of these two wards indicated they needed greater than 60 minutes for care to be delivered. They also scored below average on job satisfaction and increased likelihood of intention to leave compared to other wards in Time 2 (average of 56%, Ward 4 = 58.4%, Ward 5 = 60%).

Both time periods saw over 50% of staff highlighting an intention to leave with 51.4% selecting either 'probably' or 'definitely' leave in Time 1 and 51.9% in Time 2. However, when examined further, there was a 5.5% decrease in those leaving due to dissatisfaction compared to Time 1. Two wards where there was a significant decrease in staff leaving due to dissatisfaction (Ward 7 of 14.7% and 32 of 33.4%) and uplifts awarded also reported increases in personal accomplishment (ward 7 = 0.13 ward 32 = 0.24). Along with Ward 20, these wards noted decreased levels of Emotional Exhaustion and Depersonalisation.

4.5 Economic Analysis

The economic effect of implementing the intervention as per the Framework, is measured using two outcomes: cost of the uplift, agency staff usage.

Standard techniques are employed to estimate the cost of the additional staff using Department of Health salary scales. Whereby, the median value on the salary scale is used and adjusted for PRSI and pension (see Table 4.5.1). With regards to agency staff usage both RNs and HCAs are considered. Here the monthly averages before and after the intervention are compared. These changes are then valued in monetary terms. Agency staff are valued using average hourly cost of agency (RNs and HCAs

respectively) per ward (see Table X.X.2). These costs were collected from the individual hospitals.

Table 4.5.1: Agency Costs as per Department of Health Staff Costs as per Consolidated Salary Scales

Basis of Calculation	Basic[1]	Premia (20%)	Earnings	PRSI (10.75%)	Annual Cost
Nurse (Staff)	37,883	7,577	45,460	4,887	50,347
HCA (Band 3)	31,732	6,346	38,078	4,093	42,172

Source: Department of Health (2019)
[1]Mid-Point of 201- Consolidated Salary Scale

Table 4.5.2: Average hourly RN and HCA agency costs

	RNs Average Hourly Cost €	HCAs Average Hourly Cost €
4	36.82	34.13
5	40.21	33.31
6	45.58	33.82
7	51.01	33.40
8	39.97	33.42
9	40.11	32.26
10	41.68	33.34
11	45.66	33.31
12	43.21	35.20
13	49.50	33.66
14	53.07	32.41
15	53.82	34.83
16	44.81	34.47
17	50.31	35.20
18	42.42	32.33
19	48.72	33.87
20	45.87	32.89
21	34.62	35.03
24	59.28	43.99
25	59.28	43.99
26	59.28	43.99
27	59.28	43.99
28	59.28	43.99
29	59.28	43.99
30	59.28	43.99
35	59.28	43.99
32[1]	57.81	38.35
33[1]	57.81	38.35
34[1]	57.81	38.35

[1] Based on 2019 agency costs.

4.5.1 Cost of Uplift

Table 4.5.3 details the *uplift in place* in WTEs for RN and HCA. Ten wards received an *uplift*: there were both RNs and HCAs appointed in six wards, three wards received an RN uplift only, and one ward appointing HCAs only. Applying the annual costs provided by Department of Health (Table 4.5.1 - €50,347 for RNs and €42,172 for HCAs) the annual and monthly cost of the uplift is estimated for each ward and presented on Table 4.5.3. The total annual cost is €2,323,363. However, in four wards the uplifts were funded via transfers from other wards (8 RNs and 2.5 HCAs) in other wards the uplift was funded from converting agency staff (18.65 RNs and 10.42 HCAs). In addition, one ward was reduced by 3 HCAs (they were transferred to another ward). Thus direct investment required is €478,941.

4.5.2 Agency Costs

The effect on agency hours, following the implementation of *the uplift*, was varied across the wards (see Table 4.5.4). With regards to RNs, average monthly agency utilisation decreased in nine wards, ranging from -2% to -100%. In the remaining wards RN agency hours increased, four of these wards had no agency usage in Time 1.

With regards to HCA agency hours, eleven wards decreased HCA hours (ranging from -14% to -100%). In the remaining wards HCA agency hours increased. To estimate the cost associated with these changes the hours avoided/gained are multiplied by the average cost per hour for agency RNs and HCAs respectively (see Table 4.5.2 for costs employed per ward). With regards to RN agency there was a net monthly increase in agency spend, €37,555, across the wards; an average of €1,295 per ward. While, the net monthly increase in agency spend in HCA agency hours across the wards was €43,170; this equates to €1,507 on average per ward. The combined increase in agency spend is €81,265 on average per month.

4.5.3 Net monthly cost of uplift

Table 4.5.5 presents the monthly net cost of the uplift to Department of Health plus ongoing agency costs (€81,265), giving monthly costs €121,176. However, it is apparent that the implementation wards (€21,107) are costing substantially less than the non-implementation wards (€100,069) per month.

4.5.4 Annual agency spend

Table 4.5.6 below shows the agency spend (RN and HCA) for Hospital 1 for November 2017 to October 2019 (prior to changes) and the available data, November 2018 – April 2019 was calculated up to 12 months of data to allow for comparisons. The difference is given between the two years of data for RNs, HCAs and overall for each ward. The difference for the implementation wards, or wards receiving changes to their staffing, has also been calculated, as has the non-implementation wards. It is clear that overall agency is costing more following the implementation compared to prior (€74,037). However, the implementation wards have decreased their spending by

€309,759 following the introduction of the Framework. Therefore, the overall increase is due to the non-implementation wards spending more on agency indicating that full implementation is required in order to reduce overall agency spend. The time-period following the implementation is for six months extrapolated to 12 months and compared to the 12 months prior. Therefore, while it is reasonable to conclude this reduction in agency spend in the implementation wards is accurate should circumstances remain unchanged, it should be noted that this is a complex constantly changing environment and thus these results may alter over the next six months.

Data is not available for Hospital 2 on a month per month basis or annual spend so it is not possible to calculate the same as above.

Hospital 3 provided data on a year-by-year basis, thus is it not possible to calculate the changes in agency spend as accurately as in Hospital 1, in line with when changes were made. However, from taking the available data from January to May 2019 and extrapolating to 12 months, it is possible to see that the agency spend both RN and HCA, has decreased from 2018 to 2019 by €467,498 overall with both implementation wards showing greater savings than the non-implementation wards. See Table 4.5.7 below.

Table 4.5.3: Extension Wards: Costs of Implementing Uplift

	Uplifts in Place				Uplift via Transfers		Agency Conversion		DoH Funded			
	RNs	HCAs	TOTAL	Cost	RNs	HCAs	RNs	HCAs	RNs	HCAs	TOTAL	Cost
4												
5												
6												
7	4.5	1	5.5	268731.1095	0.5	1	4					
8												
9												
10	6		6	302079.042			6		0	0	0	0
11												
12	2.5	1	3.5	168038.0955	2.5	1						
13	1		1	50,346.51	1					0		
14		1						1	0	0	0	0
15												
16	4		4	201386.028			4		0	0	0	0
17	2	1.5	3.5	163950.756				0.5	2	1	3	142864.842
18												
19												
20	4	2.5	6.5	306,815.60	4	.5		1		1	1	42717.83
21												
24												
25												
26	0	0	0	0					0	0	0	0
27	0	0	0	0					0	0	0	0
28									0	0	0	0
29									0	0	0	0
30	0	0	0	0					0	0	0	0
35	0	0	0	0					0	0	0	0
32	5.73	3.92	9.65	453799.0509			2.73	2.92	3	1	4	193211.349
33	0	0	0	0					0	0	0	0
34	3.92	5	8.92	408217.4474			1.92	5	2	0	2	100693.014
Total	33.65	15.92	48.57	2,323,363.63					7	3	10	478,941.03
Monthly				193,613.64								39,911.75

[1] As per Table 4.5.1 [2] New ward, staffed with 32 RNs and 9.5 HCAs that transferred from old ward.

Table 4.5.4: Extension Wards Agency Hours estimated costs and savings for monthly average

	RNs -Average Hours per Month					HCA - Average Hours per Month					Total
	Phase 1	Phase 2	Change Hours	Average Cost/ hr[1]	Cost €	Phase 1	Phase 2	Change Hours/ Month	Average Cost/hr[1]	Cost €	€
4	42.33	172.5	130.17	36.82	4,793	207.5	632.03	424.53	34.13	14,488	19,281
5	0	79.04	79.04	40.21	3,178	148.67	2,089.28	1,940.61	33.31	64,641	67,820
6	187.5	265.79	78.29	45.58	3,568	28.67	671.87	643.21	33.82	21,755	25,323
7	248.72	289.75	41.03	51.01	2,093	666.83	1,789.07	1,122.24	33.4	37,486	39,579
8	5.33	14.6	9.26	39.97	370	5.33	14.42	9.08	33.42	304	674
9	13.39	49.54	36.15	40.11	1,450	171.55	446.4	274.85	32.26	8,866	10,317
10	124.33	24.67	-99.67	41.68	-4,154	1,020.67	1.33	-1,019.33	33.34	-33,988	-38,142
11	26.72	113.1	86.38	45.66	3,944	75.45	64.46	-10.99	33.31	-366	3,578
12	198.61	259.61	61	43.21	2,635	214.55	125.26	-89.29	35.2	-3,143	-507
13	96.11	194.04	97.93	49.5	4,848	789.55	670.18	-119.37	33.66	-4,018	830
14	8	237.56	229.56	53.07	12,183	386.39	586.63	200.24	32.41	6,491	18,674
15	0	0	0	53.82	-	-	14.22	14.22	34.83	495	495
16	87	72.78	-14.22	44.81	-637	293.45	366.11	72.66	34.47	2,505	1,867
17	54.67	8.76	-45.9	50.31	-2,309	291.45	33.79	-257.66	35.2	-9,069	-11,379
18	50.17	0	-50.17	42.42	-2,128	270.55	233.83	-36.72	32.33	-1,187	-3,315
19	320.28	235.72	-84.56	48.72	-4,120	41.11	-	-41.11	33.87	-1,392	-5,512
20	250.67	313.5	62.83	45.87	2,882	253.33	792.83	539.5	32.89	17,746	20,628
21	0	2	2	34.62	69	41.67	368.06	326.39	35.03	11,435	11,504
24	84	23	-61	59.28	-3,616	555.83	351.79	-204.04	43.99	-8,975	-12,591
25	0	99.58	99.58	59.28	5,904	21.17	78.08	56.92	43.99	2,504	8,407
26	56.33	163.29	106.96	59.28	6,341	513.5	146.21	-367.29	43.99	-16,156	-9,815
27	0	4	4	59.28	237	81.83	298.08	216.25	43.99	9,512	9,749
28	135.67	0	-135.67	59.28	-8,043	261.27	302.42	41.14	43.99	1,810	-6,233
29	5.33	31.67	26.33	59.28	1,561	409.67	452.63	42.96	43.99	1,890	3,451
30	0	162	162	59.28	9,604	1,365.67	254.67	-1,111.00	43.99	-48,869	-39,265
35	84	142.33	58.33	59.28	3,458	535.17	567.71	32.54	43.99	1,431	4,890
32	229	223.28	-5.72	57.81	-331	159	377.5	218.5	38.35	8,379	8,048
33	59.67	138.29	78.63	57.81	4,545	26.33	202.81	176.47	38.35	6,767	11,312
34	244.33	58	-186.33	57.81	-10,772	1,355.67	113.53	-1,242.14	38.35	-47,631	-58,403
Total					37,555					43,710	81,265

[1] As per Table 4.5.2

Table 4.5.5: Total economic cost for DOH

	Agency €	Uplift in place/ Month €	Total Direct Investment Required/ Month €
4	19,280.62	-	19,280.62
5	67,819.57	-	67,819.57
6	25,323.27	-	25,323.27
7	39,579.15	-	39,579.15
8	673.89	-	673.89
9	10,316.54	-	10,316.54
10	-38,142.00	-	-38,142.00
11	3,577.63	-	3,577.63
12	-507.13	-	-507.13
13	830.15	-	830.15
14	18,673.98	-	18,673.98
15	495.43	-	495.43
16	1,867.47	-	1,867.47
17	-11,378.72	11,905.40	526.68
18	-3,314.87	-	-3,314.87
19	-5,511.92	-	-5,511.92
20	20,628.20	3,514.32	24,142.52
21	11,504.13	-	11,504.13
24	-12,591.28	-	-12,591.28
25	8,407.13	-	8,407.13
26	-9,815.01	-	-9,815.01
27	9,749.16	-	9,749.16
28	-6,232.95	-	-6,232.95
29	3,450.69	-	3,450.69
30	-39,264.95	-	-39,264.95
35	4,889.55	-	4,889.55
32	8,047.84	16,100.95	24,148.79
33	11,312.35	-	11,312.35
34	-58,403.24	8,391.08	-50,012.16
Total	81,264.65	39,911.75	121,176.41
Total implementation	-18,804.31	39,911.75	21,107.45
Total non-implementation	100,068.96	-	100,068.96

Table 4.5.6: Annual agency spend for Hospital 1

	RN			HCA			
	Nov 17 - Oct 18	Nov 18 - Oct 19*	Difference	Nov 17 - Oct 18	Nov 18 - Oct 19*	Difference	Total Difference
4	43,335	64703	21,368	479,382	569346	89,964	111,332
5	9,142	38159	29,017	770,035	738328	-31,707	-2,689
6	126,897	165018	38,120	468,203	472049	3,846	41,967
7	30,720	10923	-19,797	707,232	683681	-23,551	-43,348
8	21,548	5532	-16,015	88,088	101488	13,400	-2,615
9	9,224	1092	-8,132	288,215	339721	51,505	43,373
10	21,633	11101	-10,532	517,227	464989	-52,237	-62,769
11	67,209	133142	65,932	174,757	143736	-31,022	34,911
12	25,747	21881	-3,866	212,541	87297	-125,244	-129,110
13	35,455	39653	4,197	301,158	305929	4,771	8,969
14	45,327	55630	10,303	378,046	235985	-142,061	-131,757
15	3,209	1556	-1,653	11,260	18254	6,994	5,341
16	23,676	30801	7,125	185,886	325493	139,607	146,732
17	23,479	3308	-20,171	106,062	29266	-76,796	-96,967
18	6,725	8993	2,268	142,652	191157	48,505	50,773
19	64,137	43565	-20,571	41,014	52375	11,361	-9,211
20	24,881	10465	-14,416	532,107	545015	12,908	-1,508
21	6,862	0	-6,862	52,781	170258	117,478	110,616
Total	589,206	645,523	56,317	5,456,647	5,474,367	17,720	74,037
Total exp wards	230,918	183,762	-47,156	2,940,259	2,677,656	-262,603	-309,759
Total non-implementation wards	358,288	461,761	103,473	2,516,388	2,796,711	280,323	383,796

*six months of data (November 2018 – April 2019) extrapolated to 12 months

Table 4.5.7: Annual Agency spend for Hospital 3

	RN			HCA			
	Jan - Dec 2018	Jan - Dec 2019*	Difference 2018-2019	Jan - Dec 2018	Jan - Dec 2019*	Difference 2018-2019	Total difference
32	242949	113199	-129750	232630	187804	-44827	-174577
33	53475	48038	-5437	95307	43414	-51894	-57331
34	128459	22043	-106416	234359	104737	-129622	-236038
Total	424883	183280	-241603	562297	335955	-226,342	-467,946
Total exp wards	371408	135242	-236166	466990	292541	-174,449	-410,615
Total non-implementation wards	53475	48038	-5437	95307	43414	-51,894	-57,331

*five months of data (January – May 2019) extrapolated to 12 months

Section 5
Discussion, Conclusions and Recommendations

5.1 Introduction

A number of research studies have demonstrated an association with poor nurse staffing levels and adverse patient outcomes. In addition, low staffing levels have also been associated with outcomes related to nursing staff such as low levels of job satisfaction, high staff turnover and missed or delayed care. This programme of research is building on the international evidence and the outcomes and recommendations from the Irish arm of the RN4Cast survey (Scott *et al.* 2010); in addition, it has been a number of years since the last extensive study on the nursing workforce in Ireland and there have been a number of changes at societal, economic and policy levels. There is also a need to take into consideration the design of health services in Ireland and how they relate to the provision of nurse staffing and skill-mix in medical, surgical and specialist settings.

The aim of the research outlined in this report was to continue to evaluate the implementation of the recommendations from the *Taskforce* for safe nurse staffing and skill-mix. Internationally, the research approach outlined here is relatively unique. The research team, using multiple approaches and collecting data longitudinally from a variety of sources, measured the impact of implementing the recommendations of the *Framework* on nurse-sensitive patient outcomes measures, staff outcome measures and organisational factors as well as measuring the economic impact. In addition, using implementation science methodology, the research team provided an evidence-based assessment of the adoption and implementation of the *Framework* in practice. The research has been extended from the 6 original wards to an additional 20 wards; 10 of which, in addition to the 6 Pilot wards, received an adjustment to their staffing levels.

This section of the report discusses the results of the study in relation to the extent to which nurse sensitive patient outcome measures, adverse patient outcomes and safety CLUEs, the patient experience, nurse outcomes and the organisational/ward environment factors changed as a consequence of the introduction the recommendations in the *Framework.* This stage of the research has collected longitudinal data from administrative databases (*TrendCare* and HIPE) over two time periods: pre and post the implementation of the recommendations and cross-sectional data at four time points from nursing and HCA staff in the Pilot Wards and at two time-points in the Extension Wards. The final part of this section reports on the cost implications arising from the pilot introduction of the *Framework* as well as examining the implementation processes/measures in the context of recommendations for a national rollout.

5.2 Implementation of NHPPD

The introduction of NHPPD, based on the systematic measurement of patient acuity and dependency measures, resulted in the identification of a need for staffing uplift in

four of the six wards involved in the pilot and 10 wards in the Extension; that is NHPPD identified a variance in actual and required NHPPD. The literature has identified NHPPD as a comprehensive approach to determining staffing need as it takes into account patient acuity and dependency in providing care rather than solely depending on staff numbers, patient to nurse ratios or historical staffing levels. The effect of the introduction of this approach has been to generally stabilise the nursing workforce in these wards and, as outlined above, resulted in a number of improved outcomes in a number of key areas. One aspect of the uplift was the time required to put the extra staff in place; however, this process is still ongoing in the extension wards and, as in the original pilot research (Drennan *et al.* 2017b) more time is required to see the full impact of the changes on a number of these wards.

5.3 Outcomes Related to NHPPD, Shift Variance, Skill mix, Agency Use, One-to-One Specialling and Absenteeism

Of the six original pilot wards, four wards (1, 2, 3 and 31), based on the assessment of their actual and required NHPPD, received an uplift of staff; this included both RNs and HCAs; this, in some cases resulted in a noticeable change in staffing in each of the pilot wards. The overall outcome of introducing NHPPD as the approach to determining nurse staffing requirements in each of the pilot sites was to that of creating stability in terms of skill mix, one-to-one specialling and, in particular, a substantial reduction in the use of agency staff. This stabilisation not only occurred in the wards that received an uplift in staff but also in Hospital 2 that did not adjust their WTE complement. What occurred in this site was that nursing leadership were using the data collected through *TrendCare* to make decisions on the utilisation and deployment of staff. The deficits identified in actual and required NHPPD between Time 1 and Time 2 and Time 3 are now reducing as the recruitment and integration of new staff continued. It is important to note that a consequence of introducing new staff to the pilot wards, time is required to supervise and integrate these new members into the workforce; a consequence of this is that the proportion of nursing hours available for clinical may be reduced during this process. However, as staff become fully integrated, supervision hours are converted to clinical hours. Overall, the variance in HPPD and hours worked during the various shifts are stabilising in Time 3 of the study following the implementation of the recommendations of the *Framework* being put in place; however, adjustments in staffing are still required and a number of Pilot wards face challenges as the levels of patient acuity and dependency change and staff turnover. In this case, using a systematic measurement system, such as *TrendCare*, in a continuous and iterative process allows the required staffing complement to be adjusted as required and this is of benefit to patients, nursing staff and management.

The *Framework* document outlined a number of ward categories based on NHPPD. Based on the data observed in Time 2, generally each of the pilot sites matched the categories in which it was hypothesised that they would be situated. For example, Ward 3, a highly complex specialist surgical unit was, based on its calculated NHPPD, to be in category B. This in effect validated the assessment undertaken of patient acuity and dependency and resulted in the levels of staffing required to staff a unit of this kind.

In the extension wards increase in whole time equivalents (WTEs) between Time 1 and Time 2 in those 10 extension wards where a negative variance between NHPPD required and available was identified. Overall, the variance in HPPD and hours worked during the various shifts are stabilising in Time 2 in these wards following the implementation of the recommendations of the *Framework* being put in place; however, adjustments in staffing are still required and a number of wards that did not have an adjustment face challenges as the levels of patient acuity and dependency change. The adjustments occurred between September and December 2018, therefore time is still required for these changes to have an impact on a number of the outcomes measured.

It was also evident that the introduction of the recommendation in the *Framework* on the supervisory status of the CNM 2 was increasing the proportion of time allocated to the CNM2 to fulfil this role. In the majority of the pilot wards, the proportion of time allocated to supernumerary status increased; no wards recorded a decrease, with one ward remaining stable. In a number of wards based on the NHPPD available, they now have the potential for 100% of the CNM 2 role available for supervisory support; that is, total hours available demonstrates that the CNM2 role is available for 100% supervisory support. The consequence of matching staffing requirements with patient acuity and dependency by not including the CNM2 grade in this calculation is increasing the time available to undertake a 100% supervisory role. Previous research has identified that the introduction of fully supervisory posts in clinical practice was associated with improved patient satisfaction with nursing care (Bender et al. 2012), a reduction in falls, pressure ulcers and increased job satisfaction of staff (Burritt et. al., 2007). The recommendation that 100% of the role of the CNM 2 should be at supervisory level is a central recommendation in the *Framework*, while it is difficult at this to disaggregate this element of the implementation on the outcomes overall, future statistical modelling will attempt to measure the impact of the supervisory role of the CNM2 on outcomes. It is of note that in the wards that received the greatest uplift in staffing, respondents' ratings of nurse manager's ability, leadership and support increased from Time 1 to Time 2 and Time 3. In the Extension wards, the results show that the amount of time the CNM2 is spending in a supervisory role in Time 2 in the extension wards in which the Framework recommendations were implemented increased from Time 1. There are still a some challenges in Hospital 1 where 55% of the total wards are 80% or above supervisory status for CNMs. Hospital 2 has achieved 95% or above time allocated to supervisory status with the majority of wards in Hospital 3 also at that level.

The *Framework* outlined recommendations for skill mix in medical and surgical settings with the ideal skill mix identified as 80% RN to 20% HCA. The results regarding skill-mix are showing stabilisation when compared to the previous results in 2017 (Drennan *et al.* 2017b). When rosters were examined, it was identified that the majority of wards exceeded, or are close to, the *Framework's* recommended 80:20 split. In comparing the two measures (shift and rosters), it is of note that the clinical skill-mix is currently being affected by the number of hours being provided to clinical supervision of new staff; this accounts, to an extent, for the mismatch between the two measures reported. In the Extension Wards, rostered skill-mix, that is the core complement of staff, demonstrated that skill-mix is close to or at the 80% RN to 20% HCA ratio recommended in the *Framework*. Overall, the ratio for the implementation

wards was 80% RN to 20% compared to the non-implementation wards of 75% RN to 25% HCA. It is envisaged that, as new staff integrate into the wards, the skill-mix on a shift-by-shift basis will match that outlined in the roster; that is hours currently allocated to the supervision of new staff, which are impacting on the skill-mix will become available for clinical care. Previous research has demonstrated that a higher proportion of registered nurses on wards is associated with a significantly lower rates of death (Estabrooks et al., 2005, Shekelle, 2013) and failure to rescue (Blegen et al., 2011), lower rates of pneumonia (Cho et al., 2003) and surgical site infection (McGillis Hall et al., 2004) and lower post-operative sepsis (Blegen et al., 2011).

In all Pilot wards in Hospital 1 that received amended staffing as a result of the introduction of NHPPD, there was a reduction in the proportion of nursing hours provided by agency staff. In Hospital 1, there were substantial reductions in agency hours following the uplift reducing from 13.4% of all nursing hours in Time 1 to 1.5% of all nursing hours in Time 3. Agency usage in Hospital 2 remains challenging; however, through the data collection process, nursing management in this site, in partnership with the Department of Health and the HSE, undertook a review of agency usage and put into place a number of targeted actions, including the implementation of an enhanced care team, to reduce these wards relatively high use of agency staff. This outcome demonstrated the value of using the data available for decision making. It is evident that as the stabilisation of staff continues, further reductions in agency usage are likely to occur which should have a positive impact on continuity of care as well as economic savings. The pilot ward in Hospital 3 saw an increase in agency usage between Time 1 and Time 2 as a consequence in the change in patient profile; however, this is now beginning to decline in Time 3. In the majority of the Extension Wards that implemented the recommendations in the Framework there was, on average, a reduction in agency usage. Overall percentage of hours provided by agency staff reduced from 16% in Time 1 to 13% in Time 2 in those wards . This compared to an increase in agency usage in wards that did not adjust staffing where agency usage increased from 6% of total nursing hours in Time 1 to 14% in Time 2. It should be noted that there was variability in agency usage at ward level; however, the overall trend in the implementation wards in relation to agency usage was downward. Although Hospital 2 did not adjust its staffing levels, it did implement the recommendations in the Framework as well as an enhanced care programme; this resulted in a fall in the hours provided by agency staff from 14% in Time 1 to 10% in Time 2.

In Time 1 of the study a relatively high proportion of nursing hours were provided by one-to-one specialling. Overall, in the pilot wards that received a staffing uplift, the requirement of one-to-one specialling for patients reduced substantially. Hospital 1 reduced the requirement for one-to-one specialling from 19.7% of total nursing hours in Time 1 to 6.9% in Time 3, a 65% decrease. Hospital 2 also had a 49.6% decrease in one-to-one specialling nursing hours required from Time 1 (prior to implementation) to Time 3 (post implementation). In the extension wards n Time 1 of the study, the research identified that a relatively high proportion of nursing hours were provided by one-to-one specialling; this specialling was predominantly provided by agency staff. In Hospital 1, overall, in the wards that received a staffing uplift, the requirement of one-to-one specialling for patients reduced from 27.7% in Time 1 to 19.9% in Time 2; this was in comparison to the wards that did not receive an uplift where the requirement

for one-to-one specialling increased from 10.8% in Time 1 to 21.7% in Time 2[31]. Hospital 2 increased the requirement for one-to-one specialling from 197.4% of total nursing hours in Time 1 to 21.8% in Time 2. In the wards in Hospital 3 that received an uplift, the proportion of nursing hours required for one-to-one specialling decreased from 22.8% in Time 1 to 10.1% in Time 2.

It is evident that the provision of a staffing uplift has led to a reduction in one-to-one specialling; that is, wards that are better staffed, regardless of patient acuity and dependency, require fewer hours dedicated to one-to-one specialling as staff have increased time available for patient surveillance. The increase in one-to-one specialling in Ward 31 is reflective of the increase in patient acuity and dependency in this site over the course of the study.

Absenteeism, in particular sickness absence, may be an indicator of increased workloads or a poor working environment with a variable picture identified in both the Pilot and Extension wards. Overall absenteeism decreased from Time 1 through to Time 3 in the majority of Pilot wards included in the implementation of the recommendations in the *Framework*. Sickness absence overall increased in Time 3 but was relatively close to the national average of 4.9% (HSE 2018). the majority of wards in Hospital 1 were below this rate, with only two wards above; while Hospital 2 has two wards surpassing this level and Hospital 3 was generally below the national level. In the Extension Wards, overall sickness absence decreased from Time 1 to Time 2 with only one ward being above the national rate of sick leave. Hospital 2 showed a different pattern of absenteeism rates in Time 2, with six of the eight wards absenteeism rates increasing, one remaining unchanged and one decreasing; while three wards had sick leave rates over the national average and one at the national level; the remaining four wards had sick leave rates below the national average. Sickness absence fluctuates according to the time of year, with higher rates recorded in the winter months; therefore, at this stage, the results need treated with caution as further trend analysis is on-going.

Although not directly within the remit of the implementation of the recommendations within the *Framework*, it is of note that bed occupancy rates in the pilot wards ranged from 89.73% to 101.11% in Time 1, from 87.8% to 105.3% in Time 2 and 92.45% to 101.6% in Time 3; these rates were all above the OECD average for acute bed occupancy at 77.3% with a number of wards above the national average bed occupancy rate of 93.8% (OECD 2016). In the Extension Wards, Hospital 1 had the highest level of bed occupancy ranging from 86% to 103%. Hospital 2 had a greater range from 72% to 109% while the lowest levels were apparent in Hospital 3, ranging from 69% to 81%. At Time 2 bed occupancy rates have remained high, between 82.13% and 106.15% in Hospital 1, 72.11% and 111.26% in Hospital 2 and 89.16 to 94.05% in Hospital 3. These high bed occupancy rates have implications for nursing work and occupancy data is beneficial in planning the nursing resource required to care for patients on wards that have high levels of patient turnover. These high bed occupancy rates have implications for nursing work and occupancy data is beneficial in planning the nursing resource required to care for patients on wards that have high levels of turnover.

[31] Wards that did not reach 95% actualisation in Trendcare have been removed from this analysis.

5.4 Nursing Sensitive Outcome Indicators

Following on from the research on the introduction of NHPPD in Australia (Twigg 2006), this research study also explored the extent to which nurse sensitive outcomes changed as a result of the introduction of the recommendations in the *Framework*. We compared HIPE data from Time 1 with Time 2 of the study in both the Pilot and Extension Wards. Patient demographic and admission data from both phases were comparable. The profile of patients was reflective of the Model designation of the three hospitals in the pilot. In the Pilot Wards, Average length of stay (AvLoS) demonstrated a fall across two of the three sites with AvLoS reducing from 10.5 days at Time 1 in Hospital 1 to 10.02 days in Time 2; Hospital 2 also had a slight reduction from 8.8 days in Time 1 to 8.6 days in Time 2. It is of note that in wards that have the least variance between staff required and staff available there was a consistent reduction in AvLoS: AvLoS in Ward 2 reduced from 13.3 days in Time 1 to 11.6 in Time 2 and in Ward 2 from 10.4 days in Time 1 to 10.2 days in Time 2. Based on the Poisson regression, the estimated death count on day 1 was 0.31 (95% CI 0.2 to 0.496). Over the first time period, from day 1 to day 178, the death count increased by 0.1% (95% CI -0.199 to 0.404) per day. During the second time period onwards (following the introduction of the Framework), the death count decreased by -0.023% per day. The model estimated death counts across the two respective periods (before and after the introduction of the Framework). A number of patient outcomes sensitive to nursing care were measured through an analysis of data from the Hospital In-Patient Enquiry (HIPE) system. The time series analysis shows that the count of NSO increased per day by 0.15% in Time 1 but decreased by 0.003% in Time 2, showing stabilisation. The regression model demonstrated that the odds of developing an NSO began to decline in Time 2, but this was no longer apparent after adjusting for case-mix. In the Extension Wards, Average length of stay (AvLoS) demonstrated a fall across all sites between Time 1 and Time 2. AvLoS reduced from 10.7 days at Time 1 to 9.45 days in Time 2 in those wards that received an uplift; a reduction in AvLoS of 1.26 days. However, it should be noted that there was also a fall in the AvLoS in the comparison wards from 11.87 days in Time 1 to 9.91 days in Time 2. We also used a segmented time series model to estimate the effect of the uplift in the 29 extension wards (15/08/2017 to 30/04/2019), for which 10 received implementation of the *Framework* from 01/09/2019, while the other 19 did not. Consequently, we allowed the NSO time-trend in the post-uplift period to vary across these two groups using an interaction term. The parallel time trend in the two groups of wards suggests that there was no change in the NSO rate that could be attributed to the uplift (and the p-value for the interaction was 0.87). An analysis using the daily count of deaths as the outcome yielded similar results. Data on nursing sensitive outcome measures, at this time, needs to be treated with caution. Further data collection and analysis is on-going as part of the longitudinal programme of research.

5.5 Nursing Work

The research also undertook, to date, four cross-sectional surveys of nursing staff in the Pilot wards: Time 1 - before the introduction of the recommendations in the

framework; Transition phase - during the implementation of the recommendations and; Time 2 and Time 3 – following the implementation of the recommendations. The aim of this stage of the research was to identify if change occurred prior to, during and following the introduction of the recommendations in the *Framework.*

The majority of respondents were RN, had completed degree level education and had worked as nurses for, on average, 12 years with approximately five and a half years of experience in their current clinical area. The vast majority of staff reported that they predominantly worked 12 hour shifts while on duty.

Across all phases of data collection, it has been possible to gain insight into factors affecting nursing work on the study wards. There are a number of trends in the data when the time periods are compared. The number of patients per nursing staff member was observed to be reducing at Transition and this trend continued in Time 2 and Time 3. Overall staff perceptions of staffing and resource adequacy increased from Time 1 through Transition to Time 3; however, this reduced at Time 3 across all wards. Perceptions of nurse manager ability, leadership and support and nurse participation in hospital affairs showed slight increases across the three time periods; however, there were negligible changes in the perceptions of nurse doctor relationships and nursing foundations for quality of care. Respondents' perceptions that the quality of care delivered was poor or fair fell from 36.3% in Time 1 to 30.3% in Time 3, with the perception that the quality of care was good or excellent increasing from 63.7% in Time 1 to 69.8% in Time 3. In the Extension wards, The number of patients cared for per nursing staff (RN and HCA) decreased slightly in both wards that received an adjustment in staffing and those that remained at the same level of staffing; The number of patients cared by wards that received an adjustment reduced from 4.83 at Time 1 to 4.47 at Time 2, a reduction of 0.36. In comparison, the wards that did not receive an adjustment reduced from 4.59 in Time 1 to 4.49 in Time 2, a reduction of .01. Overall staff perceptions in the Extension wards of staffing and resource adequacy slightly decreased from Time 1 to Time 2 across all wards. This reduced from 2.08 in Time 1 to 1.98 in Time 2 in the implementation wards, a difference of .01 whereas the non-implementation wards fell from 2.15 in Time 1 to 2.04 in Time 2, a difference of 0.11. Perceptions of Nurse Manager Ability, Leadership and Support and nurse participation in hospital affairs showed slight increases across the two time periods in the implementation wards; however, there were negligible changes in the perceptions of nurse doctor relationships and nursing foundations for quality of care which were at a moderate to high level prior to and after the implementation of the Framework. Respondents' perceptions that the quality of care delivered was good or excellent fell from 75.6% in Time 1 to 68.4% in Time 2, in the implementation wards; in comparison, the non-implementation wards fell from 73.0% in Time 1 to 70.3% in Time 2. These indicators remain challenging and further research is ongoing in these areas.

Care left undone decreased both in the Pilot wards and those extension wards that received an adjustment in staffing. In the Pilot wards, in Time 1, 75.6% of nurses reported that at least one necessary item of care was left undone due to lack of time on their last shift while 61.9% reported the same in the Transition phase, which further dropped to 31.8% in Time 2. A small increase was recorded in Time 3 with 39.3% of respondents reporting that at least one necessary item of care was left undone but this

remained substantially below the baseline of 75.6% at Time 1. Overall, an average of 2.51 care activities were left undone per shift in Time 1 while 1.94 activities, on average, were left undone at Transition, 0.75 undone at Time 2 and 1.08 undone at Time 3; again, this was below the baseline recorded at Time 1. In the Extension wards, in Time 1, 58.9% of nurses in the implementation ward and 40.1% in the non-implementation wards reported that at least one necessary item of care was left undone due to lack of time on their last shift while this fell to 52.3% in the implementation wards, it increased to 51.3% in the non-implementation wards in Time 2. The number of activities left undone in the implementation wards per shift fell from an average of 1.69 in Time 1 to 1.55 in Time 2; in comparison, the number of activities left undone in the non-implementation wards increased from 0.93 in Time 1 to 1.32 in Time 2.

Job satisfaction and intention to leave remained relatively similar at the overall level but demonstrated differences at ward level; however, this area remains challenging in both the pilot and extension wards. In the Pilot wards, the prevalence of intention to leave was lower and job satisfaction higher at Transition and Time 2 time-points (i.e. following the introduction of the recommendations in the *Framework*) when compared to Time 1. In one site, which received the majority of the staffing uplifts, overall levels of job satisfaction increased from 56.3% in Time 1 to 86.1% in Time 2. However, levels of job satisfaction and intention to leave remained challenging at Time 3. Overall, the level of job satisfaction was higher at Transition and Time 2 time-points (i.e. following the introduction of the recommendations in the *Framework*) when compared to Time 1; however, this has decreased to similar to that of the baseline (Time 1) at Time 3. Similar patterns were identified in the Extension wards. There was a slight increase in the extent to which respondents in the implementation wards would recommend their ward to colleagues: 70.2% in Time 1 and 73.2% in Time 2 with a slight decrease in the non-implementation wards: 79.9% in Time 1 and 75.1% in Time 2. Intention to leave current employment remained relatively similar over the two timepoints: implementation wards – 53% in Time 1 and 54.5% in Time 2; non-implementation wards – 50.2% in Time 1 and 50.5% in Time 2

Burnout was measured between Time 2 and 3 in the Pilot wards and Times 1 and 2 in the Extension wards. Overall, in the pilot wards, staff scored relatively low on emotional exhaustion and depersonalisation and relatively high on personal accomplishment and Time 2 and Time 3[32]. However, total emotional exhaustion scores have increased at Time 3 in comparison to Time 2. Overall scores of personal accomplishment remained similar and relatively high across both time-points. Overall, in both the implementation and non-implementation extension wards, staff scored relatively low on emotional exhaustion and depersonalisation and relatively high on personal accomplishment in Time 1 and Time 2[33]. However, total emotional exhaustion scores increased at Time 1 in comparison to Time 2. Overall scores of personal accomplishment remained similar and relatively high (positive) across both time-points.

[32] Higher scores on the emotional exhaustion and depersonalisation subscales indicate negative outcomes; higher scores on the personal accomplishment subscale indicate better outcomes.
[33] Higher scores on the emotional exhaustion and depersonalisation subscales indicate negative outcomes; higher scores on the personal accomplishment subscale indicate better outcomes.

5.7 Economic Analysis

The economic analysis of the introduction of the recommendations in the *Framework* explored three cost areas: agency staff usage, cost of the staff uplift and the cost of nurse sensitive outcomes.

Hospitals in the pilot were asked to provide their average hourly spend for agency RNs and HCAs. The majority of wards that received an uplift demonstrated a substantial reduction in agency usage in time 2. This resulted in an average monthly saving of in agency costs. When staff recruitment is factored in, the net monthly cost of the uplift was less than the agency savings realised. Therefore, in implementing the uplift there is a net monthly saving across the six pilot wards.

It was estimated that each individual NSO accrued by a patient costs approximately €2,397[34]. At the time of the study, it was evident that the proportion NSOs were decreasing by 0.88% per day; however, a longer period of data collection is required before an accurate comparison can be made in NSO costs between the various phases of the study. In Australia, Twigg *et al.* (2013) measured NSOs[35] 22 months prior to, and 22 months following the implementation of NHPPD. The cost per NSO was calculated higher in Australia than in Ireland at AUD$10,074[36]. Similar to our initial data, following the introduction of NHPPD, which led to an increase in the proportion of hours provided by RNs, a total 1,202 NSOs were averted. The increase of nursing staff cost AUD$16,833,392, therefore the net intervention cost was AUD $9,690,926.The cost per life year gained was AUD$8907.

It is also identified that turnover can result in a number of negative costs for an organisation including the need for temporary cover for staff and the cost of recruitment and adaptation (Buchan 2010). In this study, it was identified that 52.1% of respondents in Time 1 reported that they would definitely or probably leave their employment; although this reduced to 45.5% in Time 2, it was still a substantial proportion of respondents. It should be noted that the turnover rate of nursing staff in Ireland is approximately 7.7% (HSE 2017); however, there is a lack of data on the cost to the health service of staff turnover in the State. However, Buchan (2010) reports that turnover costs can be estimated by taking into consideration the following factors: percentage of pay-bill; cost per patient day and cost saving of reduction in turnover. Using percentage of pay-bill as an example, and assuming a turnover of 7.7% and turnover costs of €8,000 per nurse, in an organisation which employs 500 nurses, this would be equivalent to turnover costs of €308,000 per annum (Buchan 2010). In the extension wards, implementation wards have substantially less annual agency costs

[34] This is the average cost paid by the Health Pricing Office and may not reflect the real cost of the NSO.
[35] NSOs were based on the same taxonomy as used in this study.
[36] Approximately 7,000 Euros at 2013 rates.

than the non-implementation wards following the implementation of the recommendations in the *Framework*.

5.9 Conclusion

It is evident from the data, that, as a result of the introduction of the recommendations outlined in the *Framework,* there is on-going stabilisation of the nursing workforce in Time 3 when compared to Time 1 of the study; however, there remain challenges, not least in recruitment and retention. This was identified in patient, nurse and organisational outcomes measured as part of the research. The collection of systematic data on the nursing workforce has allowed for the planning of the staffing complement related to patient need. As a consequence of measuring patient acuity and dependency and introducing NHPPD as the method for identifying appropriate nurse staffing, there was an increase in staffing numbers between Time 1 and Time 2 in those pilot an extension wards where a negative variance between NHPPD required and available was identified. As a consequence, skill-mix in the pilot and extension sites which received an uplift is at, or reaching the recommended 80:20 ratio and, as a result, a higher proportion of RNs are now providing care than that which was evident in Time 1. One key finding was that there was a substantial reduction in the proportion agency staff used to provide care between Time 1 and Time 2 of the study in both pilot and implementation extension wards; not only has this resulted in economic savings, it has contributed to stabilising the workforce with a reduction in the requirements for one-to-one specialling. Initial analysis of HIPE data demonstrated a significant decline in nurse sensitive outcome indicators in Time 2 when compared to Time 1; this appears to have stabilised in Time 3 with small reductions noted – no significant decline was noted, to date, in the Extension wards. It is of note that this result needs to be treated with caution due to the sample size and relatively short timeframe. Self-reported nurse to patient ratios improved in Time 2 and Time 3 compared to Time 1; however, there is variability in this ratio at ward level. In wards that received the greatest uplift in staff, there was a substantial improvement in all areas of nursing work, including an improvement in respondents' perceptions that the wards were adequately staffed and resourced. The working environment was reported as challenging in both the Pilot and Extension wards and further work is required to understand the results found in this element of the research. The proportion of care left undone substantially reduced in all wards that received an adjustment in staffing levels. Levels of job satisfaction remain challenging and it should be noted that parts of the cross-sectional data were collected from nursing and HCA staff during a period of industrial unrest. Overall levels of intention to leave remain relatively high and this requires further analysis; however, there were some increases in staff recommending their ward to colleagues as a good place to work. The results of this study to date demonstrate that the introduction of the recommendations from the *Framework* is determining that the right staff are in the right place and at the right time and is having a positive impact on patient, nursing and organisational outcomes; however, challenges remain both in recruitment and retention of staff. The data presented in this report is showing that, despite challenges, the implementation of the recommendations in the *Framework* are having a positive impact on patient care, nurse staffing and organisational outcomes.

5.10 Recommendations

5.10.1 Implementing Nursing Hours per Patient Day (NHPPD)

The results of this research demonstrated that assumptions 1 and 2, as outlined in the *Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland* (Department of Health 2016) were evident; that is patient care needs differ and nurse staffing numbers, profile and skill-mix are key to ensuring safe, high quality care for patients. Furthermore, it was fond that using a systematic approach to determining nurse staffing and skill-mix (in this case NHPPD), resulted in the stabilisation of the nursing workforce over the period of the research. The use of this approach enabled, in association with clinical judgement, an informed decision-making process to be put in place. The evaluation also identified that NHPPD measured in the pilot study broadly matched the NHPPD ranges outlined in the *Taskforce* report.

Recommendation: It is therefore recommended that NHPPD be introduced nationally on an incremental basis as the means for determining nurse staffing and skill-mix needs in medical, surgical and specialist settings.

5.10.2 Governance and Oversight

The Taskforce recommended that: 'the process of setting and maintaining safe nurse staffing levels is collaborative and involves Clinical Nurse Managers, Senior Nurse Managers and Directors of Nursing with support from Human Resources Management, Quality and Safety, and Finance.' To ensure that this recommendation was fulfilled, each of the Pilot Sites put in place a Local Pilot Planning and Implementation Group. These structures were central to ensuring that the reallocation of staff and the staffing resources were put in place as the recommendations from the *Framework* were implemented.

Recommendation: It is therefore recommended that these LPITs (henceforth to be referred to as Local Implementation Teams) be introduced on a phased basis in clinical sites that are involved in the introduction of the safe nurse staffing and skill-mix programme in tandem with the national rollout. The role of these teams is to support the implementation and monitoring of the safe nurse staffing and skill-mix programme at local and group levels. It is further recommended that a dedicated resource to support the programme be considered at local/group level as recommendations in the *Framework* are implemented.

5.10.3 Enhanced Care

There was a larger than expected prevalence of one-to-one specialling across all three pilot sites when data was collected at Time 1 (baseline). However, as the workforce stabilised the requirement for one-to-one specialling reduced substantially. One-to-one specialling was reflective of different levels of patient dependency and the profile

of the wards across all sites. It is acknowledged, in some cases, the prevalence of one-to-one specialling matched the NHPPD range for specialist wards; however, the extent of one-to-one specialling identified in non-specialist wards required extensive resources to match demand. Previous research suggests that many acute hospitals are not equipped with the skills and resources to provide quality one-to-one specialling to patients who require this level of care. To address this, active assessment and management of one-to-one care through a process of enhanced care should be put in place.

Recommendation: It is therefore recommended that a set of high-level key principles for enhanced care developed as part of the Pilot are included in the *Framework*. To explicitly reflect this point; a more structured, patient-centred approach (enhanced care) to one-to-one specialling would significantly reduce costs, as well as improving the quality of care patients receive and enhance the patient experience. It is further recommended that these high-level key principles be put in place at an organisational level, taking local processes into account, whereby the roles and responsibilities of all staff engaged in one-to-one specialling be clearly identified. Therefore, it is recommended that the *Framework* be amended to include these recommendations

5.10.4 Supervisory Status of the CNM2

The *Taskforce* recommended that 100% of the CNM2 role and function should be allocated to a supervisory capacity. It further recommended that organisations invest in appropriate resource of CNM1s to support the role and function of the CNM2 and provide effective succession planning. The extent to which the CNM2s in the pilot sites reached the target of being 100% supervisory increased over the phases of the research. There is evidence that having these senior posts at supervisory level has a number of positive outcomes for both staff and patients; in addition, as supervisory status of CNM2s increased, staff perceptions of the extent to which they were supported by nursing leadership also increased.

Recommendation: It is therefore identified that this recommendation in the *Framework* has a number of positive benefits and should continue to be implemented in the next stage of implementation of the recommendations in the *Framework*.

5.10.4 Organisational Culture and Ward Environment

Assumption 3 in the *Framework* stated that the organisational environment, where patients receive and staff deliver care, has an impact on the ability to deliver safe effective care. The *Framework* recommended that the elements influencing a positive organisational culture and ward climate form an integral part of the approach to safe nurse staffing decisions. A number of issues related to the ward environment were identified in the evaluation; these included quality of care delivered, complexity of the working environment, nurse participation in hospital affairs, nurse manager ability, leadership and support and staffing resources.

Recommendation: It is therefore recommended that consideration be given to introducing organisational practices similar to that recognised by the Magnet programme (Aiken *et al.* 2000); these would include active involvement in identifying and measuring nurse sensitive outcome indicators, active programmes of quality assurance and structures to actively promote the involvement of clinical nurses in the setting of hospital policies and governance.

5.10.5 Workforce Planning and Workload Management System

The introduction on a trial basis of a workforce planning and workload management system (*TrendCare*) for nursing was central in ensuring a systematic approach to measure patient acuity and dependency and required nursing hours per patient day was used. This workforce planning and workload management system allowed the nursing resource to be calculated according to patient need rather than relying on a nurse to patient ratio estimates or a historical staffing complements. The data collected through the *Trendcare* system was instrumental in facilitating decision making from both an operational and research perspective. In particular, it enabled decisions to be made on the staffing resource based on patient acuity and dependency as measured through the required NHPPD.

Recommendation: Consideration should be given to the national implementation of a workforce planning and workload management system. This system should be capable of capturing all components of the recommendations in the *Framework* and needs to include: patient acuity measures, skill mix measures, workload management and patient allocation, calculation of NHPPD (required, actual and variance), agency use, one-to-one specialling, overtime and absenteeism. It is also key that the system integrates with organisational level patient information management systems to enable the development of nursing intensity weight based costing relative to patient Diagnostic Related Groups.

5.10.6 Nurse Sensitive Outcomes/Tipping Points

The *Framework* recommended that a patient safety *Tipping Points* at ward level be monitored and determined locally. The *Framework* further recommended that 'ward and organisation wide mechanisms be put in place, to measure and monitor, at a minimum, nurse sensitive outcome key performance indicators on patient falls, pressure ulcers, staff and patient experience.' While, in theory, it was identified that this data would have utility in exploring the relationship between nurse staffing and adverse outcomes such as slips, trips and falls, in practice this was difficult to achieve due to the variability in the quality of NIMS data received from the three sites. Issues identified included a lack of information relating to the time and date of the incident and contextual information associated with the cause of the adverse event. However, HIPE data was identified as being of utility in measuring the association between nurse staffing and nursing sensitive outcomes. Nationally the Office of the Nursing and Midwifery Services Director is implementing the Nursing & Midwifery Quality Care-Metrics to provide a systematic approach to the capture of nursing process KPIs known also a nursing metrics. The development of these will have utility in monitoring

the association between nurse staffing and outcomes as they are incorporated at ward level.

Recommendation: It is recommended that the recommendation in the *Framework* that nurse sensitive outcome key performance indicators on patient falls, pressure ulcers, staff and patient experience be monitored from ward level data is retained. Hospitals should also monitor and report on staff turnover, absenteeism rates as an indicator of the impact of the safe nurse staffing policy as highlighted in the *Framework*. Decision making on nurse staffing should be based on a systematic approach that takes into consideration high quality data collected at ward level.

5.10.7 Care Left Undone Events (CLUEs)

The *Framework* recommended that a process to assess, escalate and respond to missed care events (referred to as "Safety CLUEs") is put in place at ward and organisational level to indicate the adequacy of the nurse staffing resource. This recommendation was implemented through incorporating the safety CLUES into the *TrendCare* system. Safety CLUEs are important in exploring the association between nurse staffing and missed or delayed care.

Recommendation: It is therefore recommended that the current recommendation in the *Framework* that a process to assess, escalate and respond to missed care events remains in place. It is further recommended that future software based workload planning or workload systems must have the facility to record this data at ward level.

5.10.8 Skill-Mix

The Framework recommended that 'an initial nursing to healthcare assistant grade mix of 80%/20% (once a safe nurse staffing level exists) is recommended for use in the current environment, and that this is the subject of on-going review.

Recommendation: It is recommended that the skill mix ratio recommended in the *Framework* remains in place. This is based on the results of this study and other research undertaken internationally that have identified that a skill-mix with a higher proportion of RNs is associated with better patient and staff outcomes. This recommendation should be subject to on-going review as roles and specialities develop.

5.10.9 Patient Experience

Assumption 4 in the *Framework* stated that 'positive patient … outcomes are important indicators of the safety and quality of nursing care.' As well as undertaking a number of proxy measures of patient care, a key approach in the study was the measurement of the patient experience. The introduction of a National Patient Experience Survey (NPES) in Ireland provides the opportunity for research at a national level of the association between nurse staffing and the patient experience.

Recommendation: It is recommended that, as outlined in the *Framework,* patient experience is monitored at ward and hospital level. The introduction of the National Patient Experience Survey provides the opportunity to assess the quality of the patient experience at hospital level.

5.10.10 National Roll Out

The results of the evaluation identified that the introduction of the recommendations in the *Framework* were suggestive of increased job satisfaction and a reduction in reports of intention to leave in pilot wards were changes were made based on the *Framework*. The overall impact of the implementation of the *Framework* was to stabilise the nursing workforce in the pilot sites. This stabilisation, through the introduction of an evidence-based approach for determining nurse staffing and skill-mix, will, it is suggested on the results to date, have positive implications for the future recruitment and retention of the nursing workforce. In addition, the introduction of a systematic approach to determining safe staffing levels and the required skill-mix, backed up by a workload management system, will also facilitate the goal of stabilising the nursing workforce and enable the provision of high quality care, improvements in the economic value to patient care as costs associated with nursing sensitive outcomes and agency use are reduced.

Recommendation: It is therefore recommended that the introduction of the recommendations in the *Framework* are implemented nationally on a phased basis. This national implementation should be supported by local pilot implementation teams; these were key to the successful implementation of the pilot. This process should be supported and informed by an on-going programme of research.

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