Tallaght Hospital

Organisational Supports for Clinical Decision-making Out-of-Hours in Tallaght Hospital

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Acknowledgements

EXECUTIVE SUMMARY

Background to the study

Introduction

The out-of-hours period is associated with less favourable patient health outcomes as well as unpredictable workloads and reduced support structures for clinical activity (Aujesky *et al.,* 2009; Freemantle *et al.,* 2015; Freemantle *et al.,* 2012; Miller *et al.,* 2010; Peberdy *et al.,*2008; Seward *et al.,* 2003; Silbergleit *et al.,* 2006). In particular, appropriate skill mix, staff numbers, resources, communication structures and services availability are required to maximise patient safety and minimise risk. (Aiken *et al.*, 2002, Blegen, Vaughn & Goode, 2001; Department of Health Taskforce report on Staffing and Skill mix for Nursing, 2016; Francis Report, 2013; Mahon *et al.,* 2005; McQuillan *et al.,* 2013). As part of continued efforts to improve patient care and hospital management, Tallaght Hospital is currently examining new approaches to work design and a current priority is the out-of-hours service period.

Organisational design out-of-hours

Restricted access to specialised services as well as related delays in investigations, diagnosis and/or treatment during the out-of-hours period is a key patient management and safety issue (Shulkin, 2009; UK Regulation and Quality Improvement Authority, 2013). Reduced access to support services has a knock-on impact for the workload and efficiency of other clinical staff, who require such services to advance patient care. In a similar way, restricted access by clinical staff to senior medical clinical decision-makers is a fundamental challenge in the effective and efficient management of patient care.

Work practices and policies relating to standard service periods (i.e. 9-5 Monday-Friday) also impact on workload volume and pattern for clinical staff during out-of-hours. In particular, hospital practices such as discharge processes, ward rounds, as well as the system of consultant intakes are all interlinked with on-call work patterns. Cross-discipline, frequent, consistent ward round practices are likely to improve patient care and maintained patient safety (e.g. Hakim & Bakheit, 1998)as well as improvements to care planning that can reduce unexpected (yet routine) work tasks during out-of-hours (e.g. re-charting routine prescriptions) (Lynch *et al*., 2015).

Out-of-hours work design-innovation

The challenges outlined above highlight that more comprehensive approaches to support staff and services during the out-of-hours service period are necessary to ensure appropriate standards of care. In the UK, such efforts to address these challenges and concerns have led to the development of the Hospital at Night (H@N) model. The primary aim of H@N is to actively manage the hospital system to minimise workload during the out-of-hours service period by drawing as much work as possible into the day time working period. Initial evaluation findings by the UK Department of Health suggest this model can support hospital services in a number of ways including: better patient care (e.g. reduced mortality and length of stay, reduced external patient transfers), improved collaborative working environment, improved service delivery (e.g. bed availability, increased no. completed consultant cases; time to see patients), efficacy and productivity (UK Skills for Health, 2008; Beckett *et al.*, 2009). However, it is important to note that Hospital at Night is not without its limitations and in particular some evaluations highlight the challenges in adapting to the H@N model such as staff enthusiasm for the model (Gooding, 2004) and establishing the role of the H@N coordinator (Clark *et al.,* 2012)

The Critical Care Outreach Services (CCOS) is a another system introduced in hospitals due to the shortage of critical care beds and to facilitate the provision of critical care services outside the ICU (Intensive Care Unit) within the medical and surgical wards. Different terms have been used to describe this outreach services and these include 'Critical Care Liaison Nurse' or 'Critical Care Outreach Nurse'. A survey of CCOS in England identified that the majority of the services were involved in treating ill patients identified using the Early Warning Scoring (EWS) system, follow up of critical care patients post ICU discharge and educating and supporting ward staff on the care of critically ill adults (McDonnell *et al.*, 2007). International evidence has highlighted the role of the CCOS and ICULN in improving the confidence and skills of the ward nurses caring for high dependency patients on the wards (Endacott *et al.*, 2009) and in providing advice and support to NCHDs (Chellel *et al.*, 2006). The Faculty of Intensive Care Medicine (2015) recommends that all acute hospitals in the UK should provide a 24/7 CCOS. In line with this recommendation Tallaght hospital currently employ a Critical Care Outreach nurse as part of an Emergency Response Team (ERT). However, to date this CCOS role is only in place during day time working hours and not during out-of-hours period.

Summary

Tallaght Hospital is currently reviewing models of care in other hospitals, such as the UK Hospital at Night model (Gozzard, 2004), or an expansion of the Critical Care Outreach Service to support staff and patients effectively. However, in order to determine if there is a need for changes to the delivery of out-of-hours care in Tallaght Hospital, and possibly Ireland, it is necessary to establish a baseline understanding of how the hospital works out-of-hours (i.e. 5 p.m. to 9 a.m. and weekends). The purpose of this report is to review clinical decision-making supports in Tallaght Hospital during the out-of-hours service period.

Methodology

Aims and Objectives

Aim:

To evaluate the organisational supports for clinical decision-making out-of-hours (OOH) in the medical and surgical care settings within Tallaght Hospital.

Objectives:

1. To develop a baseline understanding of call arrangements, hospital activity and supports for clinical decision-making out-of-hours
2. To gain insight into the organisation and workflow arrangements between nursing and medical staff out-of-hours
3. To evaluate and clarify care delivery and skill mix arrangements as a baseline to potential work redesign
4. To gain understanding into how nurse and doctors communicate and make clinical decisions out-of-hours
5. To gain understanding of facilitators and challenges and barriers to effective workflow and clinical decision-making out-of-hours

Design and sample

An exploratory mixed methods design was used to evaluate out-of-hours supports for clinical decision-making within Tallaght Hospital. Figure 1 illustrates the broad range of data sources and

data collection strategies necessary to address the research objectives and capture the structure, process and outcomes elements in this study.

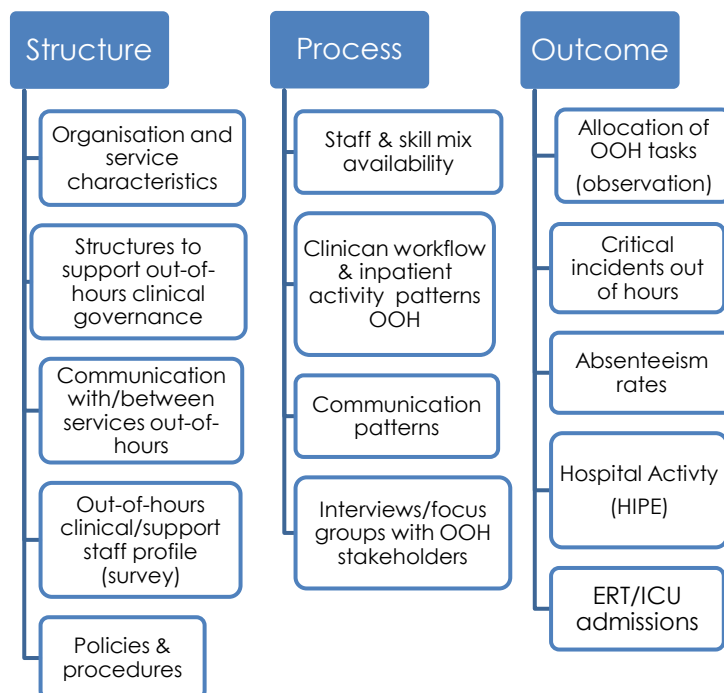| Structure	Process	Outcome
Organisation and service characteristics	Staff & skill mix availability	Allocation of OOH tasks (observation)
Structures to support out-of-hours clinical governance	Clinican workflow & inpatient activity patterns OOH	Critical incidents out of hours
Communication with/between services out-of-hours	Communication patterns	Absenteeism rates
Out-of-hours clinical/support staff profile (survey)	Interviews/focus groups with OOH stakeholders	Hospital Activty (HIPE)
Policies & procedures		ERT/ICU admissions

Figure 1   *Structure Process & Outcome criteria*

The study comprised of three main sources of data: (1) Semi-structured interviews and focus groups with various stakeholders involved in out-of-hours service delivery and management as well as nursing staff and intern doctors; (2) Observational analysis of the workflow & communication systems, patterns and volumes that influence out-of-hours care. This comprised a self-report audit of task activities completed by intern doctors during the out-of-hours period during a sample two week period; a log of ward-based nurse requests to doctors during the same out-of-hours service period and; observations of the hospital multi-disciplinary weekend clinical handover and; (3) A survey of the current out-of-hours services, patient profiles and activity as well as staff capacity in Tallaght Hospital was completed alongside an analysis of existing hospital databases (Hospital In-Patient Enquiry (HIPE), Bed Census, Emergency Response Team (ERT) calls, Critical Incidents and staffing) and relevant hospital polices and reports. Two observational wards were selected to provide an indicator of activity. The two wards included: (1) a 30-bed surgical ward, specialising primarily urological with 18 beds assigned to this service and; (2) a 31-bed medical ward specialising in Respiratory Medicine, Neurology and Gastroenterology but without any predetermined assignment. Ethical approval was granted by the Trinity School of Nursing and Midwifery Ethics Committee.

Findings

Patient profile and activity
Data from a number of Tallaght Hospital database sources were examined for the three-month period 01st September-30th November 2015 to gain insight into patient activity. All patients discharged from either of the two observation wards (one medical and one surgical) during the stated observation period were included in the analysis.

- Over the three-month observation period 454 patients were discharged from the surgical unit and 146 patients from the medical unit. The mean age of patients discharged from the surgical ward was 55 years (SD=17.8) compared with 60 years (SD=19.2) for patients discharged from the medical ward.
- Accounting for outliers, the mean hospital length of stay was 5.7 days on the surgical ward (SD=6.5) and 17.5 days (SD=11.3) on the medical unit. More than half of patients discharged from the surgical ward had a length of stay of less than 5 days (58%, 308/527) compared with a little over a fifth of patients discharged from the medical unit (22%, 38/176).

Medical work design

- Arrangements for on-call cover varies between services. A number of medical consultants within the hospital are required to provide an on-call cover (known as "take") for general medicine on a rotational basis, outside of their own specialities. Post-take ward rounds are conducted between Monday on Friday and patients are allocated to the appropriated consultant teams after this round. This system contributes to a significant volume of workload for NCHDs.
- During the three-month observation period, a total of 46 consultants were assigned as the discharging consultant to 454 patients on the surgical unit. Of these, 20 were primarily medical consultants and 31 were surgical consultants. A total of 28 discharging consultants were assigned to patients on the medical unit, of which only three were primarily surgical consultants. As noted by interviewees, this high distribution of consultants in turn leads to a high number of daily ward rounds which places additional burden on nursing staff who aim to maintain a presence on these rounds.
- A weekend medical team handover takes place each Friday to highlight to the on-call Medical Registrar patients that may need review over the weekend. Observational analysis of these meetings (n=4) identified that these meetings were informal (i.e. not chaired or with an agenda); conversations occurred in parallel, interruptions occurred regularly (i.e. pagers, mobile phones, personnel flow) and information transfer type varied. The incoming registrar collected paper records at the end of each meeting. The surgical on-call teams communicate 'post-call' primarily via an electronic 'surgical sign-out' system.

Nature and pattern of Intern work activities out-of-hours

- Observational analysis of the nature and pattern of intern work out-of-hours revealed that peak request activity was recorded between 2000hrs and 2200hrs, which coincides with the immediate period following day to night nursing handover. On weekends the largest portion of recorded activity (40.4%) occurred during the five-hour period from 11.00hrs to 16.00hrs.
- Medical Interns on-call attended calls on all twenty clinical areas, including traditionally surgical units. In contrast surgical interns only attended surgical wards in general, but more frequently.
- Prescribing medication (27%) was recorded as the most common reason for request, followed by clinical review (not due to an increased Early Warning Score) (21%), taking bloods (16%) and inserting cannulas (13%). However, taking bloods became the second most common request at weekends.

Nurse staff availability and ratios

- Data revealed that the number of registered nursing posts on both of the observed wards was below the assigned number. Surgical ward had an assigned WTE of 20 staff nurses but 17.9

FTE at time of audit. Turnover rate over last year has been 15% (3 staff). The medical ward had 21 WTE staff assigned but a shortfall of 3 WTEs existed due to vacancies and long term sick leave. This ward has had a 33% (7 staff) turnover rate over the previous 12 months.

- The majority of staff, 88% over both wards (n=32), had more than five years professional experience, while 27% had less than five years' experience (n=10).
- On the surgical Ward three staff members (16.75 % WTE) have undertaken the HSE Learning Programme in Intravenous Cannulation and Phlebotomy and are maintaining competence by regular practice. On the sample medical ward nine staff (42%) have undertaken the HSE Learning Programme on IV Cannulation and Phlebotomy, but may not regularly practice, as participants reported that it was custom and practice to request doctors to perform this task.

Participant feedback on out-of-hours working

- The sheer volume of contacts and distance involved in the role of intern creates a challenging work environment. According to the interns, this balancing act of workload is very easily tipped over the edge by unexpected events. Many note that the capacity to respond is in fact often complicated by the latent effect of the build-up of work that arisen as results of call arrangements and left over routine work.
- Surgical registrars on-call from home have established systematic routines rounding on all patients each weekend morning. The required presence of an intern on these rounds means one intern is absent from ward duties until lunch time at weekends and this can impact on workflow in other areas of the hospital. It is clear that this has further knock-on effects for the efficiency of work by nurses at a ward level.
- The traditional bleep system and its centrality to communication out-of-hours emerged as significant issues of concern for almost all participants. Interns clearly struggle with excessive volume of bleeps at certain peak periods and the lack of information recorded by this system is a cause of concern and frustration for both nurses and interns in terms of missed bleeps.
- Doctors report irritation with the absence or limited availability of nurses when they come to the wards. On the other hand, nurses are frustrated with delay or incomplete communication of actions to progress the patient journey with the result that things are delayed and are often only picked up on out-of-hours.
- Overall, interns feel supported by registrars in clinical decision-making out-of-hours and the readiness to provide support is reflected in the willingness of more senior staff to be contacted. Similarly, nurses do appear to be able to freely intervene to escalate contact if the clinical need demands particularly those who are more experienced.
- While there are issues of increasing acuity and bed shortages, many of the frustrations out of hours related to availability of equipment, access to diagnostics, computerised records systems and limited or reduced provision for supports where needed. Duplication in admission paperwork and access to working ECG machines, phlebotomy services and blood gases within a reasonable distance were a particular concern expressed by interns. Similarly, frustrations highlighted by nursing included access to pumps, delays in transport, delays in prescribing and diagnostic referrals and short supplies of pharmacy stock particularly on the weekend.
- From the interns' perspective it is clear that, during out-of-hours service period, the work activity of the intern is demand driven and task orientated for the most part and education/training needs are to some extent secondary unless essential to task. Interns in particular expend considerable time on tasks such as cannulation, venepuncture (peripheral &

via PICC), and ECGs. Many participants in the focus groups note that intern workload and indeed nursing activity is also considerably impacted by the volume of 'left over work' due to insufficiencies in the workflow in normal medical hours. Tasks highlighted include Warfarin/INR, re-charting of Kardexes, elective admissions, night sedation review, fluid replacement, routine charting of drugs on transfer from ICU/ED, post-operative pain control, post-op antibiotics, pre-op insulin regimes and discharges are regularly allowed to roll into the out-of-hours period.

- A number of nurses indicated that relatively low levels of nursing staff have completed the necessary training to undertake phlebotomy and cannulation. Restrictions around staff release and access to the necessary supervised practice were reported as contributing to the delays in building capacity around this issue.
- Interns also report concern around the quality and potential delay of discharge letters as they are often on catch up. Inconsistency between policies such as early discharge by 11 a.m. and real-life appeared to be poorly understood and discharge is perhaps understandably low on the priority list of interns as they struggled to respond the stresses of the workload.
- There was consensus across all grades of clinical staff around the positive benefits of the Emergency Response Team/Early Warning Score (ERT/EWS) systems.
- Overall, the experiences of interviewees suggest that historic work practices, employment policies and imposition of the Monday to Friday and 9-5 working day influences the working conditions of those working in the hospital out-of-hours.

Findings summary and conclusions

Overall, these findings provide an overview of the typical patient activity patterns within the medical/surgical wards and highlights the potential impact of changing hospital environment on out-of-hours clinical workflow. The analysis of trends in bed census numbers provides insight into the range of specialities and personnel engaging in the medical surgical areas and gives some insight into potential flashpoints that may arise. The call arrangements and relationship to patient activity does illustrate potential differences in workflow between medical and surgical teams during the out-of-hours. The call task activities of NCHDs indicate recurring patterns in relation the nature of routine activity and prescribing patterns out-of-hours. Findings from inductive analysis of qualitative interviews identify the nuances of the experience of working out-of-hours for staff and the barriers to workflow, the centrality of communication to effective performance, and the latent effects of call arrangements and work design.

The task of delivering health care effectively and safely out-of-hours should be considered against a backdrop of a changed health care environment with increased survival rates, greater levels of chronic illness and considerable innovation in technology, diagnostics and medical interventions. Out-of-hours workflow is considerably dependent on the requirements of the services, the availability and skill set of staff, support services and the underlying interaction and communication around these. This study has identified areas of service delivery out-of-hours that are working well such as the EWS system but has also revealed areas that might benefit from improvement for example communication strategies, medical workflow design, logistical access to equipment, services and clinical support at bedside.

Recommendations

- Evaluate the impact of call arrangements out-of-hours and determine implications for individual, service workload and advance work re-design where needed.

- Continually re-evaluate impact of strategies to increased compliance with EWTD on workflow, condition of employment and work demands for all staff.
- Develop clinical support nursing roles to enable clinical leadership and support in the out of hour's period
- Following implementation of new proposed clinical support roles evaluate the impact on workflow, task allocation and staff/patient experience out-of-hours.
- Plan for upgrade to current bleep and white board to use an alternative electronic system that will be enable safe transmission of information, appropriate prioritisation and feedback in addition to enabling effective audit of task activity out-of-hours
- Conduct regular audits of non-urgent tasks that are emerging during out of call periods.
- Evaluate rates of absence, staff competency, turnover and skill mix at local ward level to enable effective human resource planning thereby minimising latent risks to patient safety out-of-hours.
- Develop and implement data collection systems to track skill mix and training needs of all nursing staff within wards on a continual basis. Data to include details of primary registration, education and professional development undertaken so that appropriate planning for recruitment and staff training can be undertaken
- Develop a professional development plan for hospital to advance the necessary upskilling of nursing staff to enable task transfer as agreed in Haddington Road
- Re-evaluate orientation of interns and new medical staff to the Hospital to include clinical handover guidelines and discharge policy
- In conjunction with Trinity College Dublin, review the undergraduate nursing curriculum to include education on clinical skills, with direct supervision and mentoring, to meet specific competency-based outcomes during the internship period; for example, IV cannulation, phlebotomy and nurse facilitated discharge
- Re-evaluate ward multidisciplinary communication at ward level to create a more responsive *ward round* process within the hospital to enable effective exchange of information and planning/implementation of routine medical work during non-call hours. Strategies may include portable laptops, portable work stations and ward round checklists
- Conduct regular audits of clinical handover between medical staff and ward rounds
- Conduct larger studies in partnership with other hospitals that employ innovative solutions to out-of-hours support to contribute to the wider body of knowledge nationally and internationally

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LIST OF KEY TERMS AND ABBREVIATIONS

Bleep System	An electronic communication system used to contact staff throughout the 24-hour period
CCU	Coronary Care Unit. The CCU is a unit within the hospital that specialises in the care of patients with cardiac conditions that require continuous monitoring and treatment
CDM	Clinical Decision-making. *"A contextual, continuous, and evolving process, where data are gathered, interpreted, and evaluated in order to select an evidence-based choice of action."* (Tiffen *et al.,* 2014)
Clinical Handover	Clinical handover (sometimes called clinical handoff) refers to the transfer of professional responsibility and accountability of care for a patient/ group of patients, to another person or professional group. Clinical responsibility can only be transferred when responsibility is accepted by the designated individual clinician or clinical team as outlined in the policy of the healthcare organisation and this transfer process needs to be formally recorded. The clinician/s accepting responsibility for patients conducts their own clinical assessment as required and as appropriate to their roles and responsibilities (National Clinical Effectiveness Committee, 2014)
Consultant Take	A number of medical and surgical consultants are required to provide general medical and surgical on-call cover out-of-hours. Patients that are admitted during this time are done so under the care of these consultants, who take turns in being on-call. Following a "post-take" ward round patients are then referred to their previous admitting clinician (if they have been an in-patient in the previous 12 months, or a consult is sent to the most appropriate team for a review, and if that team decides to take over the care then they are transferred to that team. The "take" part is taking responsibility for their care during the out-of-hours period until they are reviewed at the ward round This on-call cover is known as "take". This means that this consultant and a registrar from their team are responsible for the care of medically admitted patients (both admitted through the emergency department and those on wards) during the out-of-hours period. Usually this consultant is on-call from home, and attends the hospital when (or if) needed. During the week, when normal working hours resume, a "post-take ward round" is conducted. This means that the team on-call overnight will visit the newly admitted patients on each ward to decide on their plan of care. All patients who have been admitted under the care of another consultant within the previous calendar year are "handed back" to the care of that consultant after the post take ward round. For "new" patients, who have not had a previous admission, a consult request is sent to the appropriate team, depending on reason for admission. On weekends this "post-take ward round" is conducted on the Monday morning.
Critical Care Outreach Service	Critical Care Outreach Service (CCOS) is a nurse-led service that extends standard services by supporting ward nurses and doctors who are caring for

	acutely ill in-patients. CCOS nurses are all highly experienced, senior critical care trained nurses who have also undergone advanced training.
DoH	Department of Health
ED	Emergency Department
ERS	Emergency Response System: Emergency Response Systems detect early signs of patient deterioration enabling medical assistance to be provided more efficiently and appropriately. In Tallaght Hospital, the ERS is comprised of three components: •National Early Warning Score •ISBAR Communication Tool •Emergency Response Team (Ennis & Barnes, 2014)
ERT	Emergency Response Team. Multi-disciplinary team that responds to ERS calls. This team consists of a Medical Registrar, Anaesthetist, ICU Nurse.
EWTD	European Working Time Directive. As quoted on the Irish government website the provisions of the European Time Working Directive (EWTD, 2003/88/EC) in respect of doctors in training (NCHDs) were transposed into Irish law by the way of Statutory Instrument in July 2004 (S.I. No. 494 of 2004). The Directive encompasses a number of measures to protect workers welfare and safety. These include: • A maximum 48 hour working week, averaged over a reference period, • Breaks – a 20-minute break for every 4 hours and 30 minutes worked or a 30-minute break for every 6 hours worked, • Rest – 11 hours daily rest or equivalent compensatory rest and 35 hours consecutive rest every 7 days or two periods of 35 hours or one period of 59 hours of consecutive rest every 14 days. *Extracted from:* http://health.gov.ie/future-health/tackling-the-capacity-deficit/european-working-time-directive/
EWS	Early Warning Score. A guide used to determine the degree of clinical acuity of a patient and involves a scoring system allocated on pre-determined clinical parameters (extracted from HSE, 2014)
H@N	Hospital at Night. Hospital at Night is model developed in the UK that incorporates a multi-disciplinary approach to delivering care out-of-hours**.** H@N aims to reduce the burden of work on out-of-hours staff and increase the efficiency and quality of patient care through improved workflow and distribution process. According to the NHS Patient Safety website *"The Hospital at Night concept proposes that the way to achieve safe clinical care is to have one or more multi-professional teams who have the full range of skills and competences to meet the immediate needs of patients. Hospital at Night aims to redefine how medical cover is provided in hospitals during the out-of-hours period. The approach provides the best possible care for patients given the changes in permitted working hours for doctors in training"* Extracted from:

	http://www.nrls.npsa.nhs.uk/resources/?EntryId45=59820
HIPE	Hospital In-Patient Enquiry. The Hospital In-Patient Enquiry Scheme (HIPE) is a system that collects information on hospital day cases and in-patients in Ireland. This data is stored on the HIPE database
HR	Human Resources
HSE	Health Service Executive
ICU	Intensive Care Unit
Integrated Discharge Planning	As set out by the HSE (2009) *"Integrated Discharge Planning is a process that encompasses the key elements of discharge: written discharge information, provision of a discharge plan and an estimated length of stay (ELOS). Integrated discharge planning includes the patient and as appropriate, the family/carer in the development and implementation of the patient's discharge plan and ensures that steps are taken to address necessary linkages with other healthcare providers in order to achieve a seamless transition from one stage of care to the next, in accordance with patient need".* (HSE, 2009; p7).
Intern Doctor	A trainee doctor in the first year of postgraduate medical training
ISBAR	Communication tool recommended for use by the National Clinical Effectiveness Committee for handovers and for communicating about patients: Identify, Situation, Background, Assessment and Recommendation
NCHD	Non-Consultant Hospital Doctor
NVIVO	Project sharing software for qualitative data analysis developed by Qualitative Solutions & Research Pty Ltd
OOH	Out-of-hours. Service period between 5p.m.-9a.m. Monday to Thurs and from 5p.m.-9a.m. Friday-Monday
SHO	Senior House Officer. A non-consultant hospital doctor who has completed their intern year and are supervised in their work by consultants and registrars.
SPSS	IBM Statistical Package for the Social Sciences. SPSS is a computer program used for survey authoring and deployment (IBM SPSS Data Collection), data mining (IBM SPSS Modeler), text analytics, statistical analysis, and collaboration & deployment (batch & automated scoring services)
Ward Rounds	A clinical process where hospital in-patients are reviewed by a member of a medical team in consultation a member of the ward nursing staff. As defined by the UK Royal College of Nursing website: *The medical ward round can be described as a complex clinical process during which the clinical care of hospital inpatients is reviewed. This process includes:* *1 establishing, refining or changing the clinical diagnoses* *2 reviewing the patient's progress against the anticipated trajectory on the basis of history, examination, NEWS (national early warning score) and other observations, and results of investigations* *3 making decisions about future investigations and options for treatment, including DNAR (do not attempt resuscitation) and any ceilings of care* *4 formulating arrangements for discharge*

	5 communicating all of the above with the multidisciplinary team, patient, relatives and carers https://www2.rcn.org.uk/__data/assets/pdf_file/0007/479329/004342.pdf
Workflow	The series of activities undertaken to complete a task/set of tasks

1   INTRODUCTION

1.1   Background

Tallaght Hospital (previously the Adelaide and Meath incorporating the National Children's Hospital – AMNCH) is a public voluntary acute teaching hospital located in Tallaght, South West Dublin. The hospital opened in 1998 following the transfer of services from the Adelaide and Meath Hospitals in the centre of Dublin. This hospital provides child, adult, psychiatric and age-related healthcare, and is a provider of local, regional and national specialities. It is also a national urology centre, regional dialysis centre and a regional orthopaedic trauma centre. There are approximately 625 in-patient beds, with 25 in-patient off site beds in St Luke's Hospital. The Hospital employed 2,362 WTE (Whole Time Equivalent) staff as of October 2015. This comprised 323 medical, 832 nursing, 377 health and social care professionals, 425 management, 228 general support and 178 patient and client care staff (HSE 2016).   The hospital is planning on expanding its haemodialysis and ICU services and oncology/haematology day unit in 2016. The following table presents a summary of the hospital activity for adult patients in 2014.

Adult Services only	2013	2014	Difference	% Difference
Emergency Department Attendances	43,576	44,640	1,064	2.4%
Inpatient Emergency	15,971	15,496	-475	-3%
Inpatient Elective	2,832	2,758	-74	-2.6%
Day case	43,882	44,051	169	0.4%
Outpatient	231,579	230,303	-1,376	-0.6%

Table 1   *Summary of Tallaght Hospital activity in 2013 and 2014 (Source Tallaght Hospital Annual Report 2014)*

Tallaght Hospital is a member of the Dublin Midlands Hospital Group, which includes St. James's Hospital; Midlands Regional Hospital, Tullamore; Naas General Hospital; Midlands Regional Hospital Portlaoise; the Coombe Women and Infants University Hospital. Trinity College Dublin is the Academic Partner for the group, and students from many disciplines across the University study and work at the hospital during their education and training.

As part of continued efforts to improve patient care and hospital management, Tallaght Hospital is currently examining new approaches to work design. The out-of-hours service period is associated with less favourable patient outcomes as well as unpredictable workloads and reduced support

structures for clinical activity. Admission to hospital at the weekend has been found to be associated with evidence of increased mortality with a significantly increased risk of dying within 30 days of admission compared to being admitted on a weekday (Freemantle *et al.*, 2015).

As in every hospital setting, the quality of clinical decision-making impacts on the standard of patient care within Tallaght Hospital. Clinical decision-making is a complex process that cannot be separated from the context in which it occurs. Challenging working environments, during the out-of-hours service period in particular, impact on the quality of clinical decision-making. An Out-of-Hours Steering Committee was set up in 2015 to assess the viability of introducing one particular approach, *Hospital at Night*. Hospital at Night aims to improve support structures and minimise workload at night for both nursing and medical staff through (1) the active management of work 'leftover' from day time; (2) the introduction of an out-of-hours nurse-led multi-disciplinary team, (3) up-skilling of nursing staff and (4) the establishment of a more efficient bleep system. This model has been widely implemented in acute hospitals throughout the UK, and evaluations have indicated that it may improve patient safety, enhance collaboration and co-ordination of care between teams and improve the working environment for staff. However, there are differences in the structure of the health systems between Ireland and the UK, and the applicability of the programme in Ireland is as yet unknown and it is unclear if the needs are the same.

In order to determine if there is a need for change to the delivery of out-of-hours care in Tallaght Hospital, and possibly Ireland, it was necessary to establish a baseline understanding of how the hospital works out-of-hours (i.e. 5 p.m. to 9 a.m. and weekends). The purpose of this report is to review clinical decision-making supports in Tallaght Hospital during the out-of-hours service period. Chapter two presents an overview of the literature on out-of-hours services and support. The methodology of this mixed methods study is presented in chapter three. The qualitative and quantitative findings are presented in chapter four and will profile the hospital activity and describe the main challenges faced by staff during the out-of-hours service period. Chapter five presents the discussion and recommendations for further research, education and practice.

1.2 Aims and Objectives

Aim:

To evaluate the organisational supports for clinical decision-making out-of-hours (OOH) in the medical and surgical care settings within Tallaght Hospital

Objectives:

- To develop a baseline understanding of call arrangements, hospital activity and supports for clinical decision-making out-of-hours.
- To gain insight into the organisation and workflow arrangements between nursing and medical staff out-of-hours.
- To evaluate and clarify care delivery and skill mix arrangements as a baseline to potential work redesign
- To gain understanding into how nurse and doctors communicate and make clinical decisions out-of-hours.
- To gain understanding of facilitators and challenges and barriers to effective workflow and clinical decision-making out-of-hours.

2   Literature Review

2.1 Introduction

This literature review presents a brief overview of the supports available during out-of-hours to assist clinicians with decision-making. Clinical decision-making is defined as *"a contextual, continuous, and evolving process, where data are gathered, interpreted, and evaluated in order to select an evidence-based choice of action."* (Tiffen *et al.*, 2014). Clinical decision-making is a complex process that cannot be separated from the context in which it occurs. Many factors such as social, professional, organisational, physical and environmental become relevant to particular decisions. At a systems level, organisational factors considered to influence decision-making include workload (the time available to make decisions and provide intervention), resources (availability of equipment, IT), interruptions (telephone calls, colleagues etc.) as well as internal and external policies and procedures. These factors may contribute to or minimise errors or mistakes, thereby influencing both the quality of health care delivered as well as outcomes for patients (Smith *et al.*, 2008; Weigl *et al.*, 2011). Not surprisingly perhaps, Croskerry and Nimmo (2011) point out that quality clinical decision-making is more likely in supportive organisational cultures that are well-designed with minimal interruptions or distractions. Indeed, Shirey *et al.* (2013) note that organisations considered as supportive reduce fear-driven decision-making by clinical managers and promote more effective workload management. Similarly, in an Irish context, the Taskforce on Staffing and Skill Mix for Nursing (Department of Health, 2016) found that the wider organisational and ward culture were considered central to both the retention of quality staff and the delivery of patient care.

2.2 Patient outcomes out-of-hours

The out-of-hours service period is associated with poorer care and health outcomes for patients. For example, Seward and colleagues (2003) found that 'shortfalls of care' (such as delay in doctor review as well as time to investigations and treatment) were likely to have contributed to nearly 13% of deaths-most of which occurred during out-of-hours. Similarly, in a recent review of all National Health Service (NHS) hospital admissions and related mortality in England between 2013-2014, Freemantle and colleagues (2015) found that patients admitted during this period were more likely to fall within the highest category of risk of death and were also more likely to die taking in to account illness severity - a finding corroborated by previous studies (Aujesky *et al.,* 2009; Freemantle *et al.,* 2012; Peberdy *et al.,*2008; Silbergleit *et al.,* 2006). Other adverse events during this service period, such as

the increased likelihood of critical incidents including medication errors, have also been observed (Miller *et al.,* 2010).

It is clear that during this period additional considerations in terms of organisational-level clinical decision-making support (i.e. appropriate skill mix, staff numbers, resources, communication structures and service availability) are required (Mahon *et al.,* 2005; McQuillan, *et al.,* 2013). For example, as noted by the Department of Health (2016), associations between safe nurse staffing levels and positive patient experience have been observed in a number of recent studies (e.g. Aiken, *et al.,* 2002; Ball & Catton 2011; Cavendish, 2013; Francis 2013; Keogh 2013;). Not surprisingly perhaps high quality skill mix as well as appropriate staffing levels are both associated with lower rates of medical errors and improved patient safety and care (Aiken *et al.*, 2002, Blegen, Vaughn & Goode, 2001; Francis Report, 2013). This Taskforce report on Staffing and Skill mix for Nursing (DoH, 2016) further notes that the quality of nurse education levels was also a predictor for patient mortality. In addition to appropriate ward level skill mix, the importance of a senior nurse manager role to support, supervise and lead staff was considered essential to the management of patient care and safety as well as to staff retention (DoH, 2016). The out-of-hours period has also been associated with other patient care related issues such as access to diagnostic, allied health and support services (i.e. laboratory, radiology services, and phlebotomy). Reduced access to these specialised services as well as related delays in investigations, diagnosis and/or treatment during the out-of-hours period is a key patient management and safety issue (Shulkin, 2009; UK Regulation and Quality Improvement Authority, 2013).

2.3 Organisation and workflow out-of-hours

As noted above, in many hospitals diagnostic, allied health and support services are not either available or provide a restricted service during out-of-hours service times. For example, with regard to diagnostics specifically, an Irish Health Service Executive Emergency Department Task Force report (HSE, 2015) observed that the national protocol sets out a seven day 12 hour working day for laboratory and radiology services in acute hospital settings. However, in practice, resource and recruitment limitations have impeded implementation (HSE, 2015). These challenges have a knock-on impact for the workload and efficiency of other clinical staff, who require such services to advance patient care.

Indeed, in addition to access to speciality services, access to senior medical clinical decision-makers for clinical staff is fundamental in the effective and efficient management of patient care. However, the HSE Emergency Department Task Force (HSE, 2015) note that the ratio of practising doctors to population in Ireland is lower than the EU average. Lower ratios are likely to impact on staff clinical decision-making support at all levels. For example, many hospitals are obliged to instead rely on agency consultant and NCHD staff. However, transient staff may not be as knowledgeable about the local working environment as well as policies of care. Importantly, filling posts in this way creates a barrier to the development of collegial and cross-discipline professional relationships-essential in the development of effective communication and workflow pathways (Lynch *et al.*, 2015). A review by the Irish Department of Health, concerning medical training and career structures for doctors, acknowledges the challenge of recruiting and retaining doctors in the Irish Healthcare system and concedes more needs to be done to support this profession (Department of Health, 2014). However, the Irish Medical Organisation, whilst agreeing with the findings of this review, criticises the lack of action by key stakeholders in addressing these issues (Irish Medical Organisation, 2013). In addition to the recruitment and retention of medical positions in hospitals, this report advises on utilising effectively the clinical decision-making capacity of other senior clinical decision makers such as Registered Advanced Nurse Practitioners and delegating appropriate tasks such as patient discharge to other clinical staff such as senior nurses to advance integrated multi-disciplinary working.

Indeed, an audit of out-of-hours medical work load and distribution in UK hospitals by Gozzard (2004), established that many tasks performed by junior doctors could have been completed by day staff (e.g. routine surgery), whilst other tasks were unnecessary duplication (e.g. multiple clerking). Standardising admission clerking protocols as well as adaptations in administrative and IT posts along with clear communication pathways may reduce such unnecessary work during the OOH period (Gozzard, 2004). Moreover, out-of-hours tasks completed by doctors such as cannulation, administering drugs, taking blood, ordering tests, chasing notes and results could also have been undertaken by other staff and do not provide valuable training opportunities. Indeed, reports on out-of-hours working models in the UK indicate that these tasks are increasingly completed by Nurse Practitioners (Hensman *et al.*, 2015). Furthermore, an audit of medical activity between 2230hrs and 0800hrs identified that some on-call staff had excessive workloads while others were inactive during this period (Morton *et al.*, 2006).

Recently, the Irish Department of Health approved the implementation of a similar transfer of tasks from non-consultant hospital doctors to nurses/midwives (Department of Health, 2016b). The purpose of this transfer of tasks from doctors is to further improve workload patterns, distribution and efficiency and is in line with the Haddington road agreement[2] (DoH, 2016b). This policy will come into force from August 2016 and includes peripheral cannulation, phlebotomy currently carried out by NCHDs; intravenous drug administration-first dose; and nurse-led discharge. Evidence for these changes is only emerging however some disease specific studies indicate that in terms of patient outcomes, comparisons between nurses and doctors yield similar results (Martínez-González *et al.*, 2015). The benefits of these changes to patients are likely to include fewer delays in receiving care and treatment. At an organisational level, such changes would create up-skilling and remuneration opportunities for nursing staff whilst creating more flexibility for organisations to reduce doctors' working hours and in some instances reduce costs (Department of Health, 2016b).

2.4 Communication out-of-hours

Indeed effective and consistent communication practices both within and between clinical professions are essential to minimise risk in hospital settings (Shulkin, 2009). Particular times during the day, such as shift changeover, have been found to be particularly vulnerable to weak communication pathways (Francis, 2013). These vulnerabilities are especially compounded in the evening handover period. For example, baseline studies of OOH workload patterns in acute public hospital settings have established that activity remains highest from 1700hrs to midnight and then reduces as the night goes on (Gozzard, 2004). As out-of-hours staff commence at 1700hrs this creates a challenge in managing workload whilst maintaining high quality communication pathways with other staff during this peak out-of-hours period (Gozzard, 2004). Indeed, the handover period between staff is a critical juncture for the effective transfer of patient information. Morton and colleagues (2006) identified that there was a lack of formal clinical handover between doctors on the afternoon shifts and night shifts. Clinical handovers are more effective if multidisciplinary in nature, collaborative, standardised and flexible (Francis, 2013; National Clinical Effectiveness Committee, 2015). Conversely, as noted in a report by the Irish Department of Health (2016), ineffective handovers can lead to incomplete information being passed on to incoming staff. This in turn can

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[2] Haddington Road Agreement (2013) is a terms of employment agreement between Irish public service management and unions

lead to reduced quality of treatment, wasted time and resources as well as reduced confidence by both patients and staff (National Clinical Effectiveness Committee, 2015). In Ireland, national guidelines for clinical handover have been recently produced by the Department of Health. Developed from a systematic review of the evidence of best practice, the stated aim of these guidelines is *"to optimise the process of clinical handover and improve patient safety by describing the elements that are essential for timely, accurate, complete, unambiguous and focused clinical handover in acute and children's hospital services"* (National Clinical Effectiveness Committee, 2015, p10). In Tallaght Hospital, an updated clinical handover policy document for new staff, as a result of changes to doctor work patterns, was also introduced to improve the clarity and effectiveness of patient information exchange at each shift changeover (Tallaght Admitted Patient Handover Policy Medical Directorate, 2014, p3). This policy sets out that a handover should (a) occur at any time that responsibility for patient care changes; (b) is chaired by the most senior clinician available and (3) is free from distractions (Tallaght Hospital Admitted Patient Handover Policy Medical Directorate, 2014-see Appendix 1). A number of tools have also been developed to standardise care during these times of increased risk (Shulkin, 2009). Established communication tools such as the ISBAR tool[3] have also been incorporated into hospital protocol cross-nationally with the aim of supporting staff in clinical decision-making. However, whilst these tools are useful, they are of limited practical value if broader system issues that negatively impact on out-of-hours work patterns and volume are not addressed.

Equipment and communication resources available to staff are a key factor in effective communication pathways. In particular, during the out-of-hours period, bleep (pager) systems are still central to communication between ward staff and on-call doctors. However, these systems have many limitations. In particular, the limited capacity of bleeps to record and trace calls is a key safety concern and creates auditing difficulties. Indeed, a review by the UK National Patient Safety Agency (2007) found that more than 1000 safety incidents in a one year period involved pagers. Unanswered bleeps can be overwritten when new requests come in, delays in returning bleep calls can lead to difficulties in identifying who was contacting the doctor and there is no method of identifying and prioritising urgent calls. Not surprisingly perhaps, an examination of doctor workflow interruptions by Weigl and colleagues (2011) highlighted that telephone calls and bleeps were the most common

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[3] ISBAR (Identify, Situation, Background, Assessment and Recommendation).

cause of work interruption. As outlined earlier in the chapter, the broad range of doctor responsibilities feeds into the frequency of interruptions on busy shifts, most particularly out-of-hours where less medical staff limit the possibility of distributing workload. Importantly, a number of studies have found that these type of frequent interruptions also impede on the quality of clinical decision-making, increase risk of error and thus reduce quality of care for patients (Jett *et al.*, 2003; Wiegmann *et al.*, 2007; Hakimzada *et al.*, 2008;). This is particularly relevant to staff during the out-of-hours period where much communication is bleep based. As discussed earlier in this chapter, these types of frequent interruptions put out-of-hours staff at increased risk of stress as well as reduced quality of clinical decision-making.

2.5 Impact of day-shift workflow on out-of-hours

Work practices and policies relating to standard service periods (i.e. 9 a.m.-5 p.m. Monday-Friday) also impact on workload volume and pattern for clinical staff during out-of-hours. In particular, hospital practices such as discharge processes, ward rounds, as well as the system of consultant intakes are all interlinked with on-call work patterns.

2.5.1 Ward rounds

Ward rounds during day time service, like the clinical handover, are a valuable opportunity for cross-discipline clinical staff to communicate and address the needs and concerns of patients and thus improve patient care and maintain patient safety. Improvements to care planning in this way can reduce unexpected (yet routine) work tasks during out-of-hours (e.g. re-charting routine prescriptions). Frequent ward rounds are associated with shorter lengths of stay for patients (Hakim & Bakheit, 1998). Furthermore, the introduction of twice-daily consultant ward rounds dramatically decreased the length of stay in two medical wards in a UK hospital (Ahmad *et al.*, 2011). However, despite this, two large-scale UK reports (The UK Royal College of Physicians and the Royal College of Nursing, 2012) and the Francis Report (Francis, 2013) note a decline in the quality of ward round practice in recent years. More specifically, both reports found inconsistencies in how round wards are completed and particular concerns were raised about the frequent absence of a nurse and the limited communication between team members. At a local level, a recent clinical audit of ward rounds in Tallaght Hospital mirrored these findings and reported additional challenges such as limited prioritisation of the ward round over other tasks, inconsistent access to relevant documentation, an inappropriate environment for completing rounds as well as the availability of good role models (Lynch *et al.*, 2015). Interestingly, this audit also noted that nursing staff were more likely to engage

with ward rounds on speciality wards where there was more familiarity between team nurse and doctor members. Out of this report, the authors suggest that admitting patients based on speciality/core wards may support the improvement of ward round practice (Lynch *et al.*, 2015). However, the persistent demand for beds in public acute hospital settings means that bed managers often need to place patients on wards not relating to the required clinical speciality - a practice not unique to the Irish context (Goulding *et al.*, 2012). In Ireland, the pressure on hospital bed managers to assign patients to the first available bed is compounded by the reintroduction of national target of 95% compliance with six-hour emergency department (ED) patient waiting time and a zero tolerance 24 hours ED waiting time (HSE, 2015). Whilst the reduction of patient waiting time is clearly an important target, Goulding and colleagues (2012) note that assigning patients to speciality wards is, depending on a patient's condition, generally associated with better outcomes. In terms of organisational efficiency, whilst processing of patients as quickly as possible to wards may alleviate system blockage at point of entry, such systems have knock-on effects for workflow efficiencies and patient safety. For example, Goulding and colleagues (2012) identified several specific safety concerns relating to this practice in UK hospitals. These include: limited communication regarding patients between specialty wards and patient assigned wards; lack of specialist knowledge by staff on non-specialist ward and inappropriate physical environment for patient (Goulding *et al.*, 2012). Furthermore, the distribution of patients in this way increases the workload burden of medical staff (Creamer *et al.*, 2010). Instead of being allocated to one ward, patients under specialist consultants are dispersed throughout the hospital. This leads to increased lengths of time by medical staff in attending to patients as well as longer hospital ward rounds. In addition, the increased frequency of ward rounds for nursing staff on the ward by different consultant teams disrupts the efficiency of other ward-level duties and creates a barrier to the formation of cross-discipline professional relationships (Williamson *et al.*, 2015).

2.5.2 Discharge planning

Discharge processing generates a large and continuous workload. However, according to a policy document by the Health Service Executive National Integrated Care Advisory Group (HSE, 2014) approximately four-fifths of discharges are straightforward and easily planned. Despite this, HSE figures for 2014 demonstrate that up to 30% of discharges were delayed (HSE, 2015). Nevertheless, it is likely that patient discharge is an activity that, if managed effectively can be planned and processed efficiently thereby maximising bed capacity. For example, Khanna and colleagues (2016)

observed in their examination of Emergency Departments in an Australian context that early and planned discharge targets reduced inpatient bed-waiting times as well as in-hospital length of stay. As Gozzard (2004) notes, ward transfers that are completed earlier in the day can improve patient planning as any issues arising from the transfer can be addressed when the full complement of day time staff are available. This allows for a more efficient workflow thereby increasing capacity and reducing demand burden (Gozzard, 2004). In Ireland, to improve efficiencies in this area there has been a recent shift towards integrated discharge planning [4] whereby planning for discharge commences prior to admission (HSE, 2008). This approach necessitates multi-disciplinary working, is led by a patient's consultant and is a core responsibility of the nurse (HSE, 2009). Citing the literature, this HSE (2009) report documents the benefits of successful integrated discharge planning as follows; effective transitioning between services, increased patient satisfaction with care, decreased length of stay and minimisation of unplanned admissions. In 2014, the HSE introduced new guidelines for healthcare discharge planning and, building on previous work, these guidelines continue to emphasise the importance of integrated multi-disciplinary working in effective discharge planning. This supports a HSE key target indicator of completing daily transfers and discharges by 1100hrs (HSE, 2014, p12). Nevertheless, whilst the vast majority of discharges occur during the normal working period, often discharges extend to the afternoon period (Wertheimer *et al.*, 2014). Later discharge times are likely to have a knock-on effect in terms of the work generated by discharges (such as later admissions leading to out-of-hours tests, x-rays etc.).

As discussed earlier in this chapter, a number of national and local level work practice policies (such as handover policy and ward rounds) are in place and are aimed at improving communication and collaboration amongst staff. Both directly and indirectly these policies, if implemented effectively, can also influence the clinical decision-making supports for staff during the out-of-hours period by increasing workflow efficiency.

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[4] **Integrated Discharge Planning** is a process that encompasses the key elements of discharge: written discharge information, provision of a discharge plan and an estimated length of stay (ELOS). Integrated discharge planning includes the patient and as appropriate, the family/carer in the development and implementation of the patient's discharge plan and ensures that steps are taken to address necessary linkages with other healthcare providers in order to achieve a seamless transition from one stage of care to the next, in accordance with patient need. (HSE, 2009; p7).

2.6 Out-of-hours and staff health

Challenging working environments during the out-of-hours period also negatively affect staff wellbeing (Brown *et al.*, 2010; Jackson & Moreton, 2013). For example, Nicol & Botterill (2004) note associations between on-call working and poorer sleep patterns as well as poorer mental health. Limited leadership and challenging working conditions along with reduced educational and career development opportunities were highlighted as key negative influencers of how nursing staff perceive working out-of-hours (Powell, 2013). In addition to educational and development opportunities, another study of junior doctors highlights additional out-of-hours specific staff concerns, such as the impact of rota design on work performance as well as the impact of shift work on the ability to study (Browne *et al.*, 2010). Indeed, associations between staff fatigue and patient safety risks are also well documented (Landrigan, *et al.*, 2004; Shulkin, 2009). The number of working hours that junior doctors average per week has come in for particular criticism in terms of staff wellbeing and patient safety (Jackson & Moreton, 2013). New legislation by the European Working Time Directorate (European Working Time Directive; EWTD, 2003/88/EC, 2009) prioritises the need to manage junior doctors' working hours in a more effective way to improve working conditions, and these standards have led to changes in how doctors' schedules are arranged. However, there is evidence that Irish public hospitals are not in full compliance with this directive with respect to non-consultant and trainee hospital doctors (Irish Medical Times, 2016) thereby limiting the impact of this directive on the experience of working out-of-hours.

Conversely, Browne and colleagues (2010) report that positive organisational support structures at work as well as co-worker morale were viewed as primary protecting factors against the effects of negative experiences of night working, such as lack of social interaction and work stress. For example, organisational support for staff training and development as well as clear and sufficient support for clinical decision-making were viewed as important to perceptions of a positive working environment. It is clear that the barriers outlined above as well as these facilitating factors have implications for the health of staff as well as the quality of clinical decision-making and thus standards of patient care and safety (Browne *et al.*, 2010).

2.7 Out-of-hours work design-innovation

Healthcare policy makers are continuously working towards new models of care that can positively impact on workflow and patterns of activity (including compliance with the EWTD) whilst maintaining high standards of patient care and safety in an increasingly challenging environment. The challenges

outlined above highlight that more comprehensive approaches to support staff and services during the out-of-hours service period in particular are necessary to ensure appropriate standards of care. In the UK, such efforts to address these challenges and concerns have led to the development of the Hospital at Night (H@N) model. The primary aim of H@N is to actively manage the hospital system to minimise workload during the out-of-hours service period by drawing as much work as possible into the day time working period. This model was developed in response to the EU Working Time Directive and the requirements to ensure the quality of clinical decision-making and coverage at night/out-of-hours within acute hospital settings (McQuillan, *et al.*, 2013). Conceptualised by Dr Elisabeth Paice, this idea was expanded upon by the UK Department of Health in 2002 (Gozzard, 2004). Since then the UK Hospital at Night approach has developed and expanded depending on the individual hospital setting and needs. However, whilst different hospitals are at different stages of implementation, the overarching model is comprised of a number of key components:

- A multidisciplinary handover of patient information and relevant clinical information from the day staff to night time staff
- Bleep filtering for Junior doctors via a designated Hospital at Night Coordinator
- Extended roles of a nurse-led multidisciplinary night team
- Up skilling of ward staff
- Introduction of new technologies (i.e. mobile phones rather than bleeps, e-prescribing, digital imaging and electronic records).
- Updating of bleep and call policies incorporating H@N related changes

Initial evaluation findings by the UK Department of Health suggest this model can support hospital services in a number of ways including: better patient care (e.g. reduced mortality and length of stay, reduced external patient transfers), improved collaborative working environment, improved service delivery (e.g. bed availability, increased no. completed consultant cases; time to see patients), efficacy and productivity (UK Skills for Health, 2008; Beckett *et al.*, 2009). A number of studies have also found that whilst H@N aims to reduce the number of hours worked by junior doctors, opportunities to gain key clinical competencies were maintained (Mahon *et al.,* 2005; Bolger & Walker, 2007; Parish, 2007; Gallagher *et al.*, 2009).

However, it is important to note that Hospital at Night is not without its limitations and in particular some evaluations highlight the challenges in adapting to the H@N model. For example, feedback

from one UK pilot H@N programme identified the challenge and importance of getting all grades of staff on board especially junior doctors and nursing staff at a ward level (Gooding, 2004). Other challenges also persist with the implementation of H@N. In the UK model the Nurse Practitioner (NP) role is important to its implementation. The NP coordinates the H@N team, provides a first line of communication for ward staff, and is responsible for clinical decision-making more traditionally associated with medical staff. However, a number of challenges persist in the development of this role. For example, Clark and colleagues (2012) found a lack of role clarity by the NP themselves as well as other hospital staff as well as reservations by staff about the changes in communication as a result of the shift towards the H@N NP. Clark and colleagues (2012) suggest that increased awareness of the role through staff training was required to improve staff collaboration during the out-of-hours service period. In line with this study, Gooding (2004) identifies that sufficient time teasing out issues as well as effective communication strategies are key facilitators to change (Gooding, 2004). Indeed, establishing organisational readiness for change is a key contributor to implementation success of any new initiative. As Burke and colleagues (2012) note enthusiastic and supportive leadership, as well as collaborative and inclusive decision-making, congruence of vested interest with stakeholders, shared and agreed understanding of programme, as well as realistic timeframes of implementation are all key facilitators to implementation change. However, as McQuillan and colleagues (2013) note in their H@N evaluation *"the challenges of maintaining even demonstrably better [H@N] handover processes in a healthcare system with conflicting goals and competing priorities cannot be underestimated"* (p472). This demonstrates the challenge of implementing even one component of H@N in a hospital setting.

The need for facilitating resources to support an organisational out-of-hours care model like Hospital at Night has also been acknowledged. In the UK model for example, Gozzard (2004) notes the importance of utilising new technologies such electronic records, e-prescribing, digital imaging and mobile phones in replacement of bleep systems. In an Irish context, many of these are technologies are in development but are not currently fully operational. Considering the clear shift in the literature towards digital-orientated models of clinical decision-making support, limited advances in this regard poses a fundamental challenge to the introduction of any innovative model of organisational efficiencies.

The Critical Care Outreach Services (CCOS) developed in the UK initially in 2000. This service was developed due to the shortage of critical care beds and to facilitate the provision of critical care

services outside the ICU (Intensive Care Unit) within the medical and surgical wards. Different terms have been used to describe these outreach services and these include 'Critical Care Liaison Nurse' or 'Critical Care Outreach Nurse'. The transition of patients from ICU to the wards is challenging for both the patients and their families, due to decrease in monitoring equipment, higher nurse to patient ratios and challenges to continuity of care due to communication difficulties between ICU and the wards (Bérubé *et al.*, 2014). The ICU Liaison Nurse (ICULN) was initially developed in Australia in 1991, while the Critical Care Outreach (CCOS) service began in the UK in 2000. Eliott and colleagues (2012) surveyed 152 Australian ICUs in 2010 and ascertained that 27% (n= 31) of ICUs had an ICULN service, and larger hospitals were more likely to report having an ICULN service than smaller hospitals. The majority of the ICULN were members of the Medical Emergency Teams (MET) and some were members of the cardiac arrest, tracheostomy support and pain management teams. A minority of ICULNs provided support to nurses caring for patients with vascular access devices. The ICULN caseload included patients discharged from ICU, ward patients referred by ward nurses or patients post ERS (Emergency Response System) call. Some of the ICULNs had a job title as a clinical nurse specialist while others had a title of nurse consultant.

Pedersen and colleagues (2014) surveyed ICUs in New Zealand to ascertain what CCOS services they provided. Only 45% (n= 9) of ICUs reported having a CCOS. Referrals to these services included; follow up of ICU patients post discharge to wards, care of ward patients referred by medical and nursing staff and patients who were deteriorating. Both the CCOS and ICULN were nurse-led services, however the CCOS had some input from the Intensive Care Medical team. The New Zealand study identified that the interventions of the CCOS included the provision of advice with respect to fluid management and adjustment to medications to the primary team caring for patients on the wards (Pedersen *et al.*, 2014). The other interventions included insertion of intravenous access devices and initiation of non-invasive ventilation. Some of the hospitals had COO services available on a 24 hour a day basis.

A survey of CCOS in England identified that the majority of the services were involved in treating ill patients identified using the Early Warning Scoring (EWS) system, the follow up of critical care patients post ICU discharge and educating and supporting ward staff on the care of critically ill adults (McDonnell *et al.*, 2007). International evidence has highlighted the role of the CCOS and ICULN in improving the confidence and skills of ward nurses caring for high dependency patients on wards

(Endacott *et al.*, 2009) and in providing advice and support to NCHDs (Chellel *et al.*, 2006). The National Outreach Forum (2012) identified the seven core elements of CCO and these are:

- Patient track and trigger
- Rapid response
- Education, training and support
- Patient safety and clinical governance
- Audit and evaluation; monitoring of patient outcomes and continuing quality care
- Rehabilitation after critical illness
- Enhanced service delivery.

The Faculty of Intensive Care Medicine (2015) recommends that all acute hospitals in the UK should provide a 24/7 day CCOS. In Ireland, a national patient track and trigger system has been developed (National Clinical Effectiveness Committee, 2014) and hospitals have devised an emergency response system to the Early Warning Score (EWS). Tallaght Hospital has developed an Emergency Response Team (ERT) and the members of this team include the cardiology registrar, anaesthetist on-call and critical care nursing staff. Tallaght Hospital currently employs a Critical Care Outreach nurse during day time working hours from 0800hrs to 1600hrs Monday to Friday, but not out-of-hours.

2.8 Summary

The out-of-hours period provides many challenges to clinical staff. Challenges in hospital communication pathways, restricted availability of services (e.g. phlebotomy, radiology), and limitations on the role of nursing staff coupled with fewer NCHDs all impact on workflow out-of-hours. The impact of day time work practices on out-of-hours workflow is also evident in the literature and demonstrates that effective communication and integrated working between daytime and out-of-hours is imperative for the delivery of high quality and safe patient care. Emerging innovations in work design have been found to be beneficial in enhancing workflow arrangements out-of-hours. These include H@N and CCO services.

3 METHODOLOGY

3.1 Introduction

This section of the report describes the methodological approach underpinning the research study and outlines the various methods used to achieve the evaluation aim and objectives.

3.2 Study Design

An exploratory mixed methods design was used to evaluate out-of-hours supports for clinical decision-making within Tallaght Hospital. A mixed methods approach was deemed most appropriate in gathering a broad spectrum of evidence to assist in understanding a phenomenon or experience (Lieber & Weisner, 2010). The usefulness of a mixed methods approach to evaluation has been well established and is especially relevant to the applied clinical setting (Sandelowski, 2000; Mertens, 2003; Morse, 2003; O'Cathain *et al.*, 2010). The research design was underpinned by the Donabedian System framework to facilitate a comprehensive understanding of structure, process and outcome criteria that contribute to effectively support clinical decision-making during the out-of-hours period in Tallaght Hospital. Figure 1 below illustrates the broad range of data sources and data collection strategies necessary to address the research objectives and capture the structure, process and outcomes elements in this study.
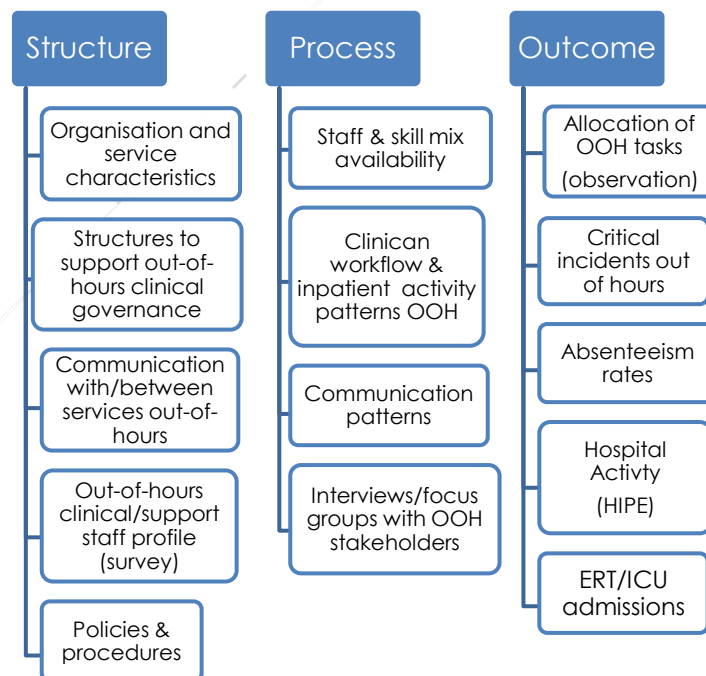
Figure 1   *Structure Process & Outcome criteria*

The study comprised three main sources of data. Firstly, data collection gathered the views and experiences of various stakeholders involved in out-of-hours service delivery and management.

Semi-structured one-to-one interviews and focus groups were considered most suited to the research given the focus on eliciting perceptions and experiences of key hospital stakeholders. Individual interviews provided a useful forum to discuss, with specific participants, their experiences of out-of-hours working and how current practice and resources impact on communication and workflow patterns and the clinical decision-making process in detail. Focus groups with nursing staff and intern doctors were completed as it was a convenient method of engaging with a larger number of individuals without overburdening the hospital.

Secondly, this study completed an observational analysis of the workflow and communication systems, patterns and volumes that influence out-of-hours care. This comprised a self-report audit of task activities completed by intern doctors during the out-of-hours period during a sample two-week period; a log of ward-based nurse requests to doctors during the same out-of-hours service period and; observations of the hospital multi-disciplinary weekend clinical handover. This information provides a snapshot of the nature, volume and pattern of work undertaken during this time.

Finally, a survey of the current out-of-hours services in Tallaght Hospital was completed alongside an analysis of existing hospital databases (Hospital In-Patient Enquiry [HIPE], Bed Census, Emergency Response Team (ERT) calls, Critical Incidents and staffing) and relevant hospital polices and reports. The purpose of this data was to establish a sample profile of patient activity as well as identify staff ratios, skill mix, available resources as well as other systems of care considered to influence how out-of-hours care is delivered. Data sources deemed relevant were identified through consultation with the Out-of-Hours Steering Committee and further informed through interviews with participants.

3.3 Participant Selection and Recruitment

The sampling strategy for this study was purposive and composition emerged and was refined as the project unfolded. A number of service provider groups were involved in the evaluation (including frontline staff and key members of management team). Individuals were invited to take part by a member of the research team and were fully informed of the research study. An overview of the broad range of data sources and participants are set out in Table 2 below.

3.3.1 Interviewees

The research team consulted with the Out-of-Hours Steering Committee as well as Nursing Management and Medical Consultants to identify key strategic informants that could provide a diverse range of views to the nature of out-of-hours working. Interviews (n=8) and focus groups (n=3; n=19 participants) were conducted with: (1) key stakeholders who would be most closely involved in directing and planning for clinical decision-making and coverage out-of-hours (i.e. hospital management, senior and frontline clinical staff) and; (2) Clinical staff (Nursing and Non-Consultant Hospitals Doctors (NCHDs)) who worked during the out-of-hours service period. All invited participants agreed to take part in the interview process. Interviews and focus groups were completed between December 2015 and April 2016.

3.3.2 Out-of-hours workflow of NCHDs

Self-report app-based logs of intern doctor workflow (volume and pattern) during out-of-hours shifts were completed. All intern doctors scheduled to work on-call during a defined observational period (7th Dec-21st Dec 2015) were invited to participate. Over the 14-night period, 56 shifts in total were covered (i.e. four interns were on-call each night). Accounting for recurrent shifts by some staff, a participation rate of 50% was achieved (n=28).

Two sample wards (one medical, one surgical) were selected for more in-depth analysis of process of care. In parallel to the app data, paper based task log tools (n=214) were completed on observation wards by nursing staff to highlight calls/requests to NCHDs during the same period. Participation was agreed at a ward level through the Clinical Nurse Manager and information regarding the individual nurse recording tasks was not collected.

3.3.3 Hospital clinical handover observations

Non-participatory observations (n=4) of the multi-disciplinary Friday handover process were also completed. These observations were structured using an observation tool adapted from the National Clinical Effectiveness Committee report (2015). These handovers were chosen for observation as they are identified specifically in Tallaght Hospital handover policy as an important communication juncture between normal service shifts and the weekend out-of-hours shift.

3.3.4 Diagnostic, Allied Health and Support Services survey

In consultation with members of the Out-of-Hours Steering Committee, the research team identified the various Diagnostic, Allied Health and Support services (n=12) who provide out-of-hours services

in Tallaght Hospital. Each service was contacted by a member of the research team and invited to participate in an online survey outlining their service. A total of 11 services participated.

3.3.5 Non-participatory data sources

3.3.5.1 Hospital reports and documentation

In a similar way to participant identification, relevant documents and databases were identified through consultation with the out-of-hours steering committee as well as hospital management, human resources and through discussions with medical and ward staff. Reports and documents identified as relevant to the study (e.g. regarding HR practices and staff, service resources) were retrieved through formal requests from various relevant sources (e.g. HR department, Nurse Management, ICT).

3.3.5.2 Patient-related data

Patient data pertaining to the two sample wards were also audited using existing hospital data sources such as the Hospital In-Patient Enquiry (HIPE) database, Tallaght Hospital Emergency Response System (ERS) database, and Clinical Incident Report database. A three-month analysis period was selected (September-December 2015) to establish a representative snapshot of activity. Hospital level data pertaining to consultant take was also collected for a sample 3-month period using a combination of the Daily Bed Census report run by the ICT Department, and the on-call rotas which are stored on the Hospital Intranet.

Data sources	Time frame of data collection
Interviews	
Individual interviews (i.e. HR, Registrar, Nursing Management) (n=8)	Dec 2015-Apr 2016
Focus groups (Interns x1 and nursing x 2) n=19	Dec 2015-Jan2016
Observational data	
Non-participatory medical handover (4)	Jan 2016-March 2016
Self-report App Intern data (977 tasks)	Dec 7th 2015 -Dec 20th 2015
Ward-level task log tool (214 tasks)	Dec 7th 2015 -Dec 20th 2015
Diagnostic, Allied Health and Support Services survey (11 services)	Feb 2016
Hospital databases	
HIPE	1st Sept – 30th Nov 2015
ERT data	1st Sept – 30th Nov 2015
Critical Incident reports	1st Sept – 30th Nov 2015
Daily Bed Census (Consultant take)	1st Sept – 30th Nov 2015
Documentation review	
HR personnel reports	2015/16
Ward skill mix report	2015/16

Table 2   *Outline of data sources included in report*

3.4   Data collection

3.4.1   Stakeholder interviews and focus groups

Staff indicated their interest in participating by contacting the research team directly. Interviews were completed between December 2015 and April 2016. All potential participants were invited to take part in a one-to-one semi-structured interview or focus group. Participants were interviewed in their place of work in a private room at a time of their convenience to ensure privacy and participants were informed of the purpose of the interviews. Prior to the interview, each individual was provided with an information leaflet and consent form (see Appendix 2 & 3) and participants were asked to provide their written informed consent. Participants were also informed of their right to withdraw at any stage of the data collection. Interview topics were not deemed particularly sensitive by the researcher although it was acknowledged that discussing individual views about hospital systems

may cause anxiety on the part of the participant. To address this issue, all participants were informed of the nature of the questions prior to the interviews/focus group and that they could withdraw at any time (See Appendix 4a & 4b for a sample copy of interview questions). The researcher also requested for each interview to be recorded for ease of transcription. Interviews took approximately 45-90 minutes to complete. At the end of each interview, participants were debriefed and any questions were answered. All participants were thanked for their time and provided with contact details of the researcher.

3.4.2   Observational data

In order to develop a baseline understanding of the nature and volume of work that Intern NCHDs undertake out-of-hours, a self-report app-based log was completed by doctors working on-call during a specified observational period. A mobile phone based survey app was agreed between the research team in consultation with the NCHD lead and Intern champions as the most effective method of data collection (in terms of data accuracy as well as minimisation burden of participation). Furthermore, unlike a paper based tool the app was at less risk of being mislaid as Interns travelled the hospital out-of-hours. A suitable app ("QuickTapSurvey http://www.quicktapsurvey.com") was identified and licences purchased. The app developers assured data encryption and privacy once a screen-lock was enabled on the user's mobile device.

A two-week sample period (December 7th- December 20th, 2015) was agreed and all interns on-call during that period were invited to take part. A two-week period was chosen as it permitted a more accurate reflection of out-of-hours activity (as opposed to one week) yet considered not unduly disruptive to the doctors' schedule. Communication with the Intern group was facilitated by two intern 'champions'. Initially an email explaining the study was distributed via these intern champions and potential participants were invited to contact the research team if they wished to take part. On contact, they were sent, via email, a study information leaflet and a copy of the consent form. Consent was obtained once the participants had read these documents and installed the app to their mobile device using encrypted software to protect privacy. Each user was given a unique username and password, and instructions on how to enable their mobile device's screen lock function, and install the app and log-in. Once their login was activated the survey was downloaded automatically to their device. Participating interns were requested to record all task requests during their out-of-hours shift. The survey was piloted with the interns on-call on the first night of the study (December 7th) and the researcher sought feedback on its use the following day. Minor changes were made to

the survey, to enable ease of use by the participants (i.e. pre-loading of each user's survey copy with their bleep number to avoid participants needing to enter it for each use). The Interns were advised that, in so far as was possible, they should complete a survey each time they were requested to undertake a task out-of-hours, whether this was by phone and bleep, in person, or using the ward whiteboard system. At the end of two weeks these task recordings were extracted from the software database and collated onto SPSS for analysis.

During the same period nurses on each of the observation wards were requested to log intern requests via a paper tool. Consent for this component of the study was obtained from each ward manager in consultation with Hospital Management. Information about the study was distributed to wards and a member of the research team met with ward staff to discuss the study and staff involvement. A paper tool was designed and distributed to both wards for the period of observation. The researcher attended both wards each evening to explain the study and the tool to staff, and address any queries. Completed tools were collected from each ward after each night shift.

3.4.2.1 Non-participatory handover observation

The researcher was permitted by Hospital Management to attend Friday afternoon clinical handover meetings in an observer capacity. The researcher did not participate in these meetings. Observation notes were collected using a handover audit tool to ensure data collection was not selective or influenced by researchers' views or biases (Appendix 7).

3.4.3 Surveys

Diagnostic, Allied Health and Support Services in the hospital were identified and invited by email to complete an online survey regarding out-of-hours service (Appendix 8). Participation (n=12) was agreed at a service level. Surveys were completed and return via Survey Monkey.

3.4.4 Audit of hospital activity

A baseline profile of skill mix and staffing levels on each ward and out-of-hours call arrangements among medical teams was established. In order to fully complete the picture, an analysis of the activity and patient profile of these wards was also required. A sample period of three months (1st September-30th November 2015) was selected to provide an example of hospital activities. Information pertaining to clinical, system, and quality metrics (agreed with stakeholders and to include critical incidents out-of-hours and absenteeism rates) were collected from relevant departments. In consultation with the out-of-hours Steering Committee as well as hospital

management, a number of existing hospital databases were also identified and data relating to sample wars was extracted for analysis. Data reports included: the Hospital In-Patient Enquiry System (HIPE; Emergency Response Team (ERT) calls and incident reporting data. Information relating to the Daily Discharges and Bed Census Report was also collected. This report, generated by the Information Technology Business Analysis department, provides a daily overview of the number of discharges and in-patients under the care of each consultant. In addition, the Daily Ward Rotas (posted on the Hospital Intranet) and the Medical Bleep list (providing information on staff allocation per team) were examined to determine the patterns of on-call activity and staff availability for the same period.

3.5 Ethical approval

Ethical approval was granted by the Trinity School of Nursing and Midwifery Ethics Committee. A number of data management measures were considered. All hard copy interviews were coded and maintained in a locked cabinet. Softcopy data were retained in an encrypted file to which only the research team had access. Meeting observation notes were also recorded on an encrypted Word document and saved on the same PC as the other data material. All data was saved and stored in TCD, School of Nursing and Midwifery on an encrypted research folder and will be maintained by the School for the standard five-year retention period.

3.6 Data analysis

Quantitative data was entered into the IBM Statistical Package for the Social Sciences, version 23 (IBM, SPSS 23), and was cleaned and audited (Pallant, 2009). A range of descriptive statistics were used to identify patterns of activity. Qualitative data was analysed using thematic analysis guided by Braun and Clarke's analytical framework (Braun & Clarke, 2006). This involved transcribing the interviews, coding the data and identifying themes. A set of themes was generated describing participants' views and this was used to enhance and complement the survey data. The computer software package NVIVO (Version 9) was used to assist in the management of the qualitative data.

3.6.1 Reliability/validity/rigor

A number of steps were taken in this study to ensure a good standard of reliability and validity of the qualitative data. These steps were based on the RATS qualitative research review guidelines (i.e. Relevancy, Appropriateness of qualitative method, Transparency of procedures, Soundness; Clark, 2003).

Relevancy of the research aim/question is fundamental to the quality of any study. The literature outlined earlier in this proposal indicates that the evidenced based out-of-hours models provide innovative ways of addressing patient care and staff working experience more effectively. However, to date this initiative has not been established in an Irish setting and there is no evidence to indicate if this model will be suitable for Irish hospitals. As the outcomes of this study will influence the likelihood of the pilot project of an out-of-hours model being introduced at Tallaght Hospital and more widely in Ireland, it is important that sufficient empirical research is available to guide any decision-making about introducing such a pilot project process.

Appropriateness refers to the suitability of the qualitative methodology utilised in addressing the research aim. The use of interviews, focus groups and audit analysis provide a comprehensive way of collating the views of key stakeholders.

Transparency of procedures refers to the rationale for the sample, recruitment, ethics, and role of researcher. Justification of the approach used for each of these important components is also set out in earlier in this proposal. Clear representation of the steps involved in the collection, analysis and dissemination of the qualitative data by the researcher is necessary to ensure appropriate of the data which is as representative of the participants as possible. In doing this process of reflexivity, the researcher undertakes continuous self-reflection to explore to what extent personal biases or experiences may interfere with the interpretation of the data and how this can be minimised

Soundness of interpretative approach was achieved through a mixed methods analysis design. In the qualitative component of the study data were transcribed by one experienced transcriber to ensure consistency. For the thematic analysis, a number of interpretation checks were completed to ensure reliability of the data (i.e. maintaining codes for each data point, continuous reviewing of raw material to compare with analysis process). To enhance the rigor of the analysis, data was analysed by two researchers and findings compared. In the findings report participant quotes were chosen carefully based on their representativeness and findings are discussed in detail in relation to existing theoretical and evaluation research literature. In the quantitative component of the study the research team responsible for collating and analysing the data were all trained and experienced in the use of SPSS and statistical analysis. A policy of data double checking was in place for all raw data

collated. Prior to the analysis of any data, a comprehensive audit of the SPSS database was completed for data entry accuracy and quality. Errors identified during the audit process were cleaned/corrected.

3.7 Summary

This chapter details how the broad range of methods used in this study were applied in practice. The next chapter, chapter four, examines the findings obtained from the quantitative data collection process. The qualitative findings are detailed in chapter five.

4 FINDINGS/RESULTS

4.1 Introduction

The aim of quantitative data collection was to obtain a baseline of the nature of the changing hospital environment and workflow during the out-of-hours period. At the outset of the study a number of key areas were identified in consultation with the Steering Committee and these are broadly assigned to the following categories, which will be discussed below; medical and surgical activity out-of-hours; medical and nursing workflow & patterns, the intra/inter-professional communication and provision of diagnostic, allied health and support services out-of-hours. Two pilot wards (one medical and one surgical) were selected to provide a sample illustration of ward activity and staffing skill mix within the hospital. In addition, a three-month analysis of hospital reports of patient profiles as well as patient-related and staff activity was completed to contextualise the findings.

4.2 Hospital activity and acuity

4.2.1 Medical & surgical ward activity out-of-hours

The Hospital In-Patient Enquiry (HIPE) system records data on all hospital inpatient stays greater than 24 hours in Ireland. The information records socio-demographic information (e.g. gender, age) health information (i.e. diagnoses, procedures) and hospital-related data pertaining to the patient's hospital stay (e.g. consultant, length of stay). Tallaght Hospital HIPE data was examined for the three-month period 01st September-30th November 2015. All patients discharged from either of the two observation wards (one medical and one surgical) during the stated observation period were included in the analysis.

4.2.2 Medical & surgical patient profile

Over the observation period 454 patients were discharged from the surgical unit and 146 patients from the medical unit.
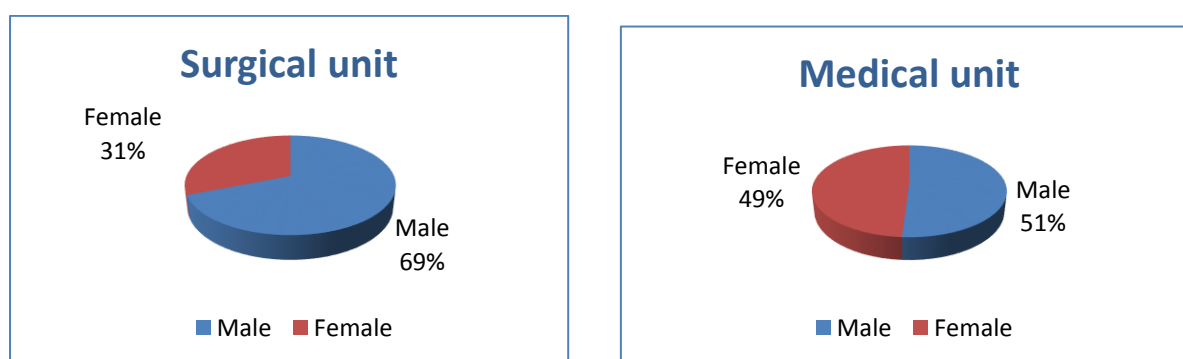
Figure 2   *Gender comparisons across sample wards*

Nearly 69% (312/454) of patients discharged from the surgical ward were male compared with 51% (74/146) of patients discharged from the medical ward. The mean age of patients discharged from the surgical ward was 55 years (SD=17.8; Median=57years). This was slightly younger than patients discharged from the medical unit (60 years, SD=19.2; Median= 64years). Figure 3 below illustrates the age-range distribution on both wards. Isolating patients 80 years and over, nearly a fifth of patients on the medical unit (29/146) compared with less than 10% on the surgical unit (40/454) were accounted for in this group.
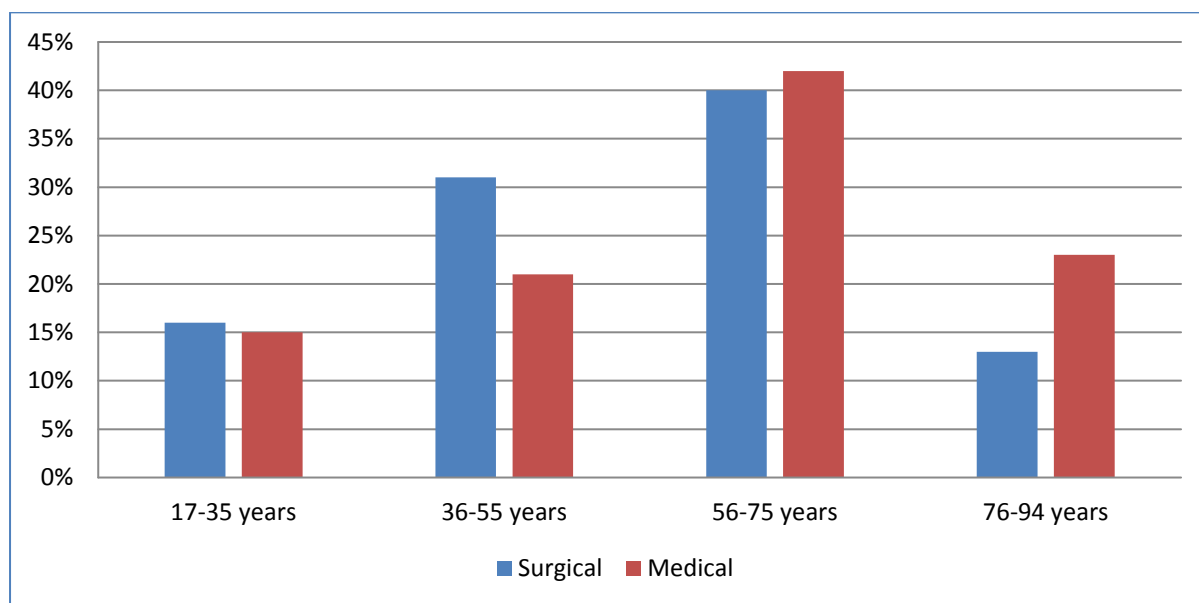
Figure 3   *Age distribution by ward*

Accounting for outliers, the mean hospital length of stay was 5.7 days on the surgical ward (SD=6.5) and 17.5 days (SD=11.3) on the medical unit. The median hospital length of stay was 8 days on surgical and 8 days on the medical unit.   More than half of patients discharged from the surgical ward had a length of stay of less than 5 days (58%, 308/527) compared with a little over a fifth of patients discharged from the medical unit (22%, 38/176).

Length of stay	Ward	
	Surgical unit (454)	Medical unit (146)
Median	5.8	8.0
Mean (SD)	5.8 (7.2)	17.5 (28.9) *
Range	74 (1-75 days)	184 (1-185)
Mean (SD) >60days	5.7 (6.5)	10.9 (11.3)
Mean (SD) >30 days	5.2 (5.1)	8.4 (6.0)
(note outliers*)		

Table 3   *Length of stay by ward*
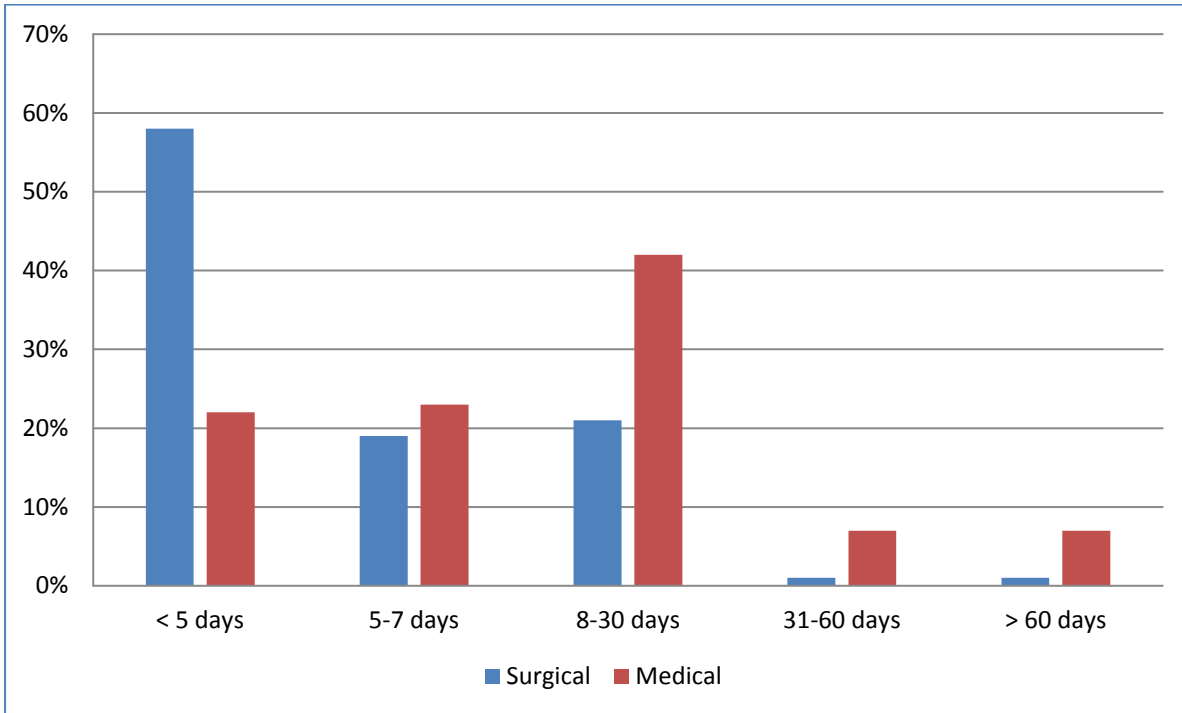
Figure 4   *Length of stay - distribution per ward*

A small proportion of patients spent one or more days in ICU. Greater numbers of patients discharged from the medical unit (6%) spend one or more days in ICU than patients from the surgical unit (3%).

ICU days >1day	Ward	
	Surgical unit (454)	Medical unit (146)
Number of patients	3% (14)	6% (9)

Table 4   *ICU stay by ward*

The mean number of diagnoses for patients discharged from the surgical ward was 4.4 (SD=3.4) and 6.9 (SD=4.4) for patients discharged from the medical unit. Figure 5 below demonstrates that patients discharged from the medical unit were more likely to have a higher number of diagnoses than the surgical unit patients. Table 5 below further highlights that the most common diagnosis on the surgical ward was related to diseases of the genito-urinary system (36%) followed by neoplasms

(20%). On the medical unit, diseases of the respiratory system (20%) was the most common diagnosis.
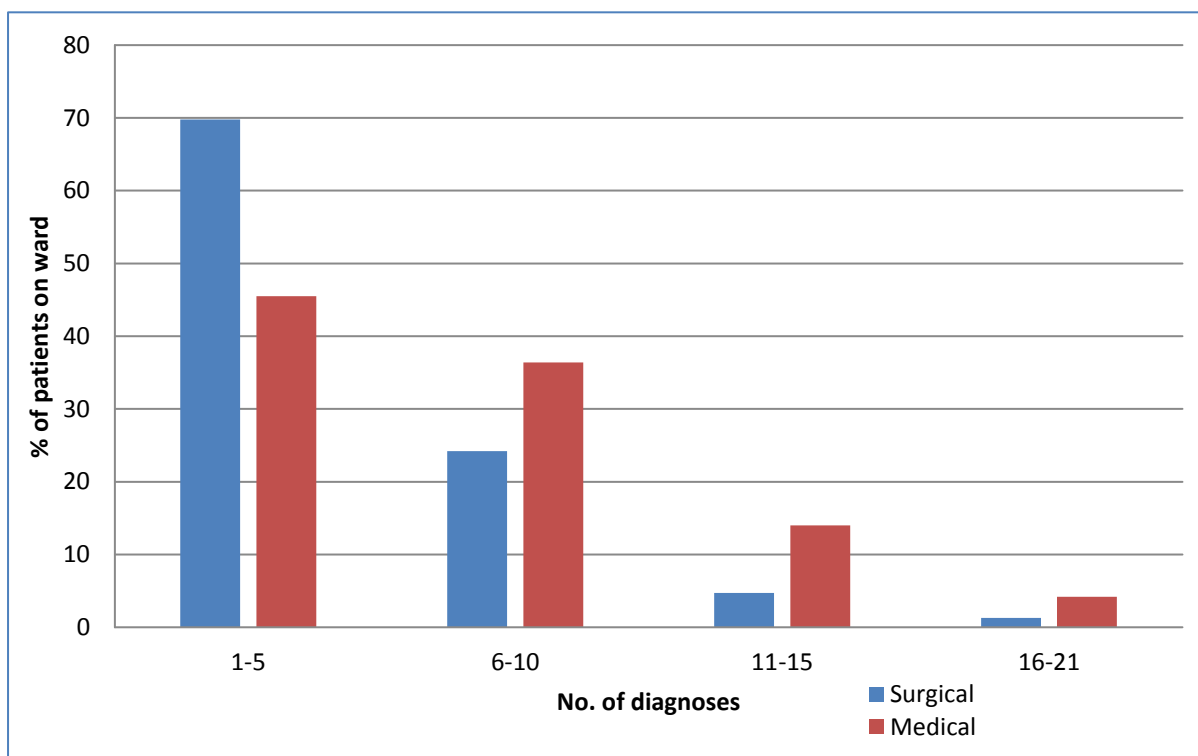
Figure 5   *Number of diagnoses based on ward type*

PROFILE	Ward	
	Surgical unit (454)	**Medical unit (146)**
Diagnosis	% (F)	% (F)
Diseases genito-urinary system	36% (164)	
Neoplasms	20% (89)	
Diseases of the digestive system	17% (77)	
Diseases of the respiratory system		20% (29)
Symptoms/Signs /not classified		15% (22)
Diseases of the circulatory system		12% (17)

Table 5   *Number of diagnoses based on ward type (3 most common)*

4.2.3   Admission & discharge patterns

The vast majority of patients discharged from the medical unit were admitted as emergency cases (92%, 134/146). In comparison, only 60% (272/454) patients discharged from the surgical unit were admitted as emergency cases whilst a little over a third were elective admissions (155/454).

PROFILE	Ward	
	Surgical unit (454)	**Medical unit (146)**
Admission type	% (F)	% (F)
Elective	34% (155)	4% (6)
Elective Re-admission	4% (19)	1% (2)
Emergency	60% (272)	92% (134)
Emergency Re-admission	2% (6)	2% (3)
Maternity	1% (2)	1% (1)

Table 6   *Admission type per ward*

The vast majority of patients from both surgical (93%, 423/454) and medical unit (82%, 120/146) were discharged home (See Table 7). Patients on the medical unit (7%) were more likely to be discharged to a nursing home accommodation than surgical unit patients (3%) although this discharge destination only accounted for a small sub-sample on both wards.

PROFILE	Ward	
	Surgical unit (454)	**Medical unit (146)**
Discharge destination	% (F)	% (F)
Home	93% (423)	82% (120)
Nursing home/convalescent/ long stay	3% (12)	7% (10)
RIP (no post mortem)	2% (7)	5% (7)

Table 7   *Discharge destination per ward (3 most common)*

4.2.3.1   *Patient profile - hospital stay >60 days*

A small sub-sample of patients who stayed in hospital for more than 60 days was also examined in further detail. Patients from the medical unit (9/146) were more likely to have a stay of longer than 60 days than patients who were discharged from the surgical unit (1/454). Table 8 below provides further details concerning the profile of this patient cohort.

Patients >60 days LoS	Surgical unit (1)	Medical unit (9)
Admission route		
Emergency	1	8
Emergency readmission	0	1
Discharge destination		
Home	0	3
Nursing/convalescent/long-stay home	1	3
RIP	0	3
Sex		
Male	1	3
Female	0	6
Consultant s		
Medical	0	9
Surgical	1	0
Age		
36-55 years	0	1
56-75 years	1	2
76-94 years	0	6
No. diagnoses		
1-5 diagnoses	0	0
6-10 diagnoses	1	2
11-15 diagnoses	0	3

Table 8   *Exploration of patients attending hospital longer than >60 days*

4.2.4   Distribution of medical & surgical patients

The vast majority of patients from the surgical unit (90%) were discharged by a surgical consultant.

Conversely, 95% of patients from the medical unit were discharged by a medical consultant.

PROFILE	Ward % (F)	
Service	**Surgical unit (454)**	**Medical unit (146)**
Medical	10% (45)	98% (143)
Surgical	90% (409)	2% (3)

Table 9   *Surgical versus Medical speciality by ward*

Figures 6 & 7 below illustrate the large distribution of consultants and patient activity on these sample medical and surgical wards. On the surgical unit, a total of 46 consultants were assigned as the discharging consultant to 454 patients. Of these, 20 were primarily medical consultants and 31 were surgical consultants. A total of 28 discharging consultants were assigned to patients on the medical unit, of which only three were primarily surgical consultants.
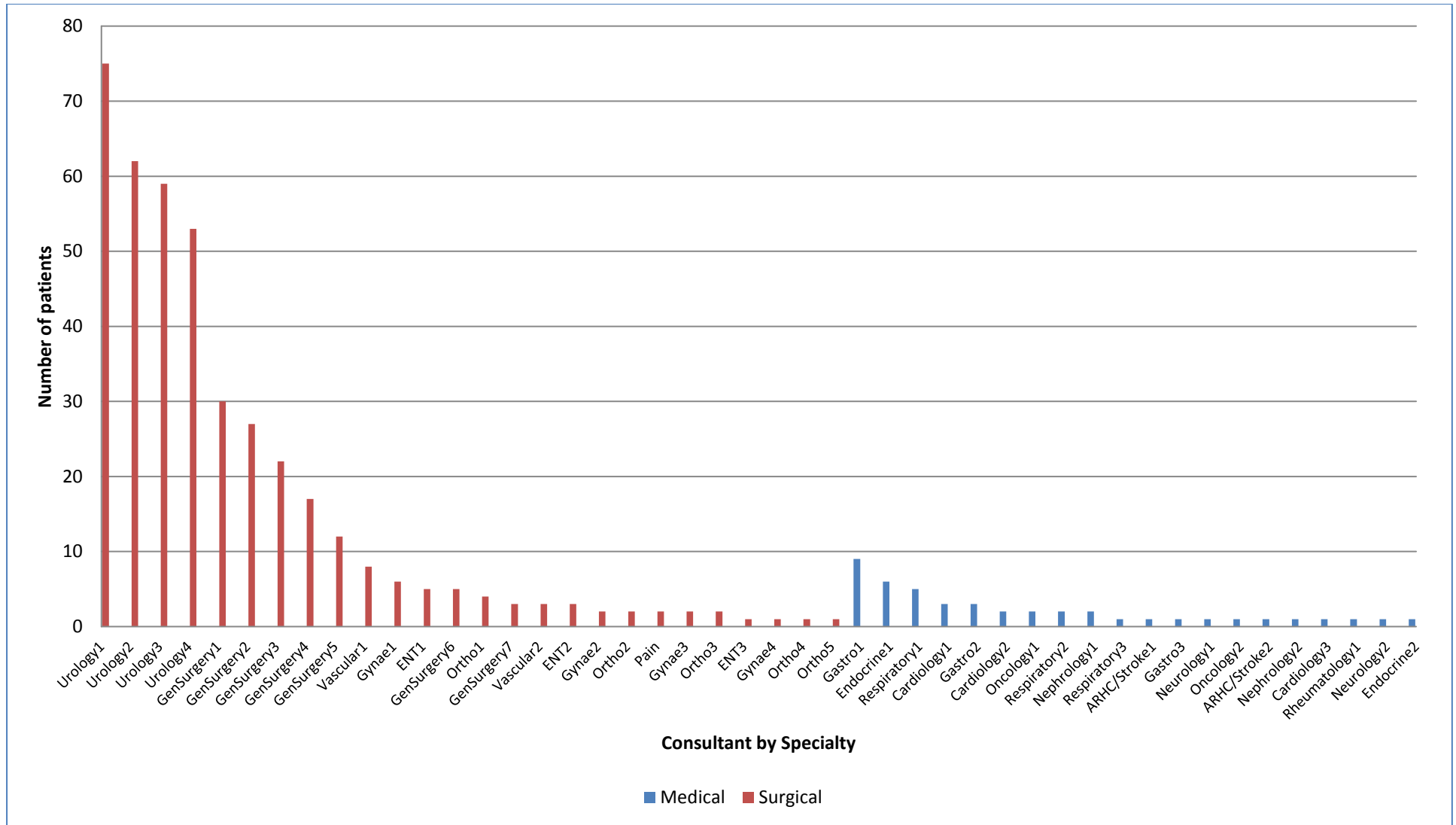
Figure 6   *Surgical unit: Assignment of Medical & Surgical consultants*
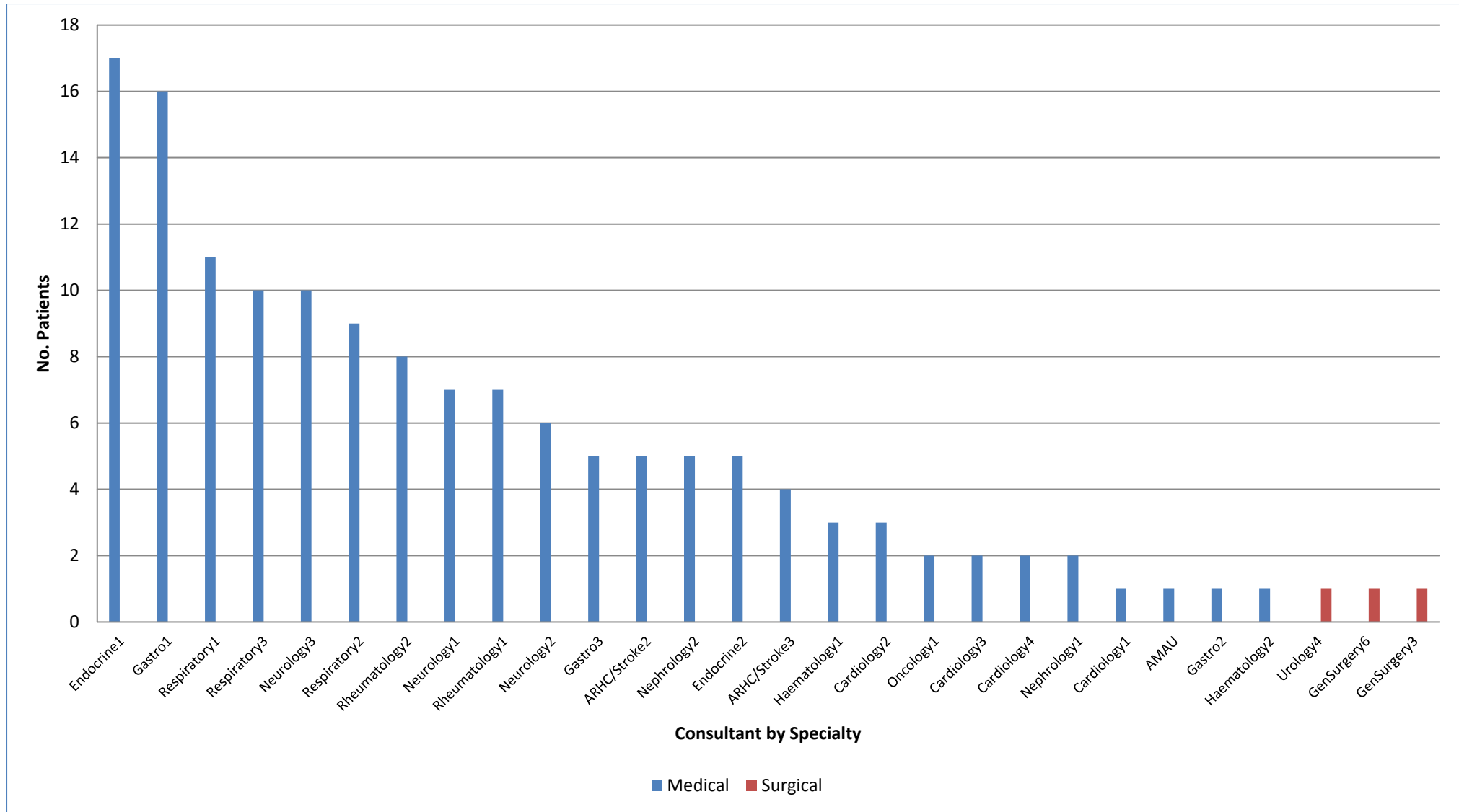
Figure 7   *Medical unit: Assignment of Medical & Surgical consultants*

4.2.5 Out-of-hours Emergency Response Team (ERT) calls

Data collected by the ERT during the out-of-hours service period was also examined for the 3-month observation period (1st Sept – 30th Nov 2015). The ERT database collates health-related information in relation to the ERT trigger. This includes patient profile information as well as call trigger details and interventions. During this time, 24 out-of-hours ERT calls were attended to between the two wards. As described in the previous section a total of 600 patients were discharged from the two observation wards during the period September to November inclusive. During this period, a total of 18 patients triggered calls as 6 ERT calls were retriggers (i.e. the same patients). There were no patients that re-triggered more than once. During the 3-month observation period, 12 ERT calls were recorded on each ward during the out-of-hours service period. Based on the number of patients discharged from each ward during this period, this accounts for 3% of patients on the surgical ward and 9% of patients on the medical unit. Data detailing reason for ERT call was also recorded. As Table 10 below demonstrates, the reasons were more disperse on the medical unit than on the surgical one.

Medical unit	F	Surgical unit	F
Exacerbation COPD	1	Exacerbation COPD	1
Resp distress	1	Resp arrest	1
Seizure-like activity	3	Resp Sepsis	2
Hypoglycaemia	1	Fast Afib	2
Pneumonia	1	Query sepsis	1
Unresponsive	1	Missing from chart	5 (42%)
Decrease GCS	1		
Activated in Error	1		
Missing from chart	2 (17%)		

Table 10   *Reason for patient ERT call based on discharge ward*

The mean EWS score for ERT patients on the surgical unit was MN=10 (SD=2.5) and on the medical unit was 8.3 (SD=3.5). On both wards patients were most likely to remain on the ward (10/12 on each ward) with the remaining being transferred to ICU/PACU (n=2 surgical unit /n=1 medical unit) or transferred out (1/12 patients on the medical unit). Data from initial ERS trigger data indicate that, of patients who triggered a single ERT call, a quarter of medical ward patients and no surgical ward patients died prior to discharge.

4.2.6 Critical incidents sample wards

A retrospective review of Tallaght Hospital clinical incidents database was conducted to ascertain the type and nature of these incidents, on the two pilot wards. Overall, there were 56 incidents recorded

on the two observation wards between September and November 2015 (inclusive). The medical unit ward accounted for 42 of these incidents whilst the remainder (n=14) occurred on the surgical ward. All cases recorded patients as the category of person affected. The most common incident hazard category was Exposure to Physical hazards (slips, trips & falls) (64%, 36/56), followed by Clinical care (30%, 17/56) and Exposure to behavioural hazards (5%, 3/56). Table 11 below further details the sub-hazard type based on ward.

	Surgical unit	Medical unit
	% (F)	% (F)
Blood/Blood Product	7% (1)	2% (1)
Clinical Procedures	21% (3)	14% (6)
Medication fluids/Medical Gases	0% (0)	14% (6)
Self-Injurious Behaviour	7% (1)	2% (1)
Slips, Trips, Falls	64% (7)	64% (27)
Violence, Harassment and Aggression	0% (0)	2% (1)
Total	100% (14)	100% (42)

Table 11   *Sub-hazard type per ward*

4.2.7 Out-of-hours medical call arrangements

A number of different arrangements exist within the hospital for providing both general and specialist medical and surgical cover for patients during the out-of-hours period. Information regarding the call rotas is available to all hospital staff and is posted daily to the hospital intranet electronic noticeboard system[5]. Since 2014 work patterns for NCHDs providing out-of-hours cover have changed in an attempt to increase compliance with the European Working Time Directive (EWTD) and ensure that staff work no more than 24 hours in one shift. EWTD encompasses a number of measures designed to protect workers' welfare and safety including those of Non-Consultant Hospital Doctors [NCHDs] (DoH, 2016). Of particular relevance to medical scheduling is the provision that workers should have a maximum 48 working week (averaged over a reference period) and are entitled to a rest break of 11 hours daily or equivalent. In Ireland, as in other European countries, this directive has led to substantial re-structuring of NCHDs work patterns and arrangements. In Tallaght Hospital, medical staff work a core Monday – Friday work week. Core daily hours of work are 9 a.m. – 5 p.m., but this

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[5] See Appendix 9 for examples of the on-call rota posted daily on hospital intranet

varies as each NCHD has a start and finish time set by their Consultant based on service need. Tallaght Hospital HR documents (Medical HR, 2016, pers. comm., 26 January) indicate the number of hours worked weekly ranges from 39 to 48 hours, dependent on service requirements, but may often exceed 48 hours.

4.2.7.1 General medical on-call/take arrangements

A number of medical consultants within the hospital are required to provide an on-call service for general medicine on a rotational basis, outside of their own specialities. This medical on-call rota is developed by the Human Resources (HR) Medical Division with input from the Clinical Director of Medicine, using a rotational template. This means that each of these consultants will be on-call for general medicine cover on an approximately 1-in-10 pattern, and in most cases call is undertaken by a different medical team each night. This on-call cover is known as "take". This means that this consultant and a registrar from their team are responsible for the care of medically admitted patients (both admitted through the emergency department and those on wards) during the out-of-hours period. Usually this consultant is on-call from home, and attends the hospital when (or if) needed. During the week, when normal working hours resume, a "post-take ward round" is conducted. This means that the team on-call overnight will visit the newly admitted patients on each ward to decide on their plan of care. All patients who have been admitted under the care of another consultant within the previous calendar year are "handed back" to the care of that consultant after the post take ward round. For "new" patients, who have not had a previous admission, a consult request is sent to the appropriate team, depending on reason for admission. On weekends this "post-take ward round" is conducted on the Monday morning. The organisation of this call rota is explained in further detail in section 4.3.1.1 below.

4.2.7.2 Shared on-call /take

Approximately once a week, a "shared take" call occurs, between the Age-Related Healthcare (ARHC) team, and another general medical team (the "co-take" team). The ARHC team are on-call out-of-hours as outlined above, and carry out the post-call ward round the next day, order relevant investigations and request consults for patients. Any patients under 65 years of age are then handed over to the care of the co-take team. Patients over 65 years of age remain under the care of the ARHC team. The ARHC team also provide cover for speciality rotas for ARHC, Rapid Stroke access and Peamount Hospital, separately to their general medical on-call cover.

4.2.7.3 Specialist medical on-call/take

A number of specialities provide on-call consultant cover, and some have unique arrangements to cover their specialist area and patients during the out-of-hours period. For example, a Nephrology Registrar is on-call for renal patients from 5 p.m. – 10 p.m. daily and a Haematology/Oncology Registrar from 5 p.m. to 9 a.m. daily. Speciality cover arrangements vary between teams and at weekends, and some teams will provide cover on-site, while some will be on-call from home. [6,7]

4.2.8 General surgical on-call/take arrangements

As with the medical cover discussed above, a number of surgical teams will provide an on-call service for general surgery on a rotational basis, outside of their own specialities. The surgical on-call rotas are devised by staff in the Department of Surgery in conjunction with the Surgical Consultants. Once the pattern has been agreed by the Surgical Consultants, the Surgical On-Call Registrar rota is then created in an effort to place Surgical Registrars on-call with their own lead consultant, as far as is feasible[8].

4.2.8.1 Specialist Surgical on-call/take

A number of specialities provide on-call consultant cover, and again some have unique arrangements to cover their specialist area and patients during the out-of-hours period. Some surgical specialities also have unique arrangements to cover their specialist area and patient cohort during the out-of-hours period. For example the Ear, Nose & Throat (ENT) registrar is on-call from 5 p.m. to 8 a.m. and Trauma Orthopaedic Registrar from 5 p.m. to 8 a.m. Again, speciality cover arrangements vary between teams and at weekends. Some teams will provide cover on-site, while some will be on-call from home.

4.2.9 NCHDs out-of-hours work patterns

The specific arrangements for on-call staff in Medicine and Surgery varies. Generally Intern-level NCHDs work a 1-in-9 call pattern, and their on-call shift begins at 5 p.m. Monday to Friday, and at weekends at 9 a.m. Saturday for a 24 hour period. Senior House Officers (SHOs) work an 'extended day', from 9 a.m. to 10 p.m., Monday to Friday, returning to usual work the following day. Two SHOs are rostered to provide overnight cover 10 p.m. to 10 a.m. from Sunday to Thursday, and Saturday

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[6] See Appendix 9 for examples of the on-call rota

[7] There is a lack of data for the frequencies of on-call specialist consultant and registrar cover, in both medicine and surgery

[8] At present no further information is available on the call pattern of general surgical cover

shifts are covered by the same SHO for 24 hours. Staff working this night shift pattern return to normal working hours after required rest periods. For medical SHOs there are three 'rotating' staff members that cover the day time hours when the team's SHO is on a rest period. Surgical, orthopaedic and urology SHOs do not have backfill staff cover. The call arrangements for Registrars differ somewhat, again due to need for compliance with 24 hour working. The 1st On-call Registrar is linked with the consultant on-call (i.e. from that team) and works the on-call shift from 13.00 to 13.00 the next day (24 hours). They are responsible for both the Emergency Department and Wards, and are the senior point of contact for Senior House Officers and Interns for queries related to medical patients, and surgical patients with medical issues. The 2nd On-call Registrar works from 09.00 to 09.00 next day. From Monday – Thursday inclusive the 2nd On-call Registrar post is covered by the Cardiology Registrar, who is on-call in-house. They are responsible for cardiology referrals from the Emergency Department, Acute Medical Assessment Unit and from 1st Registrar On-call. They also provide cover for cardiology inpatients and attend Emergency Response Team (ERT) calls. All other issues requiring the Medical Registrar are directed to 1st On-call Registrar. From Friday to Sunday inclusive, 2nd On-call registrar is covered by a general medical registrar, and the Cardiology Registrars are on-call from home for Cardiology issues only. [9]

NCHDs who have completed the rostered on-call period are require to absent themselves from the hospital for the legislated rest period. Therefore one staff member (Registrar, SHO, or Intern) on each team may not be available if they have been on-call, although potential activity within that team may have increased due to the impact of call activity in the preceding 24 hours. The availability of staff within a particular service may be further compounded by holiday or leave period.

4.2.9.1 Compliance with EWTD & overtime

The most recent statistics available on EWTD compliance for Adult Services in Tallaght Hospital are outlined below, however national statistics are not currently available for comparison. The hospital is compliant with the 24-hour workday rule and was on average 50% compliant with the 48 hours NCHD work rule for the quarter October-December 2015. According to Human resources feedback (Medical HR, 2016, pers. comm., 26 January) the main barrier to compliance is the number of staff available for rostering, in addition to service demands. There is currently no further information

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[9] See Appendix 5 for Medical Registrar on-call arrangements

available on how compliance is calculated, or how the number of man hours to be covered is calculated.

Although core working hours were described as 9-5, Interns in the focus groups reported that they regularly work longer hours than those reported in the rosters.

> *"We all have rostered hours on core and some people are rostered 9 to 5, some people are rostered 8 till 7 or some, I don't know. For example I was rostered 9 to 5 in one job but like yourself I'd always come in at 8 because you have to, you have to get things ready for the round which starts at half 8. The round starts at half 8 and yet we're rostered at 9. And you can't come in after the round"* [Q1: Interns Focus Group]

> *"When you're on surgery you have to be in half an hour before the round starts, the round starts at the latest half 7, but you have to be there, you have to have everything printed off, you have to know what new patients have come in, you have to like review the stats the night before, review bloods, like see if anyone has had any issues overnight. It takes a half an hour, we don't get paid until half 7 starts. Like that was 3 months"* [Q2: Interns Focus Group]

The traditional practice of paid overtime was discontinued with the introduction of the EWTD, as some specialities were sanctioned extra posts for compliance with same (Anaesthetics, Endocrine, Gastroenterology, Respiratory Medicine, and Cardiology). In certain circumstances overtime may be paid, but, as per Medical HR there are rules surrounding this and sign-off from the Consultant is required to do so.[10]

On-Call Arrangements for General Medicine Service				
General Medical Consultant	The following consultants rotate on-call duties, (approximately 1-in-10) for *General Medical on-call* Respiratory Consultants, Endocrinology Consultants, Dr. Wall (Medicine) Gastroenterology Consultants, Rheumatology Consultants, Age-Related Health Care,			
	The following services are on-call for their speciality; Emergency Medicine, Age-Related Health Care, Stroke, AMU, Cardiology, Haematology/Oncology, Histopathology, Microbiology, Nephrology, Neurology, Palliative Medicine, Psychiatry, Radiology, Interventional Radiology, Anaesthetics (ICU & Theatre)[11]			
		Mon- Fri		Weekend (Sat a.m. – Mon a.m.)
Medical Registrar	Registrar 1 (linked to Consultant on-call)	13.00hrs. – 13.00hrs. (A&E & Wards)		13.00hrs. – 13.00hrs (A&E)

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[10] There is no further information available regarding these rules
[11] Anesthetics is an independent specialty, however for the purpose of the report is included within the Medicine.

		Mon – Thurs		Friday	Saturday	Sunday
	Registrar 2	Cardiology Registrar 1 Registrar on consults & ERT calls 09.00 – 17.00 1 Registrar on-call overnight 17.00– 09.00 [12]		09.00hrs. – 09.00hrs. (Wards & ERT bleep)		
Medical SHO	Medical SHO 1 (ExtD) [13] Medical SHO 2 (ExtD)	17.00 – 22.30 17.00 – 22.30		16.00 – 09.30 16.00 – 09.30	09.00 – 09.00 11.00 – 11.00	09.00 – 09.00 10.00 – 22.30
	Medical SHO 1 (N) [14] Medical SHO 2 (N)	22.00 – 10.00 22.00 – 10.00				22.00 – 10.00 22.00 – 10.00
Medical Intern	Medical Intern 1 Medical Intern 2	17.00 – 09.00 17.00 – 09.00		17.00 – 09.00 17.00 – 09.00	09.00 – 09.00 09.00 – 09.00	09.00 – 09.00 09.00 – 09.00

Table 12   *On-call arrangements general medicine service*

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[12] Again see Appendix 5 Medical Registrar on-call arrangements

[13] ExtD refers to Extended Day, where the SHO will work their normal daytime hours, then remain on duty until 22.30

[14] N refers to Nights, whereby from Sunday – Thursday (inclusive) 2 SHOs will work from 22.00 to 10.00

On-Call Arrangements for General Surgical Service					
General Surgical Consultant	Information regarding the teams providing on-call general surgical cover, and the patterns of call was not available				
	The following services are on-call for their speciality; Vascular Surgery (shared cover with St. James's Hospital) Ear, Nose & Throat (ENT), Gynaecology, Orthopaedics (Trauma), Urology				
		Mon - Thurs	Friday	Saturday	Sunday
Senior Surgical Registrar		09.00 – 09.00	09.00 – 09.00	09.00 – 09.00	09.00 – 09.00
Senior Vascular Registrar				09.00 – 09.00	09.00 – 09.00
Surgical SHO	Orthopaedic & General Surgery SHO (1st On-call for Ortho) (ExtD) Orthopaedic & General Surgery (1st On-call for General Surgery) (ExtD)	17.00 – 21.00 17.00 – 21.00	17.00 – 21.00 17.00 – 21.00	On Saturdays 1 SHO is on-call from 08.30 – 08.30 (24 hrs.) for both Ortho and General Surgery Cover	08.00 - 21.00
	Orthopaedic & General Surgery (Shared Cover) (N)	20.30 – 09.00	20.30 – 09.00		20.30 – 09.00
Surgical Intern	Surgical Intern 1	17.00 – 09.00	17.00 – 09.00	09.00 – 09.00	09.00 – 09.00
	Surgical Intern 2	17.00 – 09.00	17.00 – 09.00	09.00 – 09.00	09.00 – 09.00

Table 13   *On-call arrangements general surgical service*

4.2.10 On-call/take and medical workflow

This report gives detail per consultant of number of discharges, and number of patients under each consultant's care, on a daily basis throughout the 3-month reference period 1st September 2015 – 30th November 2015. Data pertaining to daily bed census was generated through Business Objects. The report was initially split on a broadly medical/surgical/orthopaedic basis. For the purposes of this crude census, Medicine includes Pain Medicine and Dermatology and does not include Emergency Medicine. Surgery includes Orthopaedics, both Trauma and Elective.

Medicine	Surgery
Endocrinology	General
Respiratory	Colorectal
Gastroenterology	Acute Surgical Unit
Age-Related Healthcare	Vascular Surgery
Rheumatology	Urology
Oncology	Upper GI
Haematology	Ear, Nose & Throat
Nephrology	Gynaecology
Neurology	Trauma Orthopaedics
Acute Medical Unit	Elective Orthopaedics
Cardiology	
Pain Medicine	
Dermatology	

Table 14   *Breakdown of census report*

The bed census figures for each day of the 3-month period (1st September 2015 to 30th November 2015) were combined to give the following figures
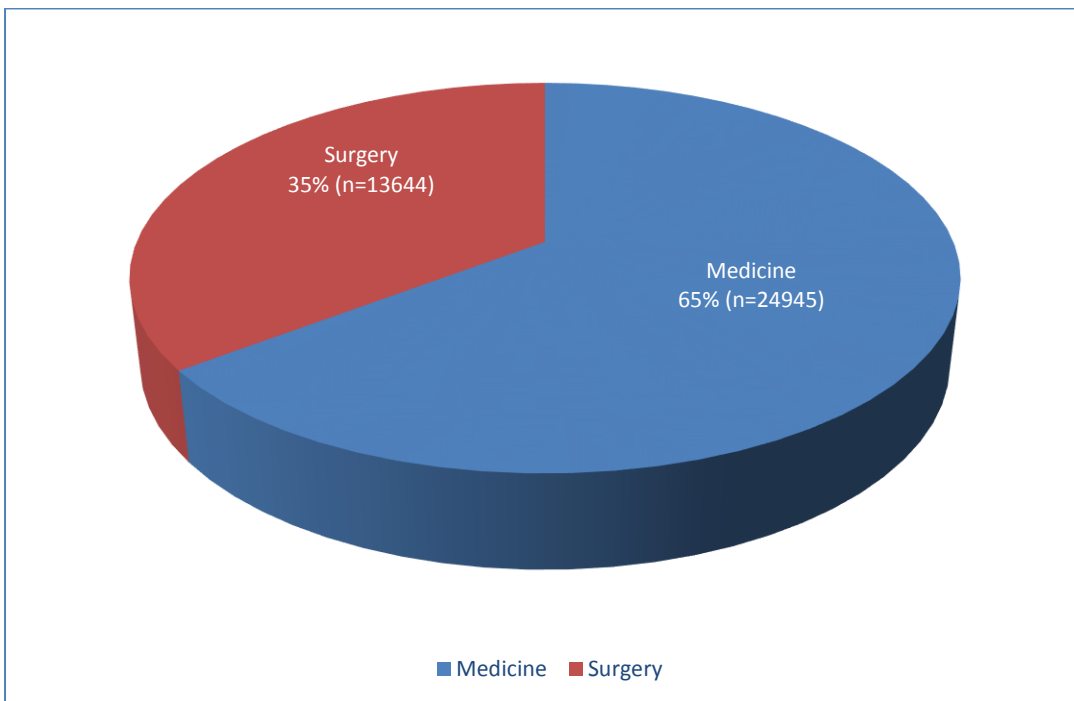
Figure 8   *Bed Census % by Medicine & Surgery 1st Sept 2015 – 30th Nov 2015*

This does NOT take into account day case procedures, only in-patient census figures, and as such is a crude indicator of workload. It does in no way highlight the complexity of individual patients and the care that they require. However, this is of interest in the context of staff availability and workload activity in out-of-hours period.

In an attempt to understand how the pattern of "on-call take" may affect the workload of various teams providing on-call cover, bed census numbers per day during September, October and November 2015 were compiled into flow charts and cross referenced to the on-call rota. Table 15 below demonstrates the number of Consultants and NCHDs assigned to the team. Other consultants who may work within the speciality but did not provide on-call cover during the 3-month period are not included.

Grade	Endo	Resp	Gast	Neph	Age Related	Rheum
Consultant	1	3	2	2	2	2
Registrar	3	5	5	2	4	2
SHO	1	5	3	1	3	1
Intern	2	2	3	1	3	1

Table 15   *Medical NCHDS/Team providing on-call cover 1st Sept – 30th Nov 2015*

4.2.10.1 Medical on-call patterns & patient census

Figures 9 - 11 below demonstrate the daily bed census figures on a trend line (i.e. number of patients in the care of that service on that day) per medical services who provide general medical on-call services, from 1st September to 30th November 2015. This figure was derived from combining the bed census figure for each team on a particular service. For example; there are three consultant respiratory physicians in post. The census figure for the 10/09/15 (n=52) is derived from combining the bed census numbers from each of these three physicians. These graphs both indicate the number of patients in the care of physicians in the Hospital over a 3-month period, but also the (circular) point marker on each trend line highlights the dates that these services provide general medical on-call services. It is interesting to note that the number of patients under a teams' care increases post-call, but also the effect of having the same service on-call for a number of days in succession appears to influence the volume of patients under that teams' care (see the Respiratory trend line). The triangular point marker refers to a date on which a shared take (explained earlier in this chapter) occurs between the Age-Related and other medical team.

September 2015

Legend: Endocrine · Respiratory · Gastroenterology · Age Related Health Care · Nephrology · Rheumatology
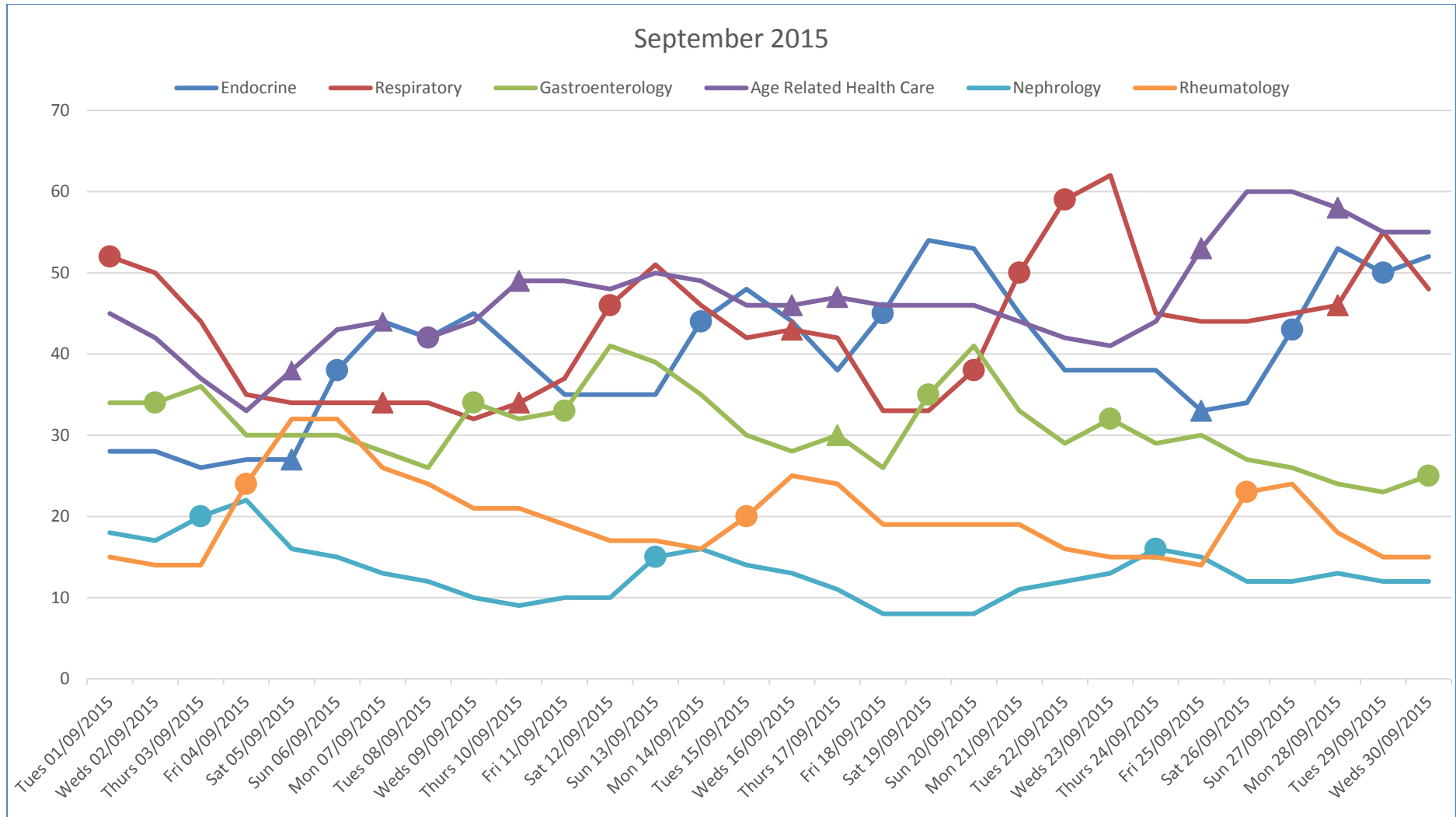
◯ Refers to on-call on that date

△ Refers to shared take between ARHC and another team

Figure 9   *On-Call "Take" Sept 2015: Bed census trends per medical service*

October 2015

Legend: Endocrine — Respiratory — Gastroenterology — Age Related Health Care — Nephrology — Rheumatology
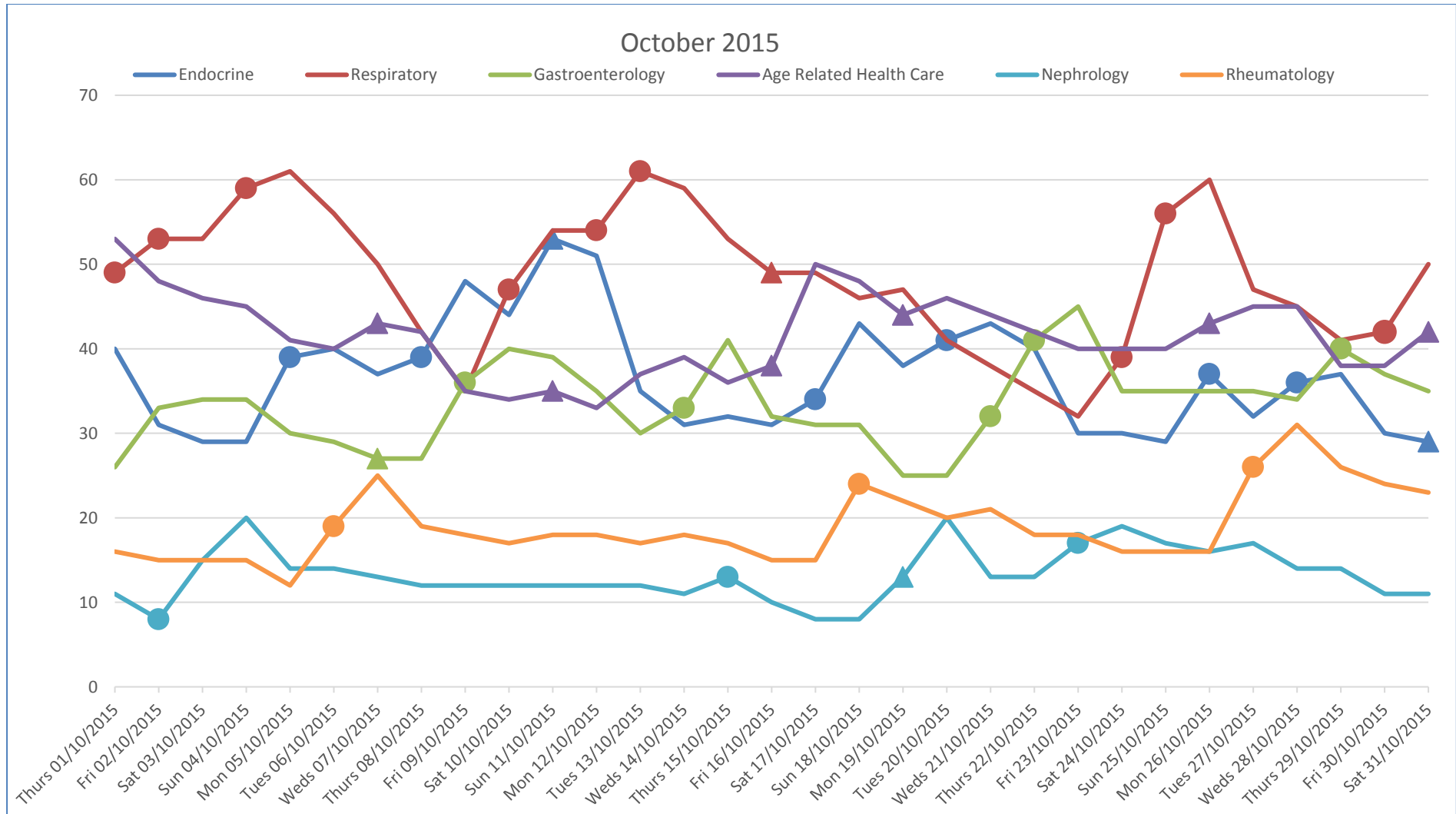
○ Refers to on-call on that date

△ Refers to shared take between ARHC and another team

Figure 10 *On-Call "Take" Oct 2015: Bed census trends per medical service*

November 2015

Legend: Endocrine — Respiratory — Gastroenterology — Age Related Health Care — Nephrology — Rheumatology
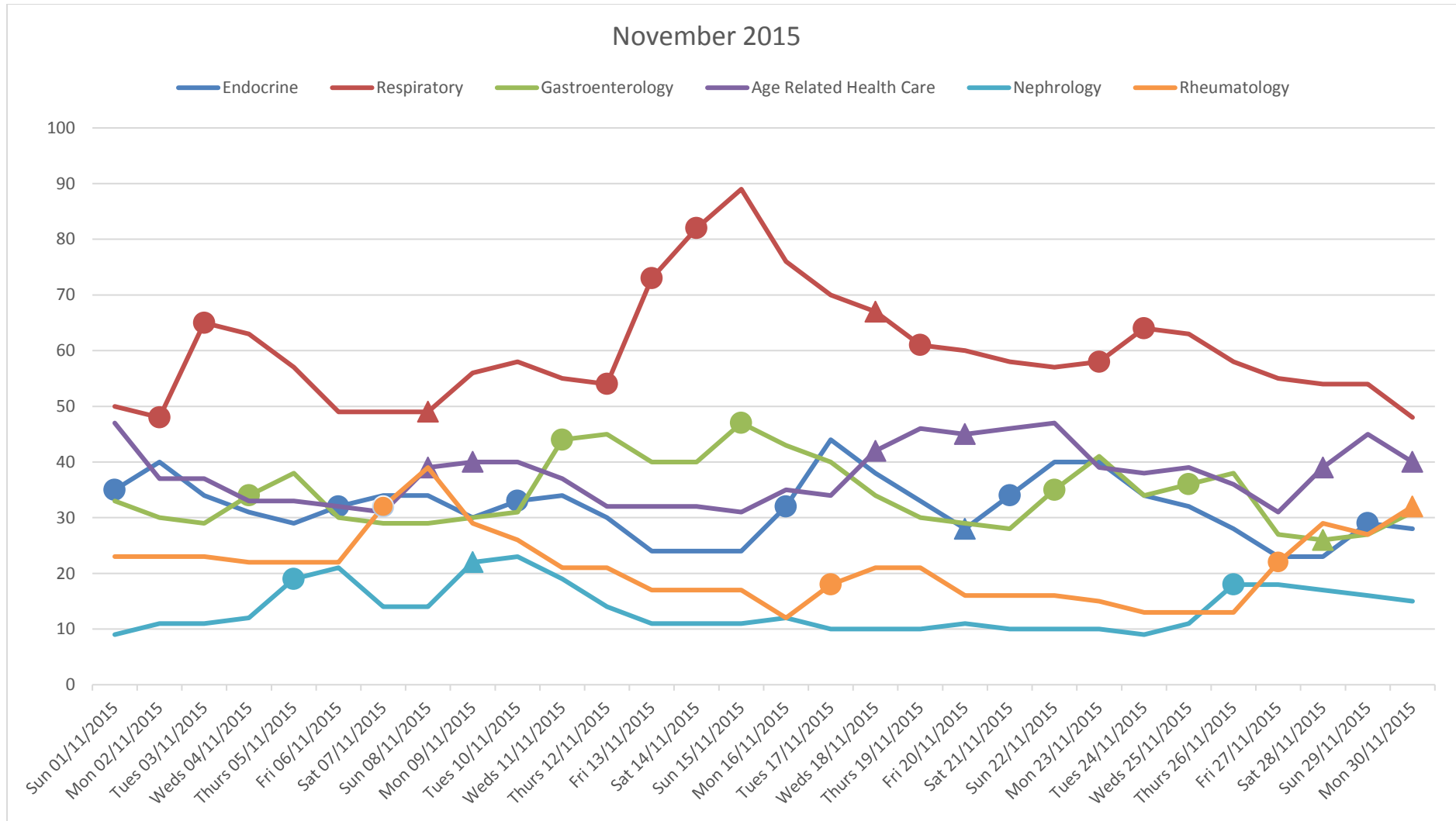
○ Refers to on-call on that date

△ Refers to shared take between ARHC and another team

Figure 11   *On-Call "Take" Nov 2015: Bed census trends per medical service*

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4.2.10.2 Surgical on-call patterns & bed census

Table 16 below demonstrates the number of Consultants and NCHDs assigned to each team. Other consultants who may work within the speciality but did not provide on-call cover during the 3-month period are not included. Figures 12 -14 below demonstrate trends in bed-census figures per service that provide general surgical on-call services, from 1st September to 30th November 2015. These graphs firstly demonstrate that the figures for surgical in-patient census are significantly lower than medicine, but as this does not include day-case surgery activity, this data must be viewed with caution as it relates only to out-of-hours activity.

Grade	Acute Surgical Unit	General Surgery	General & Colorectal 1	General & Colorectal 2	General & Colorectal 3
Consultant	1	1	1	1	1
Registrar	1	1	2	1	1
SHO		1	1	1	1
Intern		1	2	2	2

Table 16   *Medical team skill mix (on-call only) 1st Sept – 30th Nov 2015*
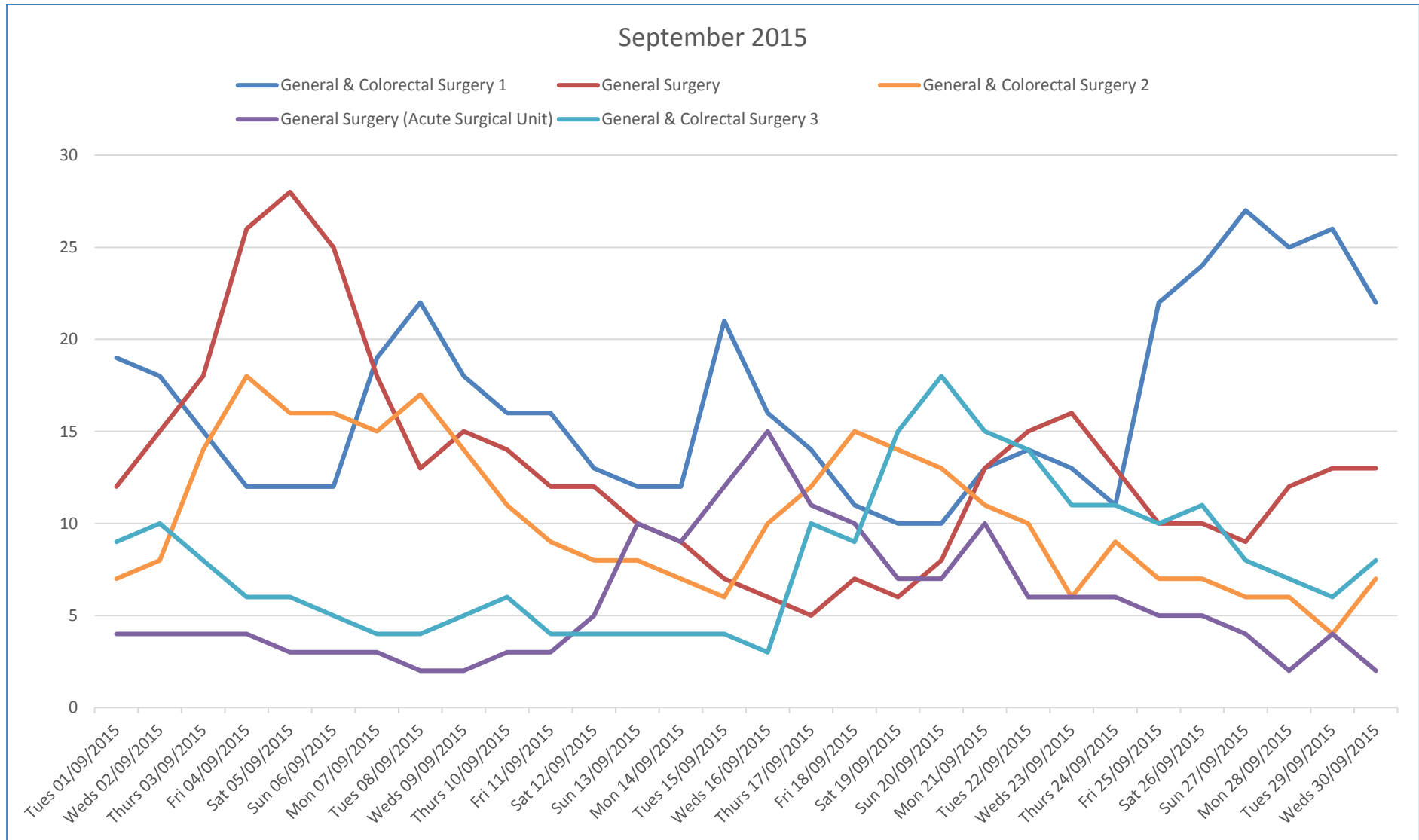
Figure 12   *On-Call "Take" Sept 2015: Bed census trends per surgical service*

October 2015
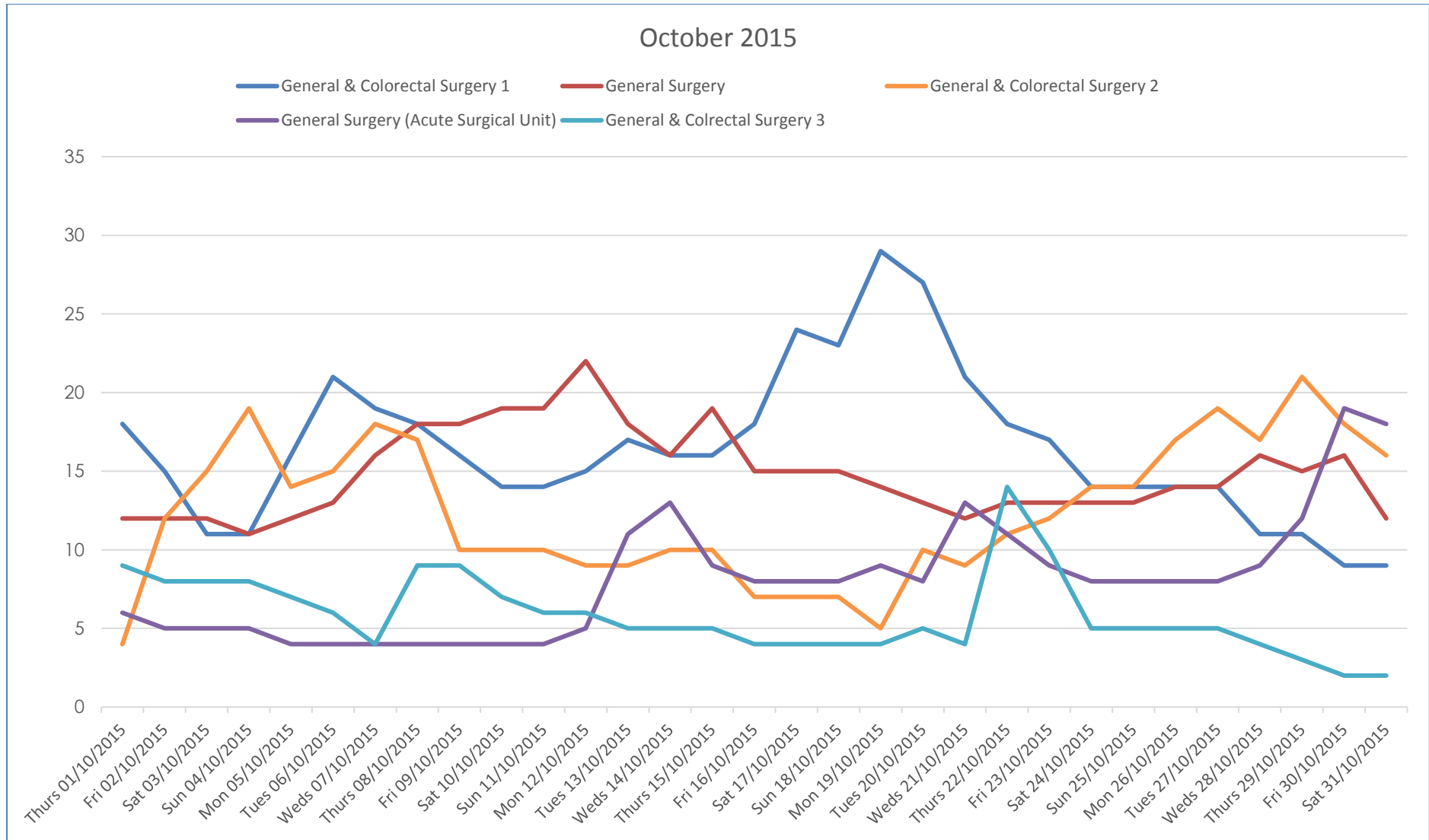
Figure 13   *On-Call "Take" Oct 2015: Bed census trends per surgical service*

November 2015

Legend:
— General & Colorectal Surgery 1
— General Surgery
— General & Colorectal Surgery 2
— General Surgery (Acute Surgical Unit)
— General & Colrectal Surgery 3
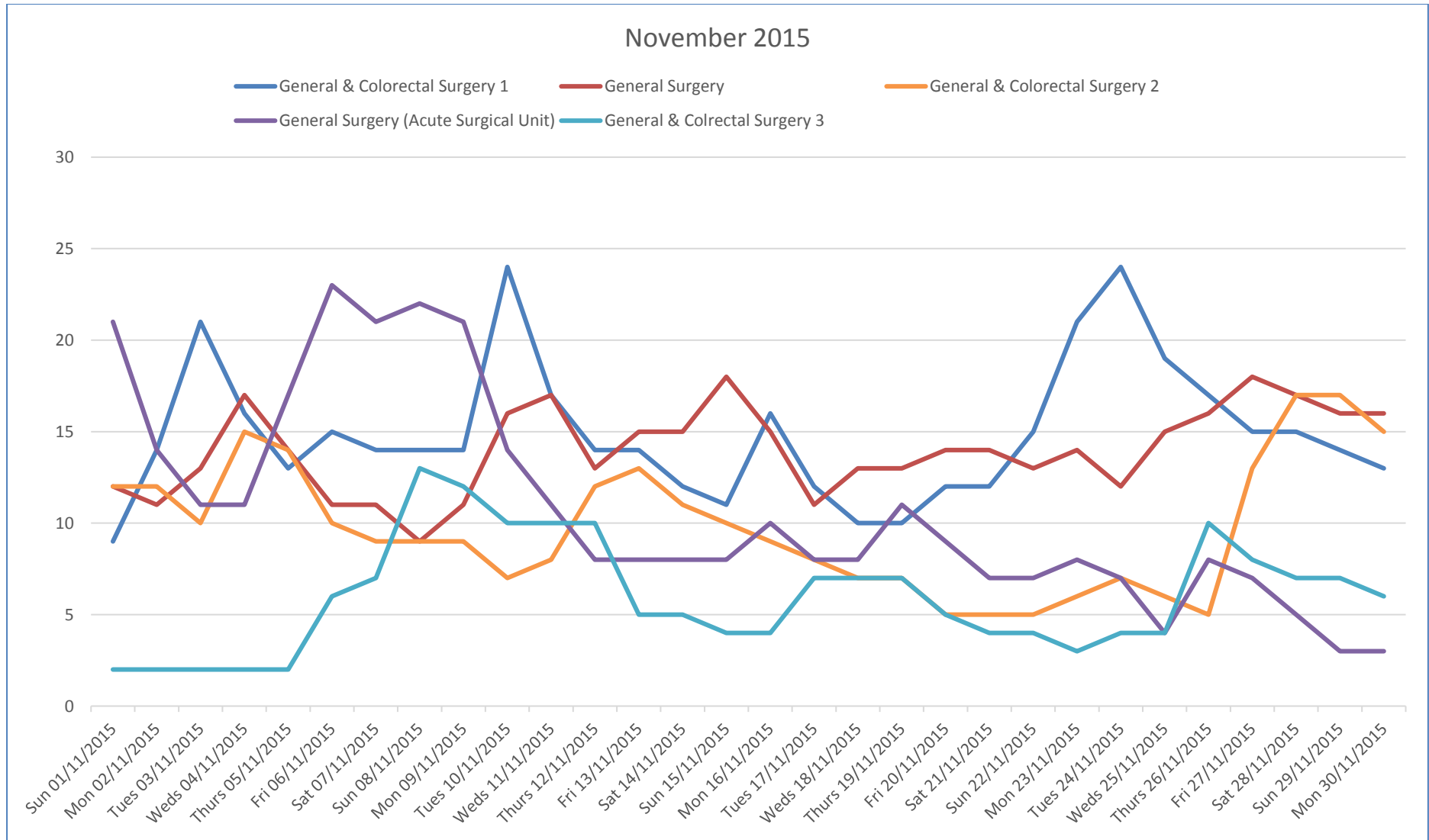
Figure 14   *On-Call "Take" Nov 2015: Bed census trends per surgical service*

4.2.10.3 Communication within surgical teams

The surgical on-call teams communicate 'post-call' primarily via an electronic 'surgical sign-out' system (Ryan *et al.,* 2010; Gibbons *et al.,* 2015). At 0700hrs each morning the surgical SHO who has been on-call overnight sends an electronic report via the hospital email system to a specific-recipient mailing list (surgical members). This communication provides a synopsis of (surgical) teams who were on-call overnight (Consultants, Registrars, SHO), the number of patients brought to theatre, any emergency department admissions, any surgical consults that occurred overnight and background history, presenting complaint and plan of care for those patients. On a Friday afternoon the intern for each surgical team compiles a synopsis of the background, presenting complaint, treatment and plan of care for *all* patients currently admitted under that team's care which is distributed electronically that afternoon.

4.2.10.4 Communication within medical teams

End of shift, or 'post-call' handover, is currently not routine practice within the medical service. There is a formal handover document which outlines the handover process (see Appendix 6b) but according to participants, adherence to the procedures outlined in the document remains low. As a result, NCHDs will communicate with each other informally at the end shift via mobile phone or messaging, if there is outstanding work to be completed, or a particular issue to highlight. As per Medical HR documents (Medical HR, 2016, pers. comm., 26 January), Tallaght Hospital has a policy to guide inpatient clinical handover, although a live version of the policy was not available on the Hospital's Policy Document management site (Q-Pulse) at the time of writing.[14]

4.2.10.5 Weekend medical handover meeting

A weekend handover meeting was introduced within the Medical Directorate a number of years ago, to highlight to the on-call Medical Registrar patients that may need review over the weekend. A number of these handover meetings (n=4) were observed between November 2015 and May 2016 by a member of

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[14] See Appendix 1 Admitted Patient Handover Policy Medical Directorate, which, as per Medical HR is given to all medical staff on appointment to Tallaght Hospital

the research team (see Appendix 7 for a copy of the audit tool). Currently a virtual handover tool, similar to that used in surgery, is being developed in medicine.

The meetings were held at 1500hrs in the operations room in the admin corridor, and the medical registrar on-call for Friday night and sometimes Saturday was in attendance. The meetings took between 30 – 45 minutes to complete, and often commenced as the out-of-hours ADON was completing the nursing handover with colleagues. In addition to the OOH ADON, a team member from Bed Management was in attendance to discuss possible discharges with the medical teams. All levels of NCHDs from any medical team can attend the handover meeting but patients should be identified for review in advance by a senior member of each team (Registrar or Consultant). The meetings were not formal, in that there was no chairperson or agenda observed. On each occasion, there was no visible leader and no formal introductions made, although it appeared that most people knew each other, and appeared to seek clarification if unsure. The observed process was that each attendee arrived, presented a verbal account of the patient requiring weekend review, completed a written record[15] of pertinent patient information and left when they had handed over. The length of the meetings depended on the number of patients requiring review as some teams may have only had one patient to handover on the day, but some may have had three or four. At the end of the meetings the registrar on-call for that night collected the paper records and kept them for their own reference.

When each person delivered their information, most gave the patient's background, reason for admission, investigations to date, plan of care, and care requirements for the out-of-hours period. Generally only medications that were pertinent to the reason for review (e.g. intravenous antibiotics, anti-coagulation medication or blood transfusion) were discussed. Specific instructions were not always given regarding patients whose condition fell outside of particular parameters. Patients' Early Warning Scores (EWS) or observations were not routinely discussed, and the patient's resuscitation status was not generally identified unless prompted by the Registrar. Attendees did identify potential for patient transfers to another facility or discharge, and anticipated timeframes in which this would happen. Operational issues, such as ICU bed availability, number of patients in the ED or awaiting assessment, or

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[15] See Appendix 6a for record sheet kept by the Medical Registrar on-call as a record of requests for review of patients over the weekend.

patients reviewed by Critical Care outreach were not routinely discussed. At times there was more than one conversation occurring simultaneously, which made it difficult to hear the information that was shared. This process, in addition to pagers, mobile phone calls and personnel leaving and entering at different times, caused some minor disruptions to the meetings.

4.2.11 Medical workflow - task requests out-of-hours

Intern level NCHDs were asked to record, using a mobile phone app, each time that they were contacted with a work request. In total, 56 shifts were rostered over the data collection period (2 Medical and 2 Surgical Interns per night over 14 nights), and data was recorded for 50% of the shifts (n=28), by 21 unique users. Nursing Staff on the two pilot wards completed a paper-based log of each contact with medical and senior nursing staff out-of-hours during the two-week study period. A total of 977 valid task entries were submitted by on-call interns to the app over a two-week observation period (7th – 20th December 2015). This data was triangulated with the recordings from the two observation wards relating to task requests to interns over the same period. A total of 214 calls/requests were logged by nursing staff on these wards, with 63.6% of these calls (n=136) recorded on the surgical ward and the remainder on the medical ward.

The distribution of calls across the out-of-hours period was examined (see Figures 15 – 17 below) and revealed that during the weekday out-of-hours periods (i.e. Monday to Friday) 58.8% of recorded requests occurred over the five-hour period between 1900hrs and 2400hrs. Peak activity was recorded between 2000hrs and 2200hrs, which coincides with the immediate period following day to night nursing handover. On weekends the largest portion of recorded activity (40.4%) occurred during the five-hour period from 1100hrs to 1600hrs, with peak activity observed between 1300-1400hrs and 1500-1600hrs. This demonstrates that there was significant difference in workload and activity in the out-of-hours period during the week (Mon-Fri) when compared to weekend out-of-hours.
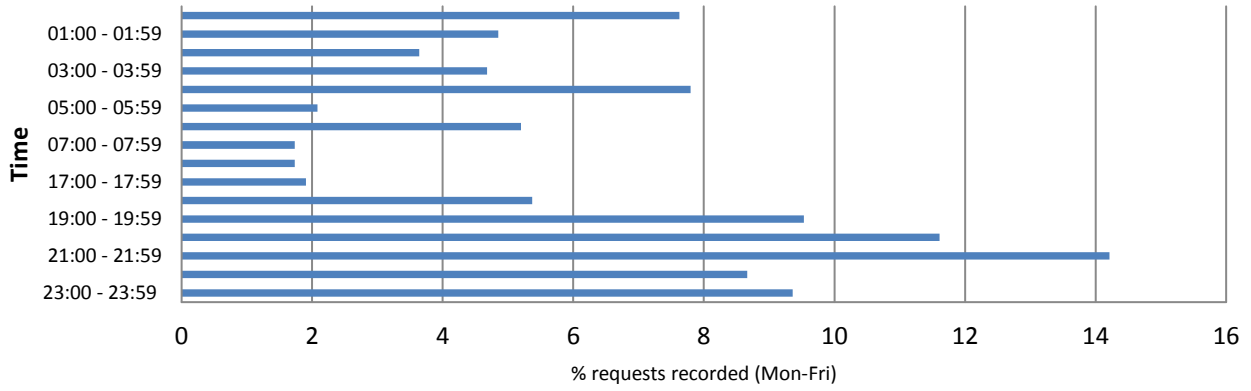
Figure 15   *Distribution of task requests to Intern NCHDs (Mon-Fri)*
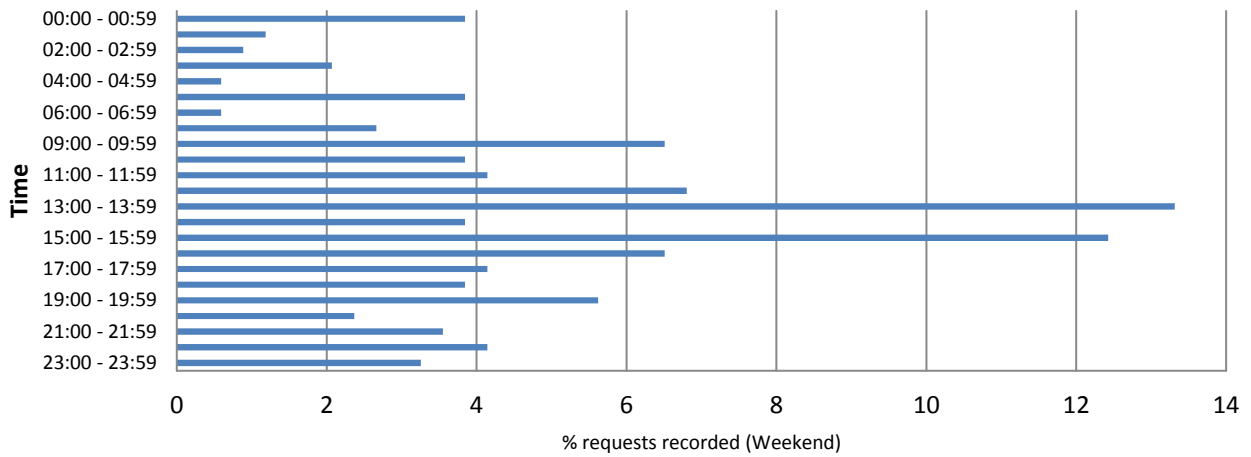
Figure 16   *Distribution of task requests to Intern NCHDs (Weekend)*
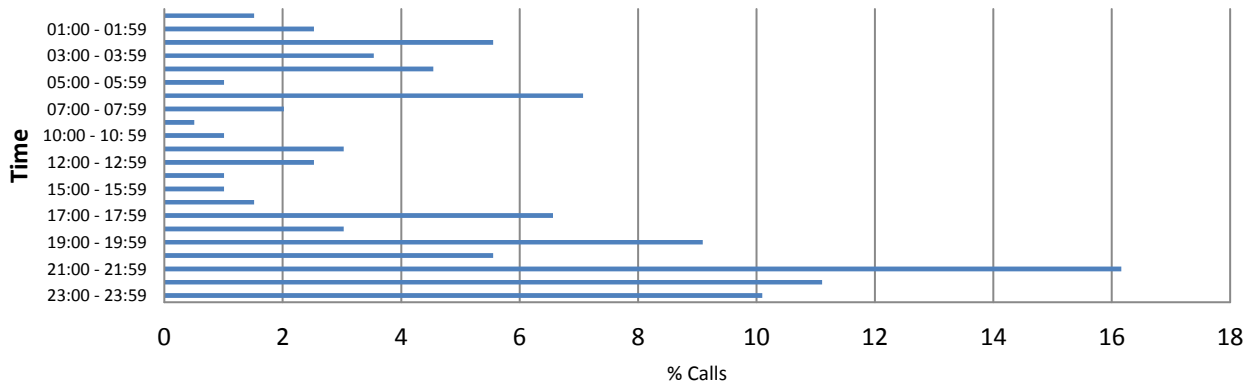
Figure 17   *Distribution of task requests by Nurses by time of day (Mon-Sun)*

Nursing staff on pilot wards report similar timing of task requests to intern NCHDs; 55% of recorded requests by nurses to NCHD interns occurred between the hours of 1800hrs and midnight (this data reflects Mon-Sun activity).

Figure 18 below illustrates the distribution of recorded calls/requests according to ward location and service type (i.e. medical or surgical intern). The figure for each demonstrates a percentage of the total calls for that service (medical or surgical). As evidenced by the graph, the Medical Interns on-call attended calls on all twenty clinical areas, including traditionally surgical units. In contrast, surgical interns attended surgical wards in general, but much more frequently. Figure 19 below also demonstrates the method of communication recorded for these requests.
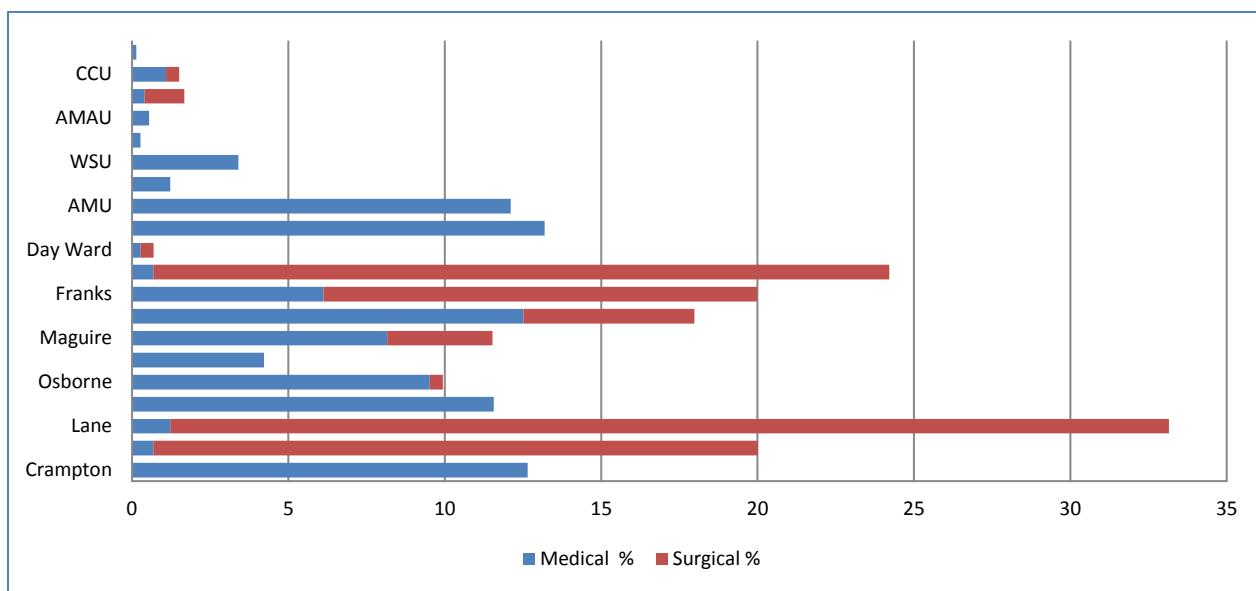
Figure 18   *Self-reported requests to Interns per ward/service*
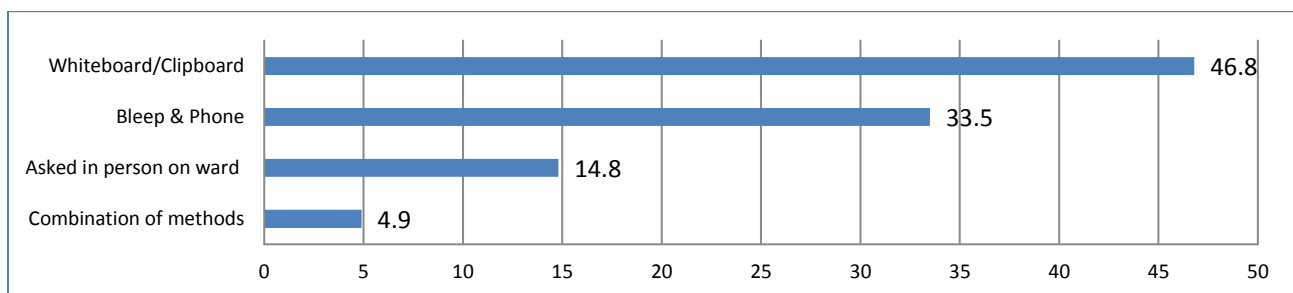
Figure 19   *Method of communication per request*

Participants were also asked to record the reason(s) for each request. Of the total 977 requests recorded, 46 recorded two reasons for request, with two calls having three reasons. Prescribing medication (27%) was recorded as the most common reason for request, followed by clinical review (not due to an increased Early Warning Score) (21%), taking bloods (16%) and inserting cannulas (13%). Figure 20 provides further detail of the main reasons recorded. However, as can be observed from Figure 21 below, some differences between the nurse's task log and interns' record emerged. The prominent pattern in the request to interns as recorded by nurses on two sample wards indicates that taking bloods, prescribing medication and cannula insertion were the primary reasons. Figure 22 displays the frequency of reported tasks by day of week.

Based on the findings from the self-reported app data, Figure 20 below highlights that charting medication is the most frequent reason for requesting Interns to attend the ward followed by clinical review. It should be noted that these clinical reviews were *not* related to early warning score (which had a category of its own). Indeed, less than 4% of reported calls/requests related to a request for clinical review due to increase in a patient's EWS. IV cannulation and phlebotomy represented nearly a third of recorded calls requested.
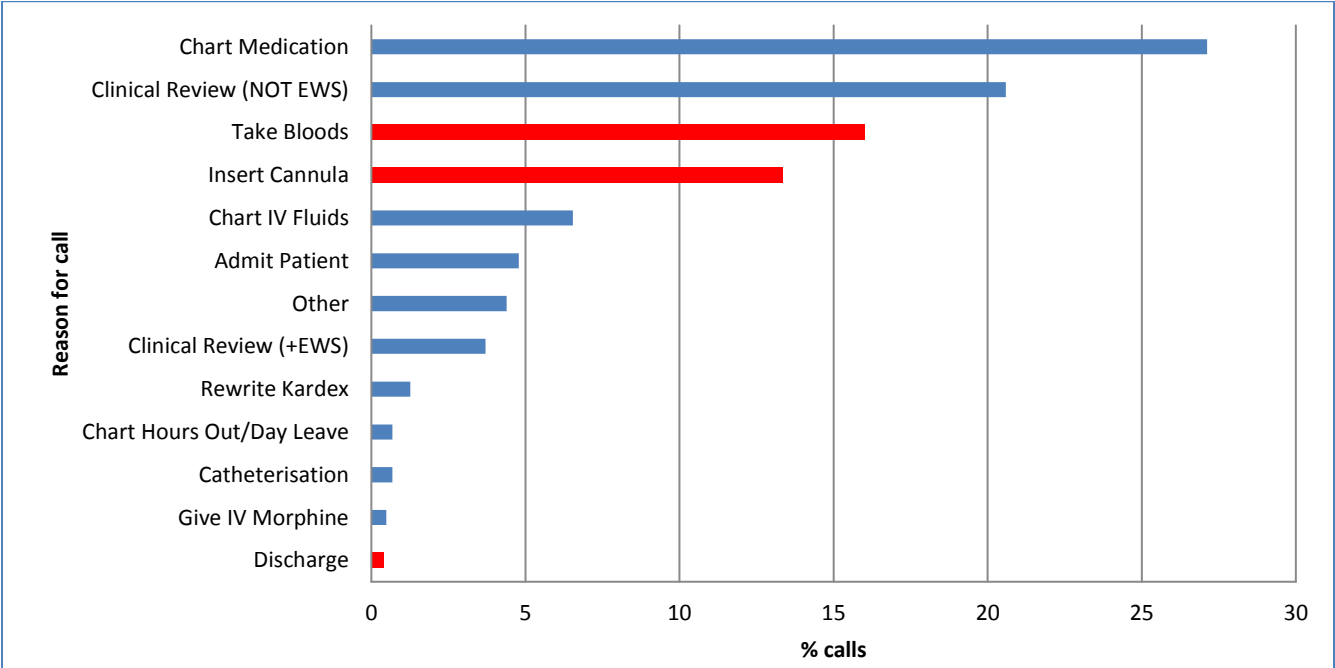
Figure 20   *NCHDs self-reported task requests (those in red are tasks recommended for transfer to Nursing staff in the Haddington Road Agreement)*
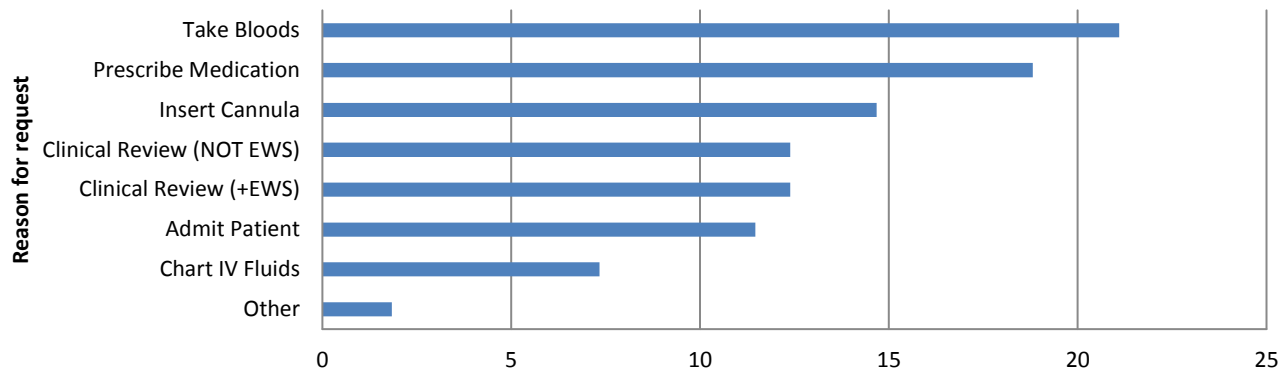
Figure 21   *% of total Nurse recorded requests per reason (n=218)*
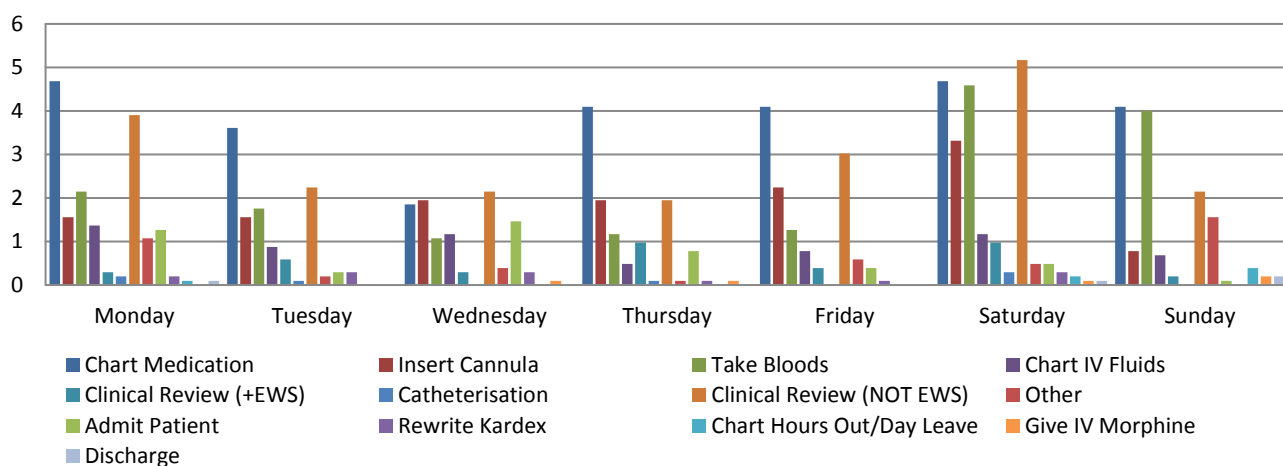
Figure 22   *Self-reported requests displayed by day of week (2 week period)*

Figure 22 demonstrates the distribution of self-reported calls by day of week, further categorised by the reason for the call/request. As outlined above, requests to chart medication, insert cannulas, take bloods and provide a clinical review (not due to increased Early Warning Score) were the daily most requested reasons for call/request. However, it is noteworthy that taking bloods becomes a much more frequent recorded request on Saturdays and Sundays. This confirms the findings discussed in the qualitative section of the study, where intern NCHDs describe themselves as the "phlebotomy service of the hospital" at weekends.

4.2.11.1 Prescribing patterns out-of-hours

Of particular note, the prescribing of analgesia represented a quarter of the requests for prescription of medications during the out-of-hours period, whilst Warfarin represented 15% and night sedation accounted for 15%. The five most frequently requested medications displayed below, totalling 73% of

total requests, could be considered as those for which need would be anticipated during the provision of day-time care by the primary team.
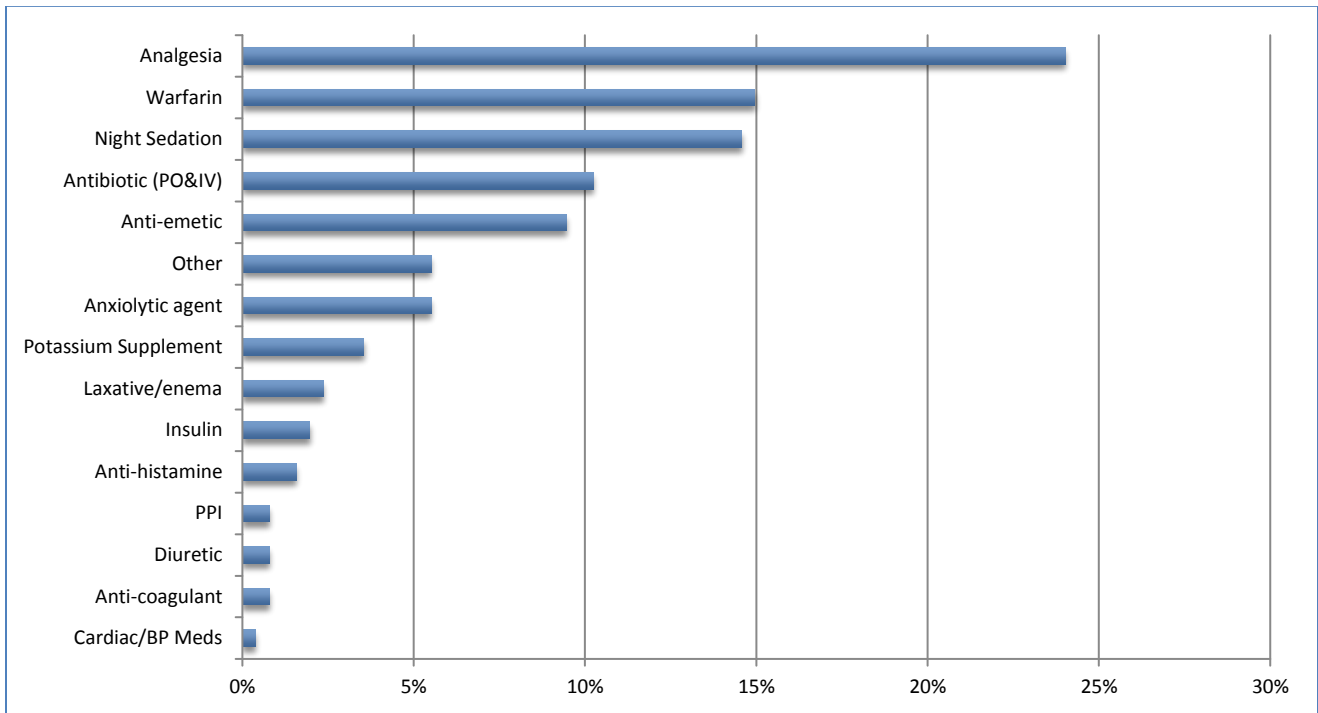
Figure 23   *Medications Charted out-of-hours*
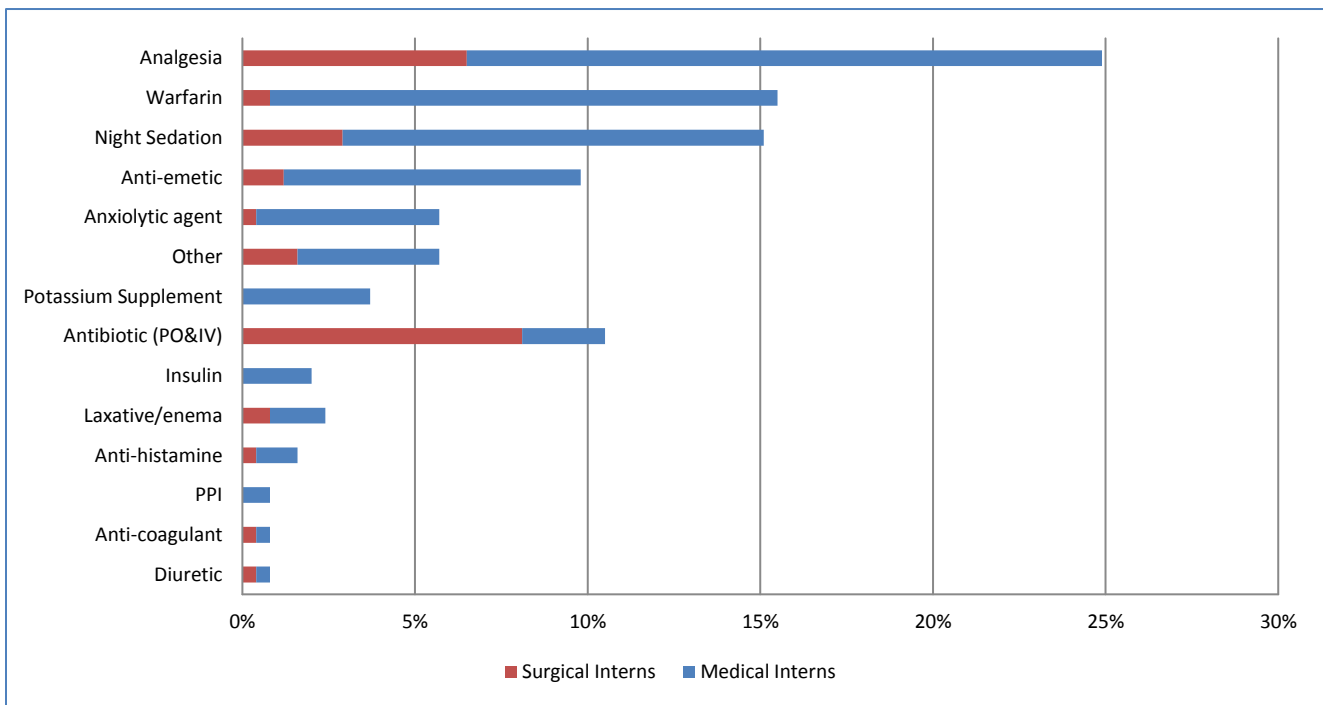
Figure 24   *Prescription request type based on Medical/Surgical Interns*

Figure 24 above further examines prescriptions during the out-of-hours period based on the Intern type (surgical or medical). This demonstrates that more requests for prescription of analgesia were recorded by Medical Interns than Surgical, whilst more requests for antibiotics were recorded by surgical interns.

As Figure 25 below demonstrates the vast majority of task requests (94%) did not require the intern to access support. In the case of support needed, this was most likely to be a Registrar or another Intern.
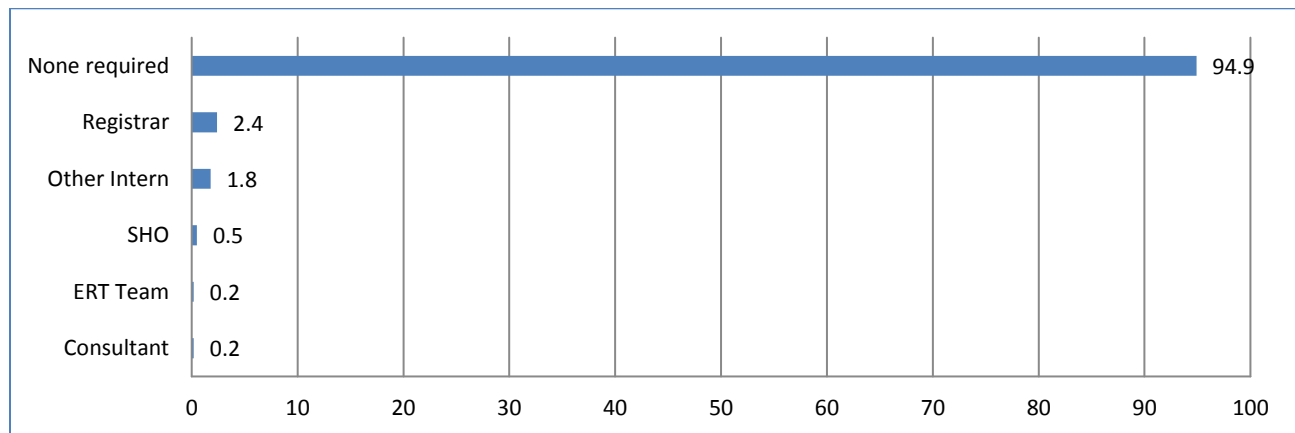
Figure 25   *Support accessed by NCHD Interns out-of-hours*

There was consistency between the two forms of data recording with requests for taking bloods, prescribing medication, inserting cannulas and clinical review (not related to increased early warning score) being the most frequently requests made. A small minority of calls related to patient incidents. During the 2-week data collection period, NCHDs reported 9 separate calls related to patient falls.

4.2.12 Nursing work patterns out-of-hours

Informed by the project aims and following analysis of ERT calls and in consultation with the Hospital at Night Steering Group two wards (one medical and one surgical) were examined to provide some understanding of the typical patient activity (Section 4.2) and human resource patterns for such areas in the hospital. The two wards selected were a 30-bed surgical ward, specialising primarily urological with 18 beds assigned to this service and a 31-bed medical ward specialising in Respiratory Medicine, Neurology and Gastroenterology but without any predetermined assignment. It is usual that both wards have an additional 1-2 patients accommodated on trollies per the Hospital's escalation protocol.

4.2.12.1 Nursing staff availability & ratios

Ward managers were asked, at the time of data collection, how many registered whole-time nursing posts (WTE, Whole-Time Equivalent) and Health Care Attendant (HCA) posts (WTE) should be on the ward, and the number that were actually on the ward. Each of the units had their assigned Clinical Nurse Manager II (CNM II) and Clinical Nurse Manager I (CNM I) posts filled. Data revealed that the number of registered nursing posts on both audit wards was below the assigned number. Surgical ward had an assigned WTE of 20 staff nurses but 17.9 FTE at time of audit. Turnover rate over last year has been 15% (3 staff). The medical ward had 21 WTE staff assigned but a shortfall of 3 WTEs existed due to vacancies and long term sick leave. This ward has had a 33% (7 staff) turnover rate over the previous 12 months. Both wards had their full complement of 5 Health Care Attendants (HCAs) at time of audit. In addition, a ward clerk was assigned to both wards to assist with clerical duties and management of patient records. They worked a flexi-time arrangement under the Clerical Services team lead, but they were usually available on the wards between 8.30 and 5 p.m. The majority of staff, 88 % over both wards (n=32), had more than five years' professional experience, while 27% had less than five years' experience (n=10). The median number of years since qualification as a nurse on the surgical ward was 9.5years and the medical unit was 16 years. On The medical unit, one staff member had a dual nursing qualification and had undertaken a management course whilst four staff had a Certificate in nursing (22% of WTE of 18). Again, four staff on the medical unit and seven staff on the surgical unit had a Diploma level nursing qualification (22% of WTE of 18 and 39% of WTE of 17.9 respectively). 14 staff on the medical unit and 12 staff on the surgical unit had a Bachelor of Science (BSc.) or Bachelor of Nursing (B.N.) degree (77% of WTE of 18 and 72% of WTE of 17.9 respectively). One staff member on the surgical unit had a post-graduate diploma in surgical nursing (5%) and one staff member had a post graduate certificate in urology (5%). Several staff on both wards had undertaken CPD courses, both within the hospital (such as 5 day wound management course) and externally (Urology course/Cancer care course). Over both wards, at the time of data collection, no staff had a master's level qualification.

	Qualification	Surgical unit (21 staff nurses)	Medical unit (20 staff nurses)
Highest Educational Qualifications	Certificate in Nursing	0	4
	Diploma in Nursing	7	2
	Degree in Nursing	12	14
	Post graduate qualification	I PG Certificate 1 PG Diploma 0 Masters	0
Continuing education courses	IV cannulation & Phlebotomy	3 completed education and practicing same	9 completed education Not practicing same
	male catheterisation	1	0

Table 17   *Summary of qualifications held by Nursing staff on each ward*

Normal working hours are 39 hours per week comprising of shift work. Some staff may work less than this due to part-time/job-sharing roles. Staff can be rostered for both day and night shift duties over time. Day shift runs from 0730hrs to 2030hrs and night shift from 2000hrs to 0800hrs, which allows for a 30-minute overlap at the end of each shift to conduct the shift handover. Staff on both shifts are involved in the care of patients in the defined out-of-hours period (1700hrs – 0900hrs). On the surgical ward 5 staff nurses (RGN), 2 intern student nurses and 1 or 2 health care attendants (HCAs) comprise the day shift staff complement, while on the medical ward this is 4 staff nurses, two intern student nurses and one HCA. Intern student nurses are considered as a 0.5 Whole Time Equivalent (WTE) for rostering purposes. Both wards have 3 staff nurses and 1 HCA assigned to night duty. The surgical ward practices a team nursing approach, their nurse patient ratio is 2 staff nurses and 1 intern student nurse assigned to care for 15/16 patients during the day. At night 1 staff nurse is assigned to 10/11 patients. The medical ward use a team nursing approach[16] in the earlier part of the day shift, and then patients are allocated to a named nurse. The usual day-time nurse patient ratio is 1 to 6 on this ward, and 1 to 10 on night duty.

4.2.12.2 Nursing skill mix & potential task transfer

On Surgical Ward three staff members (16.75 % WTE) have undertaken the HSE Learning Programme in Intravenous Cannulation and Phlebotomy and are maintaining competence by regular practice. On the

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[16] Team Nursing: The Registered Nurse functions as a team leader and coordinates a small group of personnel to provide care to a small group of patients. As coordinator of the team, the registered nurse is responsible for knowing the condition and needs of all the patients assigned to the team, and for planning the care of each patient (Marquis and Huston, 2015).

sample medical ward nine staff (42%) have undertaken the HSE Learning Programme on IV Cannulation and Phlebotomy, but may not regularly practice, as participants reported that it was custom and practice to request doctors to perform this task. All staff are competent in administering medication or nutritional support via Central Venous Access Devices (CVADs), however no staff are competent to take bloods via these devices. One staff member from the two wards is competent to undertake male catheterisation (5% of current WTE), and all staff are competent in the placing and caring for patients with nasogastric tubes. No staff members currently hold prescriptive authority, and there are currently no Patient Group Directions (PGDs) in place for the administration of particular medicines to a particular patient cohort (i.e. post-operative laxatives).

4.2.13 Diagnostic, allied health professions & support services out-of-hours

To ensure that information presented reflected accurately the provision of out-of-hours services, a number of departments within the hospital were asked to complete an online survey to describe how they operated out-of-hours. Table 18 below sets out the departments who provided descriptive information concerning out-of-hours service provision.

Department	Out-of-hours Cover Arrangements
Clerical Services	Clerical services provide limited out-of-hours cover 2/3 Staff are assigned to the emergency department for the registration and admission of patients in the ED.
Diagnostic Cardiology	No out-of-hours service. *equipment is available for use by the Cardiology On-Call team for patients requiring urgent diagnostic evaluation. Electrocardiogram (ECG) testing is performed out-of-hours by suitably trained medical and nursing staff in ward areas and the emergency department, using portable equipment.
Laboratory	Out-of-hours cover provided for urgent sample processing and blood transfusion requests (5 staff until midnight / 3 staff after midnight) Requests filed electronically following discussion with referring clinician
Medical Records	Normal hours are 08.00 – 16.30 Mon – Fri No out-of-hours service available weekdays (Mon – Fri) Limited service from 08.00 – 16.30 Sat & Sun (access to charts stored in on-file chart room only) If a chart is requested from off-site storage before 15.00 each day Monday to Thursday it will arrive back into the hospital the following morning around 09.30. If a chart is requested on a Friday before 15.00 it will be returned back into the hospital by 09.30 on Monday morning. If a chart is required urgently for ED or Admissions it can be ordered through the Adult/Paediatric Emergency Department Administrative staff. These

Department	Out-of-hours Cover Arrangements
	express deliveries (only for emergency charts) are returned within 2 to 3 hours.
Occupational Therapy	No out-of-hours service
Pharmacy	Normal working hours: 08.00 – 18.00 Mon-Fri 10.00 – 12.00 Saturday & Sunday (urgent items) * Outside of these times staff can access required medication from the Out-of-hours Medication list stored on hospital intranet, via the ADON on duty. *A pharmacist is on-call to provide drug information or dispense urgent items that are not available anywhere else in the hospital, and must be contacted via the switch
Phlebotomy	No out-of-hours service provided on weekdays (Mon – Fri) Reduced cover on weekends for urgent blood sample requests - full day Saturday (5 staff) and reduced Sunday & Bank Holiday cover(2 staff) This reduced service covers six specified wards in the hospital; Crampton, Gogarty, Maguire, Osborne, Acute Medical Unit and the Acute Medical Assessment Unit. [17]
Physiotherapy	From 16.30 each day Mon-Fri and weekends a respiratory physiotherapist (1 staff) is on-call from home for urgent referrals, which must be made through Registrar or Consultant. A post-operative orthopaedic physiotherapy service is in place at weekends (3 staff) for patients following specific orthopaedic procedures (such as hip replacement). Patients are referred using a post-operative care pathway
Portering Services	The Portering services team provide out-of-hours cover, with a variable number of staff available until 8 p.m. dependent on service need. From 20.00 overnight there are 6 staff on duty (one supervisor, one porter in theatre and four porters in-house) Duties include transporting patients to and from clinical areas, transporting samples and blood products to and from the laboratory, assisting clinical staff in theatre, ICU and PACU and mortuary duties. After 5 p. m. and at weekends portering staff take charge of the medical equipment library, and deliver equipment such infusion pumps, syringe drivers to clinical staff in ward areas.
Radiology	Out-of-hours cover is provided (5 staff) for urgent plain film x-ray and CT scans. Requests filed electronically following discussion with referring clinician
Speech and Language Therapy	No out-of-hours service

Table 18   *Diagnostic, Allied Health Professions & Support Services out-of-hours*

The other resource available to staff is the Emergency Response Team (ERT), members of which include Anaesthetics and ICU Nursing Staff. Changes in the patient's Early Warning Score (EWS), a set of

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[17] No data available as to why these wards were chosen

physiological observations which are scored according to their values, allows staff to escalate care where appropriate. An emergency response can by initiated when a patient's condition deteriorates and their score reaches a particular number. During the day-time (9 a.m. to 5 p.m.) the Critical Care Outreach Nurse is available to support unwell patients and nursing staff in ward areas.

4.2.14 Summary

This chapter has provided an overview of the typical patient activity patterns within the medical/surgical wards and highlights the potential impact of changing hospital environment on out-of-hours clinical workflow. The analysis of trends in bed census numbers provides insight into the range of specialities and personnel engaging in the medical surgical areas and gives some insight into potential flashpoints that may arise. The call arrangements and relationship to patient activity does illustrate potential differences in workflow between medical and surgical teams during the out-of-hours. The call task activities of NCHDs indicate recurring patterns in relation the nature of routine activity and prescribing patterns out-of-hours. The next phase, the qualitative phase will ascertain perceptions among staff of call arrangements and communication surrounding clinical decision-making out-of-hours, to understand barriers to workflow and ways to enhance work design out-of-hours within the organisation.

4.3   Staff perspectives of out-of-hours working

This section presents the findings of the qualitative interviews and focus groups with medical and nursing staff. These interviews focused on questions relating to how the out-of-hours service delivery works in Tallaght Hospital. Interviews varied in duration from approximately 30 to 110 minutes and took place in the hospital. The main themes that emerged from the interviews with staff regarding the supports for out-of-hours decision-making were as follows: Call arrangements; Communication pathways; Barriers to workflow and Work design.

Theme 1. Call arrangements	Theme 2 Communication pathways
Theme 3 Barriers to work flow	Theme 4. Work design
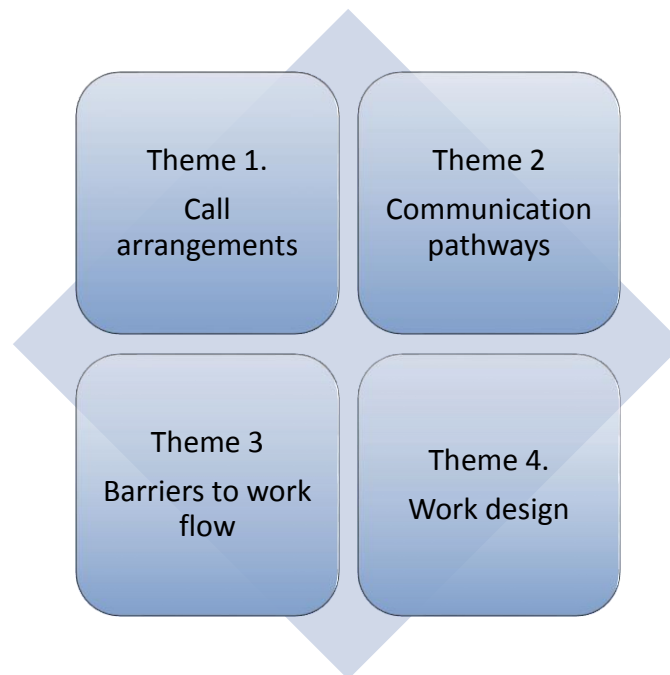
Figure 26   *Overview of the Thematic Presentation of Interview Findings*

4.3.1   Demographics

A total of 27 participants took part in interviews/focus groups and included Non-Consultant Doctors (NCHDs; Intern & Registrar grades) and Nursing staff (Managers, Nurse Specialists and Staff Nurses). All staff worked in Tallaght at the time of interview and had experience of working during the Out-of-hours period. Length of ward experience ranged from six months to 20 years. Staff were selected from both medical and surgical wards/specialities. Table 19 below sets out the participant group in further detail.

Participant group	Number of interviews	Total number of participants per group
Interns	1 (focus group)	11
NCHDs registrars	3	3
Staff nurse	2 (focus groups)	8
Nurse Managers/senior	5	5

Table 19   *Overview of Interview Participants by Group*

4.3.2   Call arrangements out-of-hours

In terms of call arrangements there was general agreement that a number of potential and actual difficulties are encountered for staff working out-of-hours as a result of call arrangements. The distribution of staff is evenly spilt at Intern level for Medical and Surgical cover (2 for each service), however there are more NCHDs assigned to the medical on-call service in-house (see Section 4.3). One registrar is supported by 2 interns for each service to provide coverage for the hospital between 5 p.m. and 9a.m. Monday to Friday and from 5p.m. on Friday through to Monday morning. In addition, the registrar supports the SHOs to cover ED for all admissions to respective services. Although SHOs are nominally available to cover the ward areas, in practice they are often required to remain in the ED due to the volume of work. This division of labour around geographical areas between interns and SHOs is generally viewed as a reasonable accommodation to make best use of available staff and skill mix out-of-hours. As set out in Tallaght Hospital Human Resource (HR) documentation, support to interns is part of the OOH Registrar role. In line with this there was agreement among all grades of staff around the willingness of senior medical personnel to be contacted and receptiveness to give support when needed.

"I think there is more of a trend to contacting someone, even if they're not on-call, to let them know that somebody is very, very sick or you know they've died or you know they're gone to ICU, that I think the threshold is kind of coming lower" [Senior NCHD SI]

"There's no point in spending the whole night worrying about someone and not being able to pay attention to the next person. So, like everyone, like the seniors, SHOs and everyone who has more experience would always have told us, always if you're in doubt ring, because it's better. And even if you get your head bitten off, at least you haven't, you know…" [Intern FG]

Some specialties have their own arrangements for on-call.

> *"We use the intern and we're XX so we actually have a XX registrar on-call till 10, so they're actually ok, you can contact them by mobile. The XX consultants as well are happy to take calls if necessary. That was a sort of a thing that they decided amongst ...themselves. Because we were having trouble at night and it's so specific for a XX patient. And even with medical Regs coming up at night, there was issues, so they're happy to take calls from us, whichever consultant is on-call"* [Staff Nurse FG]

Officially the on-call period starts at 5 p.m. and Interns report considerable pressure to get the day job finished before they start on-call activity and this can leave them playing catch up on-call related workload. Interns do not have a formal handover before they start call and their instruction regarding work to be accomplished almost exclusively arises from direct instruction given by nursing staff through the bleep system or through the white board when they do sweeps of the wards each night or periodically during the day on the weekends. There was reference to the consequent challenges faced by interns in meeting the multiple demands of their role. Of note here is the sheer volume of contacts and distance involved in their roles. According to the interns, this balancing act of workload is very easily tipped over the edge by unexpected events. Many note that the capacity to respond is in fact often complicated by the latent effect of the build-up of work that arisen as results of call arrangements.

> *"There is no handover. There's no handover, no. If someone is very concerned about a patient they'll ring us. Yeah. You know but it's not an official thing, they'll say can you do me a favour, can you take bloods or something. But apart from that we get all of our information from the nurses on the ward by bleeps or by the boards [whiteboards in situ on wards]*
>
> *……. at the weekend I guess, you know you do the list, you do a big round and there could be, could be about 80 patients on that list and that's not all the people that you're responsible for"*
> [Intern FG]

Particular challenges do arise in achieving the balance of workload actively due partly of course to the unpredictable nature of call. In particular, this imbalance is perceived by many participants to negatively

impact on the work load and sometimes the availability of the medical registrar for *all* patients who become unwell unexpectedly, both medical and surgical (if related to a medical complaint).

> *"So, we had a person that had a blocked suprapubic catheter, I was called down, just because I'm in house, I was called down to fix it and I tried once or twice and really I can't try any more than that without possibly causing damage. And it's a urology problem. But because they're not in house at night time you do end up mopping up everything, you know. Even if it's somebody, like in fast afib, you are the first point of call for anybody that's sick. Whether they're surgical, orthopaedic, medical, urology, even the haematology patients"* [Senior NCHD SI]

> *"So I think it depends as well, so if you're working on the wards you can be asked to review sick patients that are, you know sick respiratory patients, sick septic patients, sometimes you're asked to review like patients from the surgical wards or the orthopaedic wards that have acute medical issues as well"* [Senior NCHD SI]

The particular arrangements for on-call are discussed in Section 4.3 of the quantitative findings, and although nominally two registrars are on-call out-of-hours during the week, participants report that the cardiology registrar does not usually respond to medical issues for ward patients.

> *"During the week, there is a Cardiology Reg on at night time that carries the ERT bleep but until it gets to that stage where there's an ERT call, the cardiology Reg doesn't have any input with any of the medical patients"* [Senior NCHD SI]

This creates unforeseen imbalance in the workflow around this service. This imbalance can be further exasperated by the frequency of the on-call take of particular medical teams. While not frequent there were reports of extreme imbalance in some weeks for some NCHDs due to arrangements for *on take* between medical consultants, perhaps due to the unpredictable nature of call and the volume and intensity of day time work carrying over to out-of-hours. This resulted in some teams being extremely overworked with others appear to be underutilised in those periods (see Section 4.5.1 & 4.5.2).

The medical team contact on-call colleagues informally to highlight patients who are unwell or require follow-up on testing while the surgical team complete a digital sign out after 24 hours on-call. Surgical

registrars on-call from home have established systematic routines rounding on all patients each weekend morning with a distinct division of labour with one intern devoted exclusively to the ward round on weekend days. This round can be duplicated later in the day with the on-call consultant. As related by participants from across the clinical groups this can have impact on workflow in other areas of the hospital as noted:

"The other issue that happens on Saturdays, Sundays and bank holidays is for the surgical rounds, one intern has to be present with all of those rounds and that means they are, can often be absent from let's say hospital ward duties until well after lunch time" [Nurse Manager SI]

Responses by many interviewees indicate that the on-call arrangement for interns leads to an uneven pattern of work and availability to attend wards. It is clear that this has further knock-on effects for the efficiency of work by nurses at a ward level.

"For the Saturday and Sunday surgical interns that the round, if they could bring in an extra intern to cover the intern that's gone on the round, to help the intern that's left on the wards doing all the jobs, its mad." [Intern FG]

4.3.3   Communication pathways out-of-hours

Out-of-hours activity is reliant the on exchange of large amounts of high quality information. The life blood of communication out-of-hours is the bleep system with evidence of increased use of mobile phones. There is some evidence of other technologies in use for example email and messaging services for communication but recognition of the limitation and risk associated with such communication strategies:

"I mean that's probably a generational thing. But you could be wandering and the next thing you get a blast of [messages] which is just not, not appropriate at all, so they ring me because that's what I want them to do. Because I don't want to be finding out if someone is … dying, depending on Wi-Fi" [Senior NCHD SI]

Unsurprisingly the bleep system and its centrality to communication out-of-hours emerged as significant issues of concern for almost all participants. The transfer of information between nurses and interns is

reliant on the bleep system and some dissatisfaction was expressed by both parties in this regard. While all interns acknowledge the importance of interaction with and their dependency on nurses to relay to them the work to be done, they struggle with excessive volume of bleeps at certain peak periods.

"That's it, going into it, like oh I'm on-call this evening….and just even talking about this now. Just thinking about the volume…. That you're going to be going for hours and hours….The worst part is the first couple of hours because you know that you have left, like you know 14 more hours ahead, I've 12 more hours ahead, I've 5 more hours" [Intern FG]

"It's the volume, I don't mind the sleep deprivation as much as the volume [of calls] and like the feeling of being constantly bleeping" [Intern FG]

"Because and like that's slows, it does slow as the night progresses, you know you don't get a bleep free period but you do get a period when the bleeps come every 20 minutes instead of every minute" [Intern FG]

"I think that's really scary and it's really, really stressful, just the sheer volume from let's say probably about 8 o'clock till about 1 AM. It's after [nursing] handover that it really intensives you know, because obviously everyone has sat down and gone through and ok these are jobs that need to be with interns and everyone does it at once. And from every ward, so you know" [Intern FG]

Many calls are for routine work that might be picked up on the sweeps of the ward or by grouping activities. Interns are further challenged by the inability to get any information on the nature of the call, limiting their opportunity to plan response or prioritize tasks/workload:

"I know in Australia and some hospitals they have bleeps that give you little message, so you can, you know you can prioritise the bleep before you even answer them" [Intern FG]

This is of particular importance when they are engaged in direct patient contact and cannot immediately answer. Pending responses can be overtaken with more recent bleeps with result that the intern may overlook earlier ones:

"And another thing is, like there's only 2 medical interns and 2 surgical interns so it can often happen that both of us are doing procedure and neither of us can answer a bleep. And we don't know and will never get back to it, because there is so many other bleeps coming in at the time. And you don't know if the bleep you missed was the important bleep, you know"
[Intern FG]

Furthermore, as two interns are on-call those whose names appear first on the call list may receive a disproportionate volume of call thereby again limiting their ability to pace their work. Delays are inherent and compounded by the time expended in phone back and locating relevant nurses. There can be issues with accuracy of the call list on some occasions due to unforeseen changes, illness or absence.

"But interns as well and you keep on bleeping them, bleeping and bleeping and you feel like why don't they answer. And then you just eventually ring the switch and say sorry can I just check the numbers again, you know that we have correct and then they say the other one is the wrong one, so no wonder" [Staff Nurse FG]

Nurses related their frustration with unanswered bleeps and the pressure it brings about due to the inability to progress on their work and indeed to meet real and immediate patient need at times

"And you've another 10 patients that also need you so you're under pressure because XXX won't answer his bleep like you know" [Staff Nurse FG]

However, interns also noted that, in some cases, when they did respond to bleeps there would be no answer on the ward or the person answering the call was not aware of any request. They may then get a follow up at a later point querying why the intern did not respond to their bleep. These frustrations related by nurses and interns clearly demonstrate the communication issues resulting from the current bleep system. However, as noted by some interns and nurse managers, internet and phone black spots throughout the hospital limit potential adaptations to the current system with alternate technology.

The transfer of information between doctors contrasts between the surgical and medical teams and is of course influenced by the differences in the patients group. The sign out in surgery every 24 hours reflects the call period and is facilitated at weekends with the electronic surgical sign out list populated over the course of a number of days. The creation of such a handover list in medicine does appear to be

more challenging given the evolving clinical situation necessitating more frequent interaction and verbal update, therefore the handover between registrars is informal.

> *"I suppose if I had a sick patient I would contact the Medical Reg on-call to let them know what the story is, should they need to see them, or just to make them aware of them …You bleep them and sometimes you know if they're in A&E busy, you're waiting around trying to contact them, you know sometimes you can't get a hold of them or you go down to A&E and you find them, which isn't ideal either like you know. And they could be anywhere in the hospital. I'm just thinking that if they're not answering their bleep they're probably down in resus or in A&E so you might try and go down to find them. Or you try to get through to them on their mobile but you know it's not a very concrete way to hand over sick patients. And then they have to scribble down on a piece of paper while you catch them there and then you know"* [Senior NCHD SI]

Over weekends communication around medical patients can be problematic for all concerned, as the more informal list may be incomplete due to oversight in communication or unforeseen clinical situations. There is some difficulty reported by teams in getting to the standard medical handover meeting at 3p.m. on Friday afternoons. Although the challenge of not having a formal handover for call on weekdays was noted by interns, the creation of a formal handover period for interns was not believed to be particularly helpful

> *"You don't hand over on Monday morning, you just……We go home and somebody comes along and they'll see what happened"* [Intern FG]

> *"Either way someone is going to have to work extra time to do this [handover], you're either asking someone who has been in for 24 hours to stay an extra hour to tell people"* [Intern FG]

The findings do illustrate that modern-day health systems continue to rely on traditional ways of working and communicating. However, all participants noted the core function and organisation of hospital work is considerably changed given the development and challenges in health care.

> *"In the olden days when we were a speciality, XXX, 30 patients only, it was very easy to manage and coordinate because ….the consultants have their specific times and days for*

doing their ward rounds. The Regs would do their ward rounds more in the evening. So the XXX patients are seen twice a day. That's still the same for XXX. But now with the cohort of patients we have and the mixed specialities there could be 4 ward rounds going on at the same time. So of course, it does get diluted a little bit between CNM1, CNM2 and the staff nurses. So I try and encourage the staff nurses, particularly those that are fairly senior to join the consultants and the registrars during the ward rounds. I believe this hospital has become a little bit lax in seeing the importance of the ward round and the communication both during and post a ward round" [Nurse Manager SI]

Changing practices in how patients are allocated to wards has led to an increase in the number of consultants with patients on each ward. For example, in Section 4.2.3, it is observed from the HIPE data that 46 consultants attended 454 patients on one ward over a three-month period. This in turn leads to a high number of daily ward rounds which places additional burden on nursing staff who aim to maintain a presence on these rounds.

Doctors report irritation with the absence or limited availability of nurses when they come to the wards. On the other hand, nurses are frustrated with delay or incomplete communication of actions to progress the patient journey with the result that things are delayed and are often only picked up on out-of-hours:

"Or they breeze into the patient and breeze by us without saying anything,...So in the evening you're chasing after the doctors like you know what do you want, what's tonight, I want this, I want that, start that, give this, give that" [Staff Nurse FG]

"It's extremely frustrating if you come in on night duty at 8 and you see a note for physio from the team, or for a full NGT and then you go in and you're checking the bloods, I check the bloods at night or whatever, I'd be checking for referrals and there's not one referral sent. If you have multiple patients like that you're spending half your time" [Staff Nurse FG]

Some nurses report resorting to sourcing information from patients instead which they feel can undermine confidence in care. This is further exacerbated by the absence of nurses during clinical review, therefore the opportunity for clarification and exchange of patient information is forfeited. The reasons for a lack of routine follow up information being passed on by doctors to nurses are complex and some

explanations were mentioned both directly and indirectly in participant accounts. They included for example: the changing custom and practice around ward communication and wards rounds, the frequency, timing, and number of medical teams interacting with wards, nurse availability, and of course the traditional practice whereby responsibility for routine documentation of follow-up action is funnelled through Interns. Indeed, interns report feeling pressured to stay abreast of the volume of work. Examples of such work include: documentation of follow up from wards rounds, review of results and referral for diagnostics and investigations.

Those senior registrars on-call at night are confident in their ability to handle the clinical situations that arise but will seek help on occasions or seek advice from colleagues or consultants as needed. They are cognisant of the willingness and interest of consultants to be briefed when unexpected events do arise. Interns do feel supported by registrars in clinical decision-making out-of-hours and the readiness to provide support is reflected in the willingness of more senior staff to be contacted. The findings indicate that the decision to escalate contact to consultant grade is influenced by clinical needs, funnelled by junior staff through registrar grades exclusively and is usually positively received. Registrars balance not initiating unnecessary contact with the potential implications and fall out of not escalating where needed.

> *"It would depend on the consultant, if I know them better and I know that it would be something that they would, you know expect or like to be contacted. I think most consultants would appreciate to be informed if their patient had become, you know unexpectedly sick"*
> [NCHD SI]

Nurses do appear to be able to freely intervene to escalate contact if the clinical need demands particularly those who are more experienced. Occasionally nurses' report reticence either due to personality or inexperience and may require the support of either immediate more senior colleagues or the ADON to escalate.

4.3.4   Barriers to workflow

Workflow processes and related supports were a recurrent theme in the findings. As pointed out by a number of interviewees out-of-hours workflow is considerably influenced by the sometimes unforeseen demand for services, the volume and skill mix of staff, nature of out-of-hours support within the hospital (diagnostics, transport and equipment) and the underlying interaction and communication pathways

around these influences. The complexity of workflow in out-of-hours is shaped by the call arrangement and the distribution of work. There were reports that the traditional approach to the deployment of staff and resources may be no longer fit for purpose given the demands placed upon the hospital out-of-hours.

The fast pace and bed capacity consistently in excess of 100% creates job pressures and is reported by all participants in this study. There is a high level of acknowledgement and understanding by all participants around increased workload expectation upon colleagues including those of a different profession. While there are issues of increasing acuity and bed shortages to contend with many of the frustrations out-of-hours related to availability of equipment, access to diagnostics, computerised records systems and limited or reduced provision for supports where needed. Duplication in admission paperwork and access to working ECG machines, phlebotomy services and blood gases within a reasonable distance were a particular concern expressed by interns. Particular frustrations highlighted by nursing were access to pumps, delays in transport, delays in prescribing and diagnostic referrals and short supplies of pharmacy stock particularly on the weekend.

> *"Pumps, fluid pumps, there just doesn't seem to be enough, but that's medical equipment library… for the dying patient, you know we don't seem to have enough…And it has happened, has happened that we had somebody who was dying…we couldn't get a pump"* [Staff Nurse, FG]

> *"Another issue is … the floor [in the acute medical unit] won't support the x-ray machine, so we can't do portable chest x-rays in the AMU. Which is crazy because there's somebody sick enough that needs a portable, they really shouldn't be going to the department for it. Other issues would be …telemetry. We've a limited number of boxes, we started off we had 10 boxes, we're down to 8 … There's no telemetry for the acute medical unit either"* [Nurse Manager S2]

The flow of patients and admission policies for both elective and non-elective patients are also impacting on the work processes for staff working out-of-hours. Examples described such as elective night before surgery admissions in the interest of protection of beds were understood but misgivings arose around the resultant impact on the workflow. Such practice results in interns being required to do routine admissions into the early hours of the morning. Access to routine diagnostics for patients in such

scenarios are problematic and tensions do arise for when there is misalignment between wards and radiology around what might be perceived as a priority during out-of-hours. Delays are inevitable which has impact on the anticipated progression to theatre the next day and potential for increased length of stay. Such complicated scenarios require coordination and produce multi-layered communication for all staff and in particular nursing thereby increasing the workload on over stretched out-of-hours resources.

> *"Say in the evening time if a XX patient comes in and they need a XX x-ray…prior to surgery. Ring the radiographer on-call [and they say] "I'm not doing that, it's not urgent, tomorrow, tomorrow". But you're like no that's a consultant's instruction. "No I'm not doing it, it's not urgent, I wasn't told about it so I'm not doing it"…[The surgery is not always cancelled] but you'd be frantic ringing x-ray trying to get him down to get the XX…for ease the next day…so when they come in at 7 o'clock…straight down, you're going to theatre. Whereas when we don't have it done, 9 o'clock you're ringing them, will you come and do this…So there's 3 or 4 hours already missed…Because the radiographer didn't deem it urgent enough last night…and that happens quite a lot like…so… you're holding back theatre, you're holding back a bed, you know you're doing loads of things because one person said no"* [Nurse, FG]

According to both nurses and doctors, there is evidence in the findings of shortfalls in planning of routine work across many services and areas. This has considerable knock-on effect on the activities of the staff charged with covering the hospital at night or at weekends. Consistent patterns were noted by participants and they suggest such shortfalls may be effectively eased through attention to forward planning by the primary care team or indeed further attention to work design or processes. Nurses' report missed or delayed actions by doctors' significant influence the flow of nursing work and in turn the patient journey and expressed disappointment that this was not always appreciated by medical colleagues. However, it must be noted that the findings clearly illustrate that delays are seldom the result of individual performance but most commonly can be attributed to expectations, volume and pacing of workflow for out-of-hours on-call doctors.

Similarly, a lack of clarity on protocols for decision-making in some instances or perhaps escalation through the various layers of seniority can increase the need for communication at night and is perceived

to obstruct the flow of work and indeed the quality of service. At times there can also be conflicting instruction between teams creating confusion. One of many examples cited is as follows:

> *"A consultant said this [PCA] should be stopped and then the anaesthetist from [xx department]….said to continue it but like it's between like consultant and anaesthetist, who are we going to follow"* [Staff Nurse FG]

As previously mentioned, Interns in particular expend considerable time on tasks such as cannulation, venepuncture (peripheral & via PICC), and ECGs. Many participants in the focus groups note that intern workload and indeed nursing activity is also considerably impacted by the volume of 'left over work' due to insufficiencies in the workflow in normal medical hours. Tasks highlighted include Warfarin/INR, re-charting of Kardexes, elective admissions, night sedation review, fluid replacement, routine charting of drugs on transfer from ICU/ED, post-operative pain control, post-op antibiotics, pre-op insulin regimes and discharges are regularly allowed to roll into the out-of-hours period, many of which are recurrent requests observed in the app analysis in Section 4.6. However, whilst the reasons may be valid (i.e. staff shortages, patient volume/acuity etc.), the volume of work left over is not commensurate with the number of staff available to cover the out-of-hours periods.

> *"It's just a lot of the time everyone else is busy and when it hits the fan and when you're really under pressure during the day where like the jobs all come together but everyone else is always busy at that time of day as well, so you can't really ask for help"* [Intern FG]

Responding to the requirement for this type of routine work was a consistent frustration reported by the interns. Indeed, their frustration was echoed by the nursing staff who report the impact on already stretched wards operating on minimum staffing levels out-of-hours. Considerable nursing time out-of-hours is expended in the pursuit or 'chasing' of unfinished work or securing the follow through on actions identified earlier in the day.

> *"And so the patient comes back at 7 o'clock from theatre, their own team is gone home, it says on their notes they're for 2 doses of IV antibiotics or 3 doses of post op antibiotics and it's not charted. So you call the intern to get it charted, maybe they're busy and its 2 AM before it gets charted"* [Staff Nurse FG]

"Actually on that, I had to actually one night, I got a transfer from ICU, I had to actually get a printout off their medications, they came with no drug Kardex, I had to go and spend 2 hours sorting, trying to get a print out of all the medication they've gotten from ICU before I could get anything charted and then actually give it" [Staff Nurse FG]

"We used to have a thing of years ago patients not bringing in their tablets, we'd say leave them at home but it's easier for us now because things are getting so bad and so busy that we want them to bring in their tablets. Yeah but they're always told not to bring and their families send them home from A&E. Yeah they're told not to and they're like oh I had them but my wife took them home. Brilliant and then that's the special medication that you're like ringing out-of-hours, ringing the pharmacist when the wife was told oh bring them home like you know so it needs to be a big education thing at this point. Because it is reaching a critical point now where people are missing out on their doses and for a couple of days or they're not getting charted properly and you know" [Staff Nurse FG]

However, of note is the divergence in views from the two professions around this issue of cues /reminders and their impact. A core element of work process in medicine does seem reliant on the cues or reminders from nursing to complete the routine work that is so crucial to seamless health care delivery. As pointed out by a number of interviewees, nurses are often viewed as the coordinator of information, and the nurse interviewees value this aspect of their role but express concern that the traditional strategies for exchanging information is falling short of requirements. Of course, close interaction and regular communication is anticipated in response to sometimes unpredictable clinical situations to achieve the coordination needed to deliver complex medical interventions. Nurse participants value the importance of close and regular communication in response to patient's needs. Less valued by these respondents is the requirement for 'chasing of work' as considerable nursing time out-of-hours is spent on following up on incomplete work as evidenced in this following examples:

"The nurse needs to think ahead of what's needed tonight, like so like it's easy for them to come in and say put him on fluids tonight and they walk off. And they never do and then it comes to 11 o'clock that night and you're like ah he's meant to be on fluids, there's none charted" [Staff Nurse FG]

"They have changed some medications you know they could say oh yeah I'll come later and then when the evening comes you know you haven't first of all ordered it, it's not prescribed, you call the out-of-hours and you know they might not have it" [Staff nurse FG]

This does produce tension between doctors and nurses at times. It is noted that nurses are resourceful and do employ a number of strategies to overcome, such as post-it notes on the chart, verbal reminder on visual sightings and escalation of contact to registrar level to get the desired response needed to progress on their responsibilities.

From the interns' perspective it is clear that, during the out-of-hours service period, the work activity of the intern is demand driven and task orientated for the most part and education/training needs are to some extent secondary unless essential to task. In the absence of formal handover communication on their planned activities Interns rely exclusively upon instruction from nurses on the telephone or on the ward and they are appreciative of knowledge and guidance as illustrated:

"Nurses are so well, their knowledge around those kind of patients and they know what needs to be done or what doesn't need to be done" [Intern FG]

Interns report that tasks are also identified when they do a sweep or are called to ward with a 'to do list' itemized on the white board. However, the majority of interns acknowledge that the wide board does present some safety issues in a couple of ways. Interns already tired often receive only the minimum of information and so there is potential for mistakes. Furthermore, according to some interviewees, the white board task request may be accidentally erased and does not provide record that a request was placed.

"And just on another point for safety and a lot of wards do have it but some wards don't and it's so simple, everyone writes like bed number on the white board, so it's like 14 needs analgesia charted but we don't know that patients name so we go to another white board to get the name, then we go to get the Kardex but by the time you've forgotten what bed number was and you have to go back" [Intern FG]

"The interns come in and they'll just wipe them [tasks] off and not do them. But they'll have wiped it off the board so you're like oh the bloods were taken. And that evening you're like oh what's his [the patient's] haemoglobin and you're like oh his bloods weren't taken" [Staff Nurse FG]

Another method of communication used to communicate with the doctors is post- it notes. However, interns also raise concerns regarding the reliability of this method:

"I know on our ward we put post-it notes on the front of Kardexes, you know please chart warfarin. And you'd leave it, like you'd have it stuck on the front since you did your morning drug round and saw that there was warfarin due tonight, stick a post it on the front, please chart warfarin, they'll come around on or on the ward round with the whole team, they'll see the patient, they'll have their Kardex, all their medical notes and everything and they don't chart it and they go off and they do all their other jobs and it ends up being left to the intern and like somebody else said it could be 2 AM in the morning they're getting their warfarin" [Staff Nurse FG]

Overall, the experiences of interviewees suggest that the historic work practices, employment policies and imposition of the Monday to Friday and 9-5 working day influences the working conditions of those working in the hospital out-of-hours. There was also widespread understanding of the expectation of the lengthened working day with routine hospital activity ongoing until late in the evening. Indeed, Saturdays are reported to require the same as weekday but in many instance staffing and available in other areas are considerably reduced:

"Challenging [during out-of-hours]? I suppose there is less staff, less support around, so if you've a very ill patient bar your emergency response team you don't have a lot of support. And by that I mean even staff numbers at ward level. Like during the day we might have 5 or 6 staff, at night you're down to 3 if you're lucky. And if somebody is ill and not replaced it's even worse. … Saturdays used to be considered let's say a less busy day, certainly in this organisation Saturdays can be extremely busy. You have major theatre Thursdays and Fridays and then these are the patients that you're caring for Saturday. So when I did rosters in the beginning here I often put less staff on, on a Saturday, now I don't, Saturday staffing levels are pretty much on par, the same as Monday to Friday. Sundays and bank holidays maybe could be a little less" [Nurse Manager SI]

Legacy practices do persist contributing to the increasing imbalance of activity and one such discussed was the gatekeeping arrangements to ensure out responsible use of diagnostics. This results in funnelling of all referrals for diagnostics through interns and registrars and this was viewed by many to, at times, obstruct flow and be a source of frustration for nursing. Indeed, it was also noted in the findings that nursing can freely refer to occupational therapy and social work and other specialist services but not to physiotherapy. However, as described in Section 4.8, appropriate referrals were a contentious issue for many ancillary services and changes in practice in this regard would necessitate consultation with these departments.

Time pressure is a recurrent characteristic of hospital work for all front-line staff and participants all report the various effects of this on their performance. Renewing a full medication Kardex by on-call Interns in circumstances where patients are not known to them was a worrying risk management issue for them. Interns do report concern around the quality and potential delay of discharge letters as they are often on catch up. Inconsistency between policies such as early discharge by 11 a.m. and real-life appeared to be poorly understood and discharge is perhaps understandably low on the priority list of interns as they struggled to respond the stresses of the workload.

> "But as far as we're concerned they're low priority like because you've got sick patients to deal with….Yeah because they're well……They're well……They're well enough to go home" [Intern FG]

The insufficiency of the hospital to adequately comply with HSE guidelines on discharge by 11 is also reported is reported in Section 4.2.2. Activity around discharge is a particular area of concern for Interns as they are cognisant of their responsibility for communication between the hospital and GP. Interns report they play consistent catch-up on discharge summaries, with some underestimation of the considerable administrative time it takes to complete this activity to the required standard. Indeed, this inconsistency in facilities to actively promote compliance in some aspects of discharge policy and efficient use of beds was observed also by nursing with regard to housekeeping and transport resources:

> *"Even though we're supposed to like be discharging people in the mornings and stuff and then we can't actually get any person up to the bed until after 3 o'clock [weekend day] because we can't get it cleaned"* [Staff Nurse FG]

"I had a patient that unfortunately passed away at about 25 past 7 in the evening, so the family stayed with her and I called at 9 to get her down to the mortuary because the family wanted to go home and they wanted her settled, it was after 12 o'clock when the porters came up to take her downstairs" [Staff nurse FG]

A number of key tasks emerged in both the quantitative and qualitative findings that present considerable challenge to the workload of the interns. Participants also spoke at length of the challenges in clinical decision-making for junior staff across the professions. In particular, interns describe themselves as the phlebotomy service of the hospital on Sundays and express frustration with impact of this activity on their ability to manage their other work. The impact of the ED bed policy influenced workflow in all patient areas. This was evident in the increased pressure to accommodate patients on trollies with concerns regarding patient safety a recurrent theme, requiring advocacy and intervention from senior nursing personnel at times.

Workflow processes and related supports were a persistent theme in the findings. There is wide acknowledgement that the hospital is working under restrained resources with high levels of turnover, issues of skill mix and the latent effect of national health policy such as efficiency of throughput in ED. There are some very positive examples of peer-to-peer support and clinical leadership throughout the hospital, staff helping out, sharing knowledge between wards and specialist areas and there is a sense of comradery in many ways. However, strategies   to increase efficiency in some areas and to use time effectively do have perhaps unseen effect on other areas. The logistical aspects of the volume of work to be undertaken at OOH is considerable with critical flashpoints highlighted for example the weekend surgical ward round:

"But then your co-intern is going to get bleeped about that patient because you're still on the round. Then they have to discharge the patient but they don't know what the prescription is" [Intern FG]

Beds are a valuable commodity within the hospital environment, carefully guarded and at times a source of disagreement. The location of patients produced barriers to workflow with reference by a number of participants on the effect of bed policy on efficiency and effectiveness. It is evident that participants are resourceful in overcoming some of the territorial barriers to patient flow as illustrated

"You know this is the only way you're going to get that patient in there is consultant to consultant"

[Nurse Manager SI]

This issue of beds does create some particular pressures on the call arrangements in the hospital and expectation around which doctor will care for whom does still appear to be allocated along surgical and medical divides. Participants report regular housing of medical patients on surgical wards but post-operative patients are not accommodated on medical wards. There is consistent and recurrent preference from the participants to accommodate patients within their specialties for the obvious benefits to quality of care. However, there was acknowledgement of the changing health care landscape and impact of the ED 6-hour role. This is evidenced in systematic effort to effect timely patient flow with for example the surgical round the norm on Saturday. However, some solutions were also found to create unexpected and sometimes challenges circumstance for these staff working out-of-hours. For example the practice of one intern dedicated to the rounding on Saturday was reported by many participants to have a negative effective on the processing of routine work in other areas in the hospital. In the event of an intern being occupied with an ill person, work processes for surgical patients could sometimes be stalled. The complexity of these barriers to workflow demonstrate the importance of collaborative and inclusive planning both for day time and out-of-hours services periods.

4.3.5 Work design

There were a number of findings in the interviews with staff that may inform work re-design and the proposed outreach/clinical support positions under consideration by the Hospital at Night Steering Group. Of particular influence are staff shortages, turnover and disparity in skill mix and experience among nurses and indeed among junior doctors. As is evident from the ward staff skill mix data in Section 4.7 this is further compounded by limited or reduced access to expertise of senior colleagues out-of-hours. This has created a need for access to seasoned professionals with attributes needed for mentorship and up-skilling of staff during out of hour periods.

There was an understanding that proposed roles would to some extent be demand driven but central to this having the necessary attributes, qualification, relevant experience, and clinical network in critical care to facilitate decision-making, targeted support and escalation as needed. As one staff nurse

illustrates below, having an experienced resource to provide advice or guidance was valued by many participants.

> *"That there was somebody you could ring and say would you just come and review them as a nurse because this isn't a doctor issue yet. But it potentially is going to become an issue for the doctor"* [Nurse Manager SI]

There was consensus across all grades of clinical staff around the positive benefits of the Emergency Response Team/ Early Warning Score (ERT/EWS) systems. Findings confirmed the view of this senior nurse that

> *"Bringing in our EWS emergency response as well, the ERT team has you know had a huge benefit, you know and particularly for nursing and interns I think, they hugely embrace"* [ICU Nurse SI]

Although uncommon, occasions do arise where the ERT might be inappropriately initiated for a myriad of often legitimate reasons on the part of the instigator. Some participants suggest there may be opportunity for debriefing and informal staff education to preserve the integrity of the service. The findings reveal some areas where refinement is needed around the EWS for example documenting baseline parameters, the nuances of interpretation on borderline scores, when the pregnancy score is EWS/ERT might be instigated and the pathway for escalation around that process. The seamless transition of patients from the Emergency Department (ED) with higher, but anticipated, EWS scores and active treatment plan underway was one example where targeted support to staff at a local level would be helpful to avoid re-activation of a subsequent ERT upon arrival to ward:

> *"I do find very frustrating when people come in to A&E and they have a very bad pneumonia, and they're septic and they need lots of oxygen, they need bipap and they have a tachycardia and they're febrile and everything else. And you've made all this assessment and you've put in the plan, and they move to the ward and they still have a EWS of 8, it has to take 24 to 48 hours for that to change and I think that's what's really frustrating is that the nurses are saying it's a EWS of 8 but I can't change that EWS of 8, everything has been put in, I can't change it, they just have to accept that it's going to be a EWS of 8 for 24 hours"* [NCHD SI]

As set out in Section 4.8, feedback from the various diagnostic, allied health and support services departments also reflect a need to educate staff on appropriate referring and service utilisation. As one service provider notes, training for interns and ward staff could help reduce the burden on many services thereby reducing waiting times for priority cases as this comment from one service reflects

> *"The appropriateness of referrals is a constant struggle for the service as this varies from hospital to hospital and therefore can be difficult for [clinical staff] to determine this"…"Greater training to staff on referral to the on-call services that [allied health services] provide"* [Questionnaire response, Allied Health service provider]

Skills in assessment and clinical decision-making are needed to respond to the increased acuity of the patient profile. In particular, timely intervention and response to sepsis was evident in the findings as a priority in the organisation. A number of protocols have been established to deal with these issues such as the SEPSIS protocol and introduction of the ISBAR However, there was some dissatisfaction with response times due to the demands on medical personnel. The potential for deteriorating patients does necessitate more advanced intervention in the medical-surgical areas with delays anticipated in the transfer to ICU beds. There were also reports from ICU medical staff of the challenges in caring for patients outside of ICU without the skilled support of nursing colleagues that might be anticipated in higher dependency areas. Therefore, having a role with flexibility to respond to such circumstances may be of benefit to increase safety and quality of service. It may also facilitate anaesthetist staff time as patients may be more safety accommodated in those waiting periods:

> *"It would be very beneficial to have a senior nurse with ICU/Critical Care experience to be available to assist the Registrar and perhaps take over care until that patient is transferred to the appropriate department.....That's where it's good that we have, you know the ICU or the anaesthetic nurse"* [NCHD SI]

> *"Because sometimes then if they decide to intubate the patient on the ward or put in lines. The ward nurses, through no fault of their own, this wouldn't be a procedure they'd be used to or they wouldn't, you know you wouldn't generally have patients with, you know central lines. Our clients being ventilated on the wards"* [Nurse Manager SI]

Another potential activity for the out-of-hours critical care outreach will be the follow up and overview of transition of discharged ICU patient to offset potential shortfalls in care, ICU readmission and or increased pressure on ward staff.

The majority of interviewees acknowledged that the changing profile of medical-surgical patients coupled with limited HDU beds and external pressures on hospital resources and bed management sometimes necessitates staff to step up to provide care in circumstances that may challenge their professional comfort zone. There was also appreciation of the need to up skill staff in recognising and responding to the acutely deteriorating patient:

> *"Giving them a bit more understanding of you know the parameters or dynamics are changing and you know kind of giving them a little bit more information might help ……..you know so it's, you know kind of screaming weekends that that's where we need to invest that extra support and you know come Monday morning you've patients all over ICU, you know that come from the wards"* [ICU senior nurse SI]

The nature of skills and activity that staff need support with varied in the findings but all were underpinned by an expressed need for access to senior and experienced clinical judgement to support staff. Throughout the findings participants also identified access to necessary clinical support with equipment and procedures as a priority issue. Examples that may assist in the expansion of scope of practice among out-of-hours staff included: titrating BIPAP, ABGs, central lines, IPV, tracheostomy care, telemetry, venepuncture & cannulation.

> *"It would be ideal to have somebody that can go and work with them if they've a patient just newly started on NIV, help to get it set up, get it prescribed, get it set up properly in the first place. Because even with new doctors, sometimes they're not familiar with the prescription sheet for the NIV and the settings and you know that can cause. Whereas if it's a nurse that's familiar with it, they'll be able to say well you know you start in these settings or they can suggest and obviously it's prescribed by the doctor then whatever way they want it. But if you have somebody experienced that knows what they're doing. It makes an awful difference"* [Nurse Manager SI]

A number of nurses indicated that relatively low levels of nursing staff have completed the necessary training to undertake phlebotomy and cannulation. Restrictions around staff release and access to the necessary supervised practice were reported as contributing to the delays in building capacity around this issue. Some nurses do report reluctance to adopt these tasks due to concern over the impact on their primary role. However, there is also expressed enthusiasm among nurses to take on this activity in the interest of improving the quality of service and feedback from the NCHD interviewees would also indicate there is significant demand for task transfer from medical interns. Indeed, as set out in Section 4.6, analysis of reasons for calls to interns during the out-of-hours period highlight that bloods and cannulation are two of the top four reasons for calls. However, it is likely that some incentive may be needed for this process of task transfer to happen. One suggestion put forward included a more concerted but flexible clinical based education programme to enable more rapid up skilling of nursing staff. The presence of more experienced clinical resources out-of-hours was viewed as a means to both encourage staff and provide the necessary supervision:

> *"But again if you had a resource, if you had somebody there that can do these things. That's where it's invaluable… And even encourage them, because if they see it being done, I think people are more inclined to say well yeah I can actually do it and I'll try it"* [Nurse Manager SI]

In discussing organisational support for out-of-hours many participants remarked on the effect of the European Working Time Directive (EWTD) on-call and staffing arrangements. There was some noted disagreement around the effect of organisation compliance with EWTD on rostered staff schedules. Interviewee noted they that may in fact be misaligned with the actual custom and practice and indeed real world work practice and remuneration practices as illustrated in the following:

> *"For example I was rostered 9 to 5 in one job but like yourself I'd always come in at 8 because you have to, you have to get things ready for the round which starts at half 8. The round starts at half 8 and yet we're rostered at 9. And you can't come in after the round"* [Intern FG]

In summary, the findings illustrate the complexity of service provision out-of-hours. Many of the challenges to the provision of good quality clinical decision-making are related to work design and workflow and are underpinned by the quality of communication and supports around these activities.

4.3.6 Conclusion

Findings from inductive analysis of qualitative interviews illuminate the nuances of the experience of working out-of-hours for staff and the barriers to workflow, the centrality of communication to effective performance, and the latent effects of call arrangements and work design. These findings provide knowledge and understanding not accessible through the other means of data collection reported and therefore deepen and contextualise many of the other components of the evaluation findings.

5   Discussion and Recommendations

5.1   Introduction

Achieving seamless workflow is particularly challenging in out-of-hours due to the complexity of health care organisations, unforeseen or variable demands and established ways of working and utilization of personnel. Clinical decision-making activities are dependent upon effective teamwork and communication and the various structures and processes that shape such endeavours have evolved over time in response to available resources and the prevailing organisation culture and/or priorities. In many instances these are not purposively designed or indeed explicitly considered. There is considerable reliance on informal methods and processes that have evolved over time which keep the enterprise ticking over in optimal conditions, when capacity and demand are reasonably matched. However, these are less effective when the system is challenged by variability (Institute for Health Care Improvement (IHI) 2003). The study findings draw upon both quantitative measures of activities, tasks and the qualitative experience of multidisciplinary staff working out-of-hours to generate meaningful and local data in relation to hospital activity and resources during out-of-hours. The IHI (2003) stresses the importance of such data to enable evaluation of how workflow is designed so care is reliably delivered under a variety of circumstances.

5.2   Hospital systems for call out-of-hours

Particular challenges do arise within health systems in achieving the balance of workload out-of-hours due partly of course to the unpredictable nature of on-call. This imbalance is further complicated by the changing landscape of the health care environment. Considerable differences are apparent in the volume of patients on the medical and surgical services in the hospital. It is important to acknowledge the analysis of patient activity on two sample wards is limited, confined to inpatient stay and does not take into account day surgery. Furthermore, the analysis of inpatient census cannot speak to the complexity of an individual patient's need. However, it is still also evident some areas might benefit from examination. The call arrangements for the two services are somewhat similar and consideration may be given as to imbalance in workload and use of available resource. There are a number of reported projects that sought to achieve balance in medical work, most notably the Hospital at Night Health primarily in the UK health system (Hamilton-Fairley *et al*., 2014). A variety of lessons have been learnt from these initiatives including the importance of flexibility within and between roles, the under

appreciation of generic rather than specialist skill demands out-of-hours, in addition to importance of coordination of all discharge and admission activity 24/7. Health care organisations have been found to be slow to adapt and change work processes and many of the issues detected here have been reported elsewhere (Toomath *et al.,* 2014; IHI, 2003). Patient safety is complex and modern health care environments may require considerable reform of current practices out-of-hours. The EWS systems is an example of such reform and is welcomed by all parties. However, this is only part of the solution to effectively supporting decision-making out-of-hours.

Junior doctors (Interns) report that their work out-of-hours is primarily task orientated and to some extent their educational requirements are secondary to service needs with issues of work overload and burnout as similar to other studies nationally (McGowan *et al*., 2013; Duncan & Haslam 2015). Medical workflow issues reported in this study reflect those of other jurisdictions and include dispersion of patients throughout the hospital, insufficient capacity, excess and uneven workload, reduced quality of medical staff training and low morale (Toomath *et al*., 2014). For example, a substantial process of analysis and change management was undertaken in a large New Zealand hospital in similar circumstances with a range of strategies adopted including spread of work across more medical teams, stratifying patients according to stay, allocating teams/patients geographically and increasing access to Consultants during out-of-hours. The reported outcomes were impressive with estimated annual savings of 6000 bed days and improved staff morale/retention in an academic 1200 bed teaching hospital (Toomath *et al*., 2014). In the current report, similar challenges were identified along with a number of additional factors that impact on out-of-hours activity and these are discussed below.

5.3 Communication out-of-hours

The findings of the study confirm the centrality of communication to effective team performance and hospital activity out-of-hours. Effective team work and communication underpin patient safety (IHI, 2003). Teamwork issues between doctors and nurses are evident and potentially impede the flow of work due in some part to misunderstandings around role function, mental models and priorities (O'Connor *et al.,* 2016). The shift patterns for on-call medical staff, especially during the weekends do not adequately allow for protected time for handover, which is one of the key recommendations of the Clinical Handover Guidelines (National Clinical Effectiveness Committee, 2015) and this may be considered in any redesign process. These NCEC guidelines (2015) recommend greater use of electronic

records and the use of the ISBAR tool for intra and inter disciplinary communications and such developments are ongoing within the hospital. Whilst a hospital policy for the weekend handover is in place, key elements of this policy are not implemented in practice (such as attendance by key senior personnel, handover environment free from interruptions and conducive to effective communication). Indeed, the most frequently reported method of communication between nurses and doctors is the white board and bleep system with frustrations and potential risk for patient safety alluded to in the findings. Importantly, these systems do not facilitate recording and/or auditing of the effectiveness of the communication system between nurses and doctors. The fitness for purpose of the existing bleep and white board system does require consideration and a cost benefit analysis to investment in infrastructure to modernise such systems would be timely and indeed may be offset against risk to safety.

In an effort to address the shortcomings of out-of-hours bleep communication system, some hospitals have moved to alternative technologies such as mobile phones, use of tablets and other digital systems. In the UK, some NHS sites have piloted the iBleep system since 2010 - a web enabled and remotely hosted smart paging system aimed at replacing the traditional bleep system between doctors and ward staff during the out-of-hours service period (ibleep.net). Instead of using the ward phone and pager system, requests are entered via the ward computer to a central hospital coordinator who reviews and delegates the task to the medical team on-call based on appropriateness and availability. An internal report by the company producing the system found positive changes following the introduction of the system such as improved auditing of workload activity and patterns along with clear response patterns to requests (Walters, 2011, cited by Blair & Orr, 2011). The feasibility for adaption here would require evaluation as Blair and Orr (2011) noted key concerns raised in this report by staff such as the quality of sound of mobile devices on the ward as well as dependence on quality of local wireless network were also highlighted. There were some other mixed views of this system by doctors, with some welcoming the level of transparency it provided whilst others reporting miscategorised 'high-priority' calls negatively impacted on their experience of working (Blair & Orr, 2011). Indeed, the categorisation of calls in terms of priority differs between nursing staff and medical staff and, communication systems regardless of their innovativeness, need to be used in conjunction with standard communication frameworks such as the ISBAR.

An electronic inpatient whiteboard was designed as part of a patient flow project carried out in Toronto's University Health Network (Wong *et al.,* 2009) in an attempt to create improvement in waiting times for unscheduled care. Patient demographics are interfaced with the patient management system software, and the whiteboard allowed users to communicate the status of the patients allied health care plan, as well as real-time notification and updating of laboratory results, radiology reports, and medication orders. Results demonstrate that the adoption of this technology has improved discharge planning and information availability and sharing during ward rounds, and increased nurse satisfaction with information sharing. Physicians were less satisfied, as the whiteboard did not always contain information required for their work processes, necessitating use of paper charts, and creating duplication of effort (Wong *et al.,* 2009).

Findings present the changed patient profile, number of outliers and the number of medical teams interacting with individual wards which constrain staff availability and time for communication. The findings of this study do indicate that there is potential for further streamlining of supports to facilitate decision-making out-of-hours. For example, of note in the study is the effects of bed management policy with patients being widely dispersed across the hospital. In a joint publication on principles for best practice for medical rounds the Royal college of Physicians and Royal College of Nursing in the UK (2012) stress the importance of medical ward rounds. The negative impact of the *safari ward round* has been reported in a recent ward round audit within the hospital (Lynch *et al.,* 2015) and the implications for inefficiency in the transmission and sharing of information is clearly is evident in the left-over activities that emerge during out-of-hours. Reforms in ward round practices will require leadership and will challenge some accepted cultural norms. Acknowledgement of the important contribution of nursing, with some practical adaptations such as access to mobile desk and computers in addition to the use of round checklists has been found to be useful improving ward rounds (Desal *et al.,* 2011; Herring *et al.,* 2011; Hale & McNab, 2015)

The analysis of patient activity in the sample wards give tangible insight into the logistical challenges that exist for medical teams in reaching their patients and communicating with relevant staff so they may expedite the patient journey efficiently. Of particular concern also is the impact of nurse staffing, turnover & skill mix on continuity of care and therefore the quality of communication is of utmost

importance. Legacy practices in the hospital such as rigid gatekeeping of communication around diagnostic services out-of-hours can produce unforeseen obstacles to patient flow and these may well be evaluated. Effort should be made to find patient centric and flexible solutions to enable responsible use of resources and effective communication processes where possible.

5.4   Out-of-hours activity

The majority of ward based medical work in the out-of-hours period is undertaken by Interns. Peak periods of activity were observed in the findings in relation to the demands on junior doctors and the period after nursing handover on nights was identified as a particular flashpoint. The readiness among NCHDs for advancement on agreed transfer of tasks (Intravenous cannulation, phlebotomy, Nurse-led discharge) from non-consultant hospital doctors to nurses under the related provision in the Haddington Road Agreement was clearly endorsed in the findings. Interns in particular expend considerable time on tasks such as phlebotomy, IV cannulation, and ECGs and all are tasks that equally may be undertaken by other personnel. Such tasks can detract from time available to do the core clinical decision-making and the training aspect of the internship ole. An increase in availability of support staff and/or potential transfer of some tasks to nurses will greatly reduce the workload of the interns, especially during the weekend. According to the Department of Health (2016a), the aim of task transfer is to allow for timely interventions in patient care while reducing NCHD workload to comply with the EWTD, by transferring four specific tasks (IV cannulation & phlebotomy, first dose antibiotics and nurse-led discharge) to suitably trained and qualified registered nurses. Plans to increase transfer of certain tasks from Interns to Nurses will require both wider hospital and local ward needs analysis for upskilling of existing staff and planning for transfer of activities.

Unseen delays and anomalies in admission and discharge policy are evident in the findings and the impact of such processes may be underestimated in the busy hospital environments. Furthermore, deficiencies in the transfer of patients between ED/ICU to the wards resulted in unnecessary additional workload for nurses and interns. These deficiencies also included medications not been prescribed. Strategies to increase awareness and compliance across the both clinical staff and support staff may be of benefit to increased efficiency and appropriate bed management. The findings do reveal the sustained Monday to Friday focus of staff arrangements for all support services in the hospital despite the unprecedented changes in patient demand over recent years. The underlying systems for care delivery

are not sufficiently flexible or responsive to enable workflow out-of-hours. Effective analysis of variability, looking beyond individual or professional interests using process mapping techniques will assist in gaining insight to the human factors that guide team performance. Barriers to patient flow do require challenge of the prevailing custom and practice of staff arrangements and innovation in roles are needed. To effectively support out-of-hours decision-making there is a need to look beyond traditional work arrangements for all staff and more towards more innovative, flexible, and inter-professional ways of working.

5.5   Work re-design/reform out-of-hours

The audit of staff activities gives insight into the staffing constraints that exist for some areas of the hospital. High levels of staff turnover and insufficiencies in skill mix are associated with high risk to patient safety (Aiken *et al.*, 2014). Such risks are compounded by the hospital operating at maximum or indeed exceeding bed capacity. Skills in assessment and clinical decision-making are needed to respond to the increased acuity of the modern patient profile. In particular, timely intervention and response to sepsis was evident in the findings as a priority in the organisation. A number of protocols have been established to deal with these issues such as the SEPSIS protocol and introduction of the ISBAR. However, there was some dissatisfaction with response times due to the demands on medical personnel. The potential risk associated with deteriorating patients does necessitate more advanced intervention in the medical-surgical areas with delays anticipated in the transfer to ICU beds. Redesign should also consider the challenges in caring for patients outside of ICU without the skilled support of nursing colleagues that might be anticipated in higher dependency areas. Access to effective role modelling, encouragement or advice out-of-hours may give staff the necessary support they need at critical junctures or stressful moments. Proposed roles to facilitate clinical support would to some extent be demand driven but central to this having the necessary attributes, qualification, relevant experience, and clinical network in critical care to facilitate decision-making, targeted support and escalation as needed. Therefore, acknowledgement of the importance of skill retention is implied due to the potential risk of dilution of skills over time due to the diverse range of activities.

Tucker & Edmondson (2003) estimated that as much as 33 minutes in every eight-hour nursing shift is lost in avoidable systems errors that might have anticipated. Tolerance for system and workflow issues are potentially inhibiting productivity in many departments. Many of the requested tasks out-of-hours

are routine and result from decisions made, and not implemented, during the daytime period. There is evidence of tolerance of deviation from norms and perhaps frequent problem solving and under reporting of missed care. Issues around prescribing of medications were prevalent for example, re-charting drug Kardexes, prescribing analgesia, sliding scales of insulin, warfarin, night sedation and fluids were just some identified and in many instances patients' needs could have been anticipated by the teams during the day. Failing to achieve administration of medications within 30 minutes of prescribed time was one of the top three reported missed care in an evaluation of the nursing work environment across three US healthcare systems (Winsett *et al.,* 2016). A recent 2015 BMJ Quality and Safety report describes how often health care staff work in "fix and forget" mode (Hewitt & Chreim, 2015). Through the course of daily work healthcare staff encounter problems and they almost routinely find work-around strategies to solve the ones most relevant to the patients in front of them. They, for example, find missing medications, get drugs charted/re-charted, and find substitutes for broken equipment. This phenomenon within healthcare *of fix and forget rather than fix and report* (Hewitt & Chreim, 2015) is in itself a barrier to patient flow and is at odds with Lean/Six Sigma approaches to health care reform as advocated by quality organisations (IHI, 2005). Hewitt & Chreim (2015) warn that if fixing and forgetting becomes the norm, adapting to imperfections will follow creating further normalisation of error. This normalisation is particularly evident in in some of requests to interns out-of-hours and work design strategies should seek way to minimise such routine oversights.

5.6 Limitations

The documentation of tasks by nurses and interns was self-reported and this will limit application of findings. Direct observation of task activity was not feasible given the study resources. The analysis reflects inpatient stays and does not include day surgery census so it may underestimate the volume of activity. The findings are confined to one hospital, however the issues raised around team work and workload out-of-hours do echo similar issues reported elsewhere (Blakely *et al.,* 2013; O'Connor *et al.,* 2016).

Despite the limitations, this study does uncover some issues that potentially influence workflow processes and patient safety in the out-of-hours period.

5.7 Recommendations

- Evaluate the impact of call arrangements out-of-hours and determine implications for individuals and service workload and advance work re-design where needed.

- Continually re-evaluate the impact of strategies to increase compliance with EWTD on workflow, conditions of employment and work demands for all staff.

- Develop clinical support nursing roles to enable clinical leadership and support in the out-of-hours period

- Following implementation of new proposed clinical support roles, evaluate the impact on workflow, task allocation and staff/patient experience out-of-hours.

- Plan for upgrade to current bleep and white board system to use an alternative electronic system that will be enable safe transmission of information, appropriate prioritisation and feedback in addition to enabling effective audit of task activity out-of-hours

- Conduct regular audits of non-urgent tasks that are emerging during out of call periods.

- Evaluate rates of absence, staff competency, turnover and skill mix at local ward level to enable effective human resource planning, thereby minimising latent risks to patient safety out-of-hours.

- Develop and implement data collection systems to track skill mix and training needs of all nursing staff within wards on a continual basis. Data to include details of primary registration, education and professional development undertaken so that appropriate planning for recruitment and staff training can be undertaken

- Develop a professional development plan for hospital to advance the necessary upskilling of nursing staff to enable task transfer as agreed in Haddington Road

- Re-evaluate orientation of interns and new medical staff to the Hospital to include clinical handover guidelines and discharge policy

- In conjunction with Trinity College Dublin, review the undergraduate nursing curriculum to include education on clinical skills, with direct supervision and mentoring, to meet specific competency-based outcomes during the internship period; for example, IV cannulation, phlebotomy and nurse facilitated discharge

- Re-evaluate multidisciplinary communication at ward level to create a more responsive *ward round* process within the hospital to enable effective exchange of information and

planning/implementation of routine medical work during non-call hours. Strategies may include portable laptops, portable work stations and ward round checklists

- Conduct regular audits of clinical handover between medical staff and at ward rounds
- Conduct larger studies in partnership with other hospitals that employ innovative solutions to out-of-hours support to contribute to the wider body of knowledge nationally and internationally

5.8 Conclusion

The task of delivering health care effectively and safely out-of-hours should be considered against a backdrop of a changed health care environment with increased survival rates, greater levels of chronic illness and considerable innovation in technology, diagnostics and medical interventions. Out-of-hours workflow is considerably dependent on the requirements of the services, the availability and skill set of staff, support services and the underlying interaction and communication around these key factors. This study has identified areas of service delivery out-of-hours that are working well such as the EWS system but has also revealed areas that might benefit from improvement for example communication strategies, medical workflow design, logistical access to equipment, services and clinical support at bedside.

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APPENDICES

Appendix 1: Admitted Patient Handover Policy Medical Directorate

Admitted Patient Handover Policy Medical Directorate

Tallaght Hospital

Document Number:

Effective Date:

Review Date:

Review No.: 1

Status:

Date of Drugs & Therapeutics' Committee Approval (if Appropriate): N/a
Recommended for authorisation:
Signature: _____   Date: _____
Clinical Director, Medical Directorate
Authorised by:
Signature: _____   Date: _____
Chief Executive Officer

Table of Contents

Purpose

The purpose of this policy is to ensure that there is clear and effective clinical handover at the beginning and end of each shift. The changing working patterns of doctors have created a need for improved handover of clinical responsibility and information.

Review History

Date	Review No.	Change	Ref. section
13/2/14			

Persons Affected

Consultants, Specialist Registrars, Registrars, Senior House Officers, Interns, Nurses and all Multidisciplinary staff.

Policy

The policy of Tallaght Hospital is to ensure that inpatient clinical handover is conducted in a manner which facilitates effective communication between all members of the multidisciplinary team. There is continuity of information which is vital to the safety of patients. The information provided during handover will influence the delivery of care for the entire shift.

Definitions

Handover is the system by which the responsibility for immediate and ongoing care is transferred between healthcare professionals.

Responsibilities

Consultants, Specialist Registrars, Registrars, Senior House Officers, Interns.

- Handovers must be co-ordinated and have clear leadership.
- Handover takes place every time shift responsibility changes hands.
- Handover must be facilitated by the most senior clinician available (consultant, specialist registrar/registrar).
- Dedicated time which must be interruption free of bleeps, phones, other staff members.
- Teams from all medical specialties must attend Friday afternoon inpatient handover with the exception of services who have dedicated teams on-call out-of-hours. This handover takes place in the Operations Room in the administration corridor at 15:00 on Fridays.
- The type and level of handover is influenced by the time of day and week i.e. is it occurring at the weekend vs. a weekday, night vs. morning.

Management

- Must have a dedicated area for handover with IT and radiology access and near to the patient/clinical area.
- Rotas must have an overlapping time built in for handover.
- Notify the team leads in advance of any new locum members and provide contact details.
- Provide the locum with details of time and venue of where to meet the team.

Procedures

Communication process at handover.

- Handover must start with a short briefing outlining what is expected of the team. This briefing is given by the team lead who must be a registrar or consultant.
- Handover must be focused and structured.
- It is an opportunity to give and receive information and must allow for questions to be asked.
- Information presented must be succinct and relevant.
- Time is given to debrief.
- Written handover must be considered as a live document and updated from time to time during the shift. This must be available for the oncoming team.
- The team needs to ensure that they are aware of and know any new locum members that are on duty particularly at night.
- At handover any changes to consultant cover in a relevant specialty should be notified to the team.

Patient information at handover.

- Number of current inpatients and their location.
- Referred patients or accepted patients or those due to be assessed including patients awaiting urgent consults or patients waiting to be seen by the ICU team.
- Patients who are unstable or whose clinical status is deteriorating.
- Bed availability, including ICU/CCU.

Written handover information.

- Patient name, location, consultant, patient sticker with MRN and DOB.
- Vital signs, resuscitation status, specific concerns.
- Background date of admission diagnosis, lab results, medications, progress.
- Critical assessment of the situation, clinical impression, detail concerns.
- Recommendations, management plan, specific requests and time frame.

Follow up after handover: Specialist Registrars, Registrars, Senior House Officers, and Interns.

- Unstable patients are identified and reviewed based on immediate clinical priority.
- Note is taken of outstanding test results awaited and action taken accordingly.
- Where necessary establish a contingency plan and tasks should be prioritised.

Data Protection: Clinical Director, Consultants, Specialist Registrars, Registrars, Senior House Officers, Interns.

- Confidentiality of patients must be respected when handling their personal information.
- All notes must either form part of the patient's file or should be disposed of in the confidential waste bin.
- Handover must not be within earshot of patients, visitors or other staff members.

Implementation and education plan

- Policy presented at induction.
- Policy distributed to the wider team at clinical directorate meetings and NCHD forum.
- Education, support, facilitation and training of doctors in relation to handover. Evaluation and audit
- Regular review of the process at clinical directorate meetings and NCHD forum.
- Audit of handover process must happen on a regular basis to provide feedback and inform Clinical Director of specialties and areas where improvements are required.
- The Clinical Director and relevant specialty director have responsibility for ensuring that best practice on patient handover is practiced by all teams.

Appendix 2: Sample information leaflet

Background

The out-of-hours service period is associated with less favourable patient outcomes as well as unpredictable workloads and limited support structures for nursing and medical staff. Tallaght Hospital is currently examining new approaches to out-of-hours service delivery to address these issues.

The Programme

A review of clinical decision-making out-of-hours aims to improve support structures and minimise workload at night for both nursing and medical staff through (1) the active management of work 'leftover' from day time; (2) the introduction of an out-of-hours nurse-led multi-disciplinary team, (3) up-skilling of nursing staff and (4) the establishment of a more efficient bleep system. A similar model has been widely implemented in acute hospitals throughout the UK, and evaluations have found that it can improve patient safety, enhance collaboration and co-ordination of care between teams and improve the working environment for staff. However, there are differences in the structure of the health systems between Ireland and the UK, and the applicability of the programme in Ireland is as yet unknown and it is unclear if the needs are the same.

Stage One evaluation study

In order to determine if there is a need for changes to the delivery of out-of-hours care in Tallaght Hospital, and possibly Ireland, it is necessary to establish a baseline understanding of how our hospital works out-of-hours (i.e. 5p.m. to 9 a.m. and weekends). We would also like to understand the main challenges of night time working as experienced by staff. The outcomes of this Stage One study will directly inform and guide a potential Stage Two study which is the implementation and evaluation of an out-of-hours programme of care delivery.

A detailed picture of hospital activity and staffing patterns will be developed using existing data sources (including HIPE, iPMS, staffing etc.) as well as through the collection of additional observational data on selected wards. To supplement and add context to this data an important component of this study seeks to describe the experiences of staff who work during the out-of-hours period and who understand the complexities of delivering care during this time.

The purpose of this component of the study is to gather your views on topics related to the objectives of this study (as set out in further detail in the attached consent form). Participation is voluntary and if you agree to take part please read and sign the consent form attached. If you have any questions concerning this study or your participation, contact details of members of the research team are set out below.

This study is a collaboration between Tallaght Hospital and the Trinity Centre for Practice and Healthcare Innovation (TCPHI), School of Nursing & Midwifery Trinity College Dublin and is funded by the Meath Foundation and ethical approval has been granted. If you have any questions or would like to find out more about this study please contact a member of our research team.

Dr Mary Quirke, Healthcare Researcher, Tallaght Hospital & TCD quirkemb@tcd.ie

Meabh Prendergast, Research Assistant, Tallaght Hospital & TCD prendem3@tcd.ie

Appendix 3: Sample participant consent form

Title of study: Out-of-hours Clinical Decision-making at Tallaght Hospital

The aim of the study:

The aim of this study is to develop a baseline understanding of the service needs around out-of-hours clinical decision-making to determine the precise requirements for service change at a local level within the Hospital. It is also envisaged that this (stage one) baseline study will form the basis of a follow-up (stage two) evaluation study assessing the implementation of an out-of-hours support initiative in Tallaght Hospital.

The objectives of this stage-one study are to:

1.   Describe the relevant policies and procedures in place nationally, and more specifically in Tallaght Hospital, that influence the level of clinical decision-making support during the out-of-hours period.

2.   Describe how the provision of patient medical care works during the out-of-hours period in a sample of wards in Tallaght Hospital

3.   Identify the demands upon medical and nursing staff and (provision of) ancillary services that impact on clinical decision-making during the out-of-hours period.

4.   Review alternative models of care/initiatives that have demonstrated improvements in clinical decision-making support structures and quality of care provision.

5.   Determine the requirements for service change at local level within Tallaght Hospital and provide recommendations for organisational change using the findings of this study and best-practice literature

6.   Identify current out-of-hours work patterns, workload distribution, staff satisfaction and clinical outcomes

You have been invited to take part in an interview as part of this study. The purpose of this component of the study is to gather your views and experiences on topics related to the aims and objectives of this study (as set out above).

DECLARATION

I have read, or had read to me, the information leaflet for this project and I understand the contents. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction. I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights. I understand that all information will be treated in the strictest confidence.

I agree that anonymised data from the study may be stored and used in future related studies without further consent being sought from me. The interview information collected from this (stage one) project may feed into a stage two follow-up evaluation study and I understand that I may be contacted again by the research team to discuss my experiences of the implementation of any such initiative in Tallaght Hospital. Data from the study will not be used in future unrelated studies without further specific permission being obtained. I understand that I may withdraw from the study at any time and that I will receive a copy of this consent form.

PARTICIPANT'S NAME:………………………………………………………………………..

PARTICIPANT'S SIGNATURE:……………………………………………………………..

CONTACT DETAILS:…………………………………………….. Date:…………………….

Statement of investigator's responsibility: I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and have fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

INVESTIGATOR'S SIGNATURE:………………………………………. Date:…………………..

If you have any questions or would like to find out more about this study please contact a member of our research team.

Dr. Mary Quirke, Healthcare Researcher, Tallaght Hospital & TCD: quirkemb@tcd.ie

Meabh Prendergast, Research Assistant, Tallaght Hospital & TCD: prendem3@tcd.ie

Appendix 4a Sample interview schedule (individual)
Introductions

- Information Sheet to be provided & discussed
- Consent sheet to be provided & signed prior to interview
- Ethics (i.e. consent, confidentiality, right to withdraw, recording of data etc. reiterated) discussed

1. Please tell me about your role as Critical Care Outreach Nurse

2. Please tell me a little about the process of and supports for communication between you and ward nursing staff during the day time period

    a. Can you describe what happens in the Out-of-hours period?
    b. What support exists (from a critical care point of view) for ward nursing staff out-of-hours?

3. Please tell me about the process of communication between you and other professionals (medics/AHP) during the day time period

    a. Can you describe what happens in the Out-of-hours period?
    b. What support exists (from a critical care point of view) for medical staff out-of-hours?

4. In your experience what are the challenges that exist during the out-of-hours service period?

    a. What do you see as risks?

    b. What things worry you?

    c. What ways can things be improved?

    d. What limitations are there to changes?

Closing

Any other comments you would like to include?

Any questions?

Thank you for your time.

Appendix 4b Sample focus group interview schedule

Introductions

- Research team introduced and brief background of study provided (note: focus on H@N removed and replaced with Out-of-hours)

- Information Sheet to be provided & discussed

- Consent sheet to be provided & signed prior to interview

- Ethics (i.e. consent, confidentiality, right to withdraw, recording of data etc. reiterated) discussed

1. Initial question

- Can I ask everyone to give their first name and when you were last on-call.

2. Think back to your last shift on-call, tell me about your handover experience?

   o What format (forms of communication) was your handover?

   o Who did you receive the handover from and when?

   o Were you given enough information to prioritise patients' needs?

   o How did this experience compare to what normally what happens?

   o When you think back on the handover, how effective was it and how can it be improved? (explore consistency of handover process, attendance by relevant personnel, communication, sufficient time)

3. During this shift-what were the main challenges during the hours <u>prior to midnight</u> when you were on-call?

   o Tell me about the tasks you were asked to do?

     ▪ Who asked you to do these tasks?

     ▪ Were these tasks appropriate to on-call staff and if so why or why not?

Thinking back on these tasks, could someone else do these tasks?

4. *Asking this question again-* During this same shift-what were the main challenges during the hours <u>after midnight</u> when you were on-call?

   o Tell me about the tasks you were asked to do?

     ▪ Who asked you to do these tasks?

     ▪ Were these tasks appropriate to on-call staff and if so why or why not?

Thinking back on these tasks, could someone else do these tasks?

5. During this last shift on-call-think about a situation where you had to make clinical decisions that were challenging

  - o What supports are available to help you make these challenging clinical decisions?

    - ▪ Supports in terms of access to investigations, lab results,

    - ▪ Support in terms of IT, (online resources, policies etc.)

    - ▪ Supports in terms of secretarial, multidisciplinary team, senior nurses

    - ▪ Support in terms of access to senior medical staff, Emergency Response Team

    - ▪ What are your views of these supports, how satisfied are you with supports available and how could they be improved?

    - ▪ From your previous experiences working on-call in other hospitals (or in other specialities), what do you think could improve the supports available to help you make these clinical decisions?

6. Again, thinking back to your last shift on-call- at the end of your shift, how did you give your handover?

  - o What was the format?

  - o Did you give handover to different teams individually? How do you prioritise patients?

  - o How did this differ to what happens normally?

7. Final question- tell me what else do you think will help on-call medical staff (that we have not mentioned already) to make clinical decisions during the out-of-hours service period?

  - o Communication –

    - ▪ with doctors, nurses and others

    - ▪ Bleeps and IT support

  - o Shift patterns- European Working Time Directive

  - o Resources

Thank you for your time

- • Remind participants if they have any questions or concerns, our contact details are on the information sheet and they can contact us directly or via their NCHD rep

Appendix 5 Medical Registrar on-call arrangements and responsibilities

Medical Registrar call arrangements

HUMAN RESOURCES DIRECTORATE

HR Medical Division	**01- 414 3680 / 5863**
HR Nursing Division	**01- 414 2202 / 2048**
HR General Division	**01- 414 3903 / 3377**
HR Records Division	**01- 414 5858**
HR Pensions	**01- 414 2029**
Fax:	**01- 414 5878**

TALLAGHT HOSPITAL
A TEACHING HOSPITAL OF TRINITY COLLEGE DUBLIN
TALLAGHT
DUBLIN 24

www.amnch.ie

MEMORANDUM

TO: Executive Nursing Team; CNMs; All Medical Teams; Switch; HR; Executive Management Team
FROM: Clinical Director Medicine
DATE: 10th July 2014

RE: Change to Medical Registrar on-call responsibilities
_____

Dear Colleague,

In order to facilitate 24 hour compliance amongst registrars participating in the general medical call rota, there will be a change in the way call is structured. With co-operation from Cardiology Services, a new process has been agreed.

From Monday 14th July 2014, the following arrangement will be in introduced:

1st on-call Registrar will be linked with the team on-call and will work 13:00-13:00 (24hours)
2nd on-call Registrar will work 09:00-09:00 (24hours) as follows:

> -Mon-Thurs inclusive: Cardiology Registrar
> -Fri-Sun inclusive: General Registrar 2

Mon-Thurs
The Cardiology Registrar will be on-call in-house and responsible for the following:

- Cardiac referrals direct from ED/AMAU/Medical Registrar on-call to ED
- Cover for cardiology inpatients (including CCU) out-of-hours
- ERT calls 09:00 Monday – 16:00 Friday and will carry the ERT pager

All other calls to a registrar should be directed to Medical Registrar 1 on the on-call rota. He/she will then make a decision to see the patient or delegate the responsibility to one of the two SHOs on-call.

Fri-Sun
The Cardiology Registrar will be on-call from home for Cardiology only, as is currently the case. All ward referrals to a registrar should be to Registrar 2 on the rota. General Registrar 2 will carry the ERT pager from 16:00 Friday – 09:00 Monday.

ED cover 09:00-13:00
Registrar 1 from the previous 24 hours shift to take emergency calls from ED in the following instances:

- **AMAU unable to send an SHO**
- **Patient requires registrar input**

These patients are then handed over to the current team on-call. This arrangement will be reviewed at 1 month.

HUMAN RESOURCES DIRECTORATE

HR Medical Division   01- 414 3680 / 5863
HR Nursing Division   01- 414 2202 / 2048
HR General Division   01- 414 3903 / 3377
HR Records Division   01- 414 5858
HR Pensions   01- 414 2029
Fax: 01- 414 5878

TALLAGHT HOSPITAL
A TEACHING HOSPITAL OF TRINITY COLLEGE DUBLIN
TALLAGHT
DUBLIN 24

www.amnch.ie

MEMORANDUM

TO: Executive Nursing Team; CNMs; All Medical Teams; Switch; HR; Executive Management Team
FROM: Clinical Director Medicine
DATE: 20th November 2014

RE: Change to Medical SHO on-call responsibilities
_____

Dear Colleagues,

As there are no longer two in-house medical registrars on-call midweek the role of both the medical registrar and the medical SHO on-call midweek has changed.

There follows an outline of the duties of the on-call medical SHO:
1.   Receive referrals from ED staff regarding patients with acute medical issues as per previous duties

2.   Review patients on the wards with acute medical conditions. Appropriate patients for review include patients that are A) unwell but are deemed not for ERT call or B) are unwell but not sufficiently unwell that an ERT call is warranted. If escalation of care is appropriate, liaise with the medical registrar.

3.   Assist the cardiology registrar in the management of ERT calls

The medical registrar on duty in ED will co-ordinate the work of the two medical SHOs on duty.

Appendix 6a Request form for Medical Registrar on-call to review patients during the weekend.

Patients for Weekend Review by Medical Registrar On-Call (MROC).
This request should be related to a condition of due gravity to require Registrar (Reg)/ Specialist Registrar (SpR) review, and should be requested by the consultant or Reg/SpR. Please do not add patients who can be satisfactorily reviewed by the medical interns.

NAME   _____
DOB   _____
MRN   _____
Ward   _____
Consultant   _____

Requires: Clinical Review ☐
                   Be aware of, review if required ☐
                   Discharge ☐
                   Check bloods/ investigations ☐   All bloods must be ordered.

For review on Sat ☐   Sun ☐   Both ☐
Clinical Details/ Reasons for Review:
_____
_____
_____
_____
_____
_____
_____

Appendix 6b Handover timetable, attendees and procedure in Tallaght Hospital

Handover process (Weekdays)

Time	Attendees	Procedure
17:00	SHO 1	Report to AMAU
18:30	PM AMAU Registrar + SHO Registrar 1 on 24hr shift +/- Consultant on-call	Handover of patients admitted from AMAU/ED from 09:00-current time to Registrar 1 on extended day and Medial Consultant on-call where feasible.
21:30	Registrar 1 on 24hr shift SHO 1 + 2 on Extended Day SHO 1 + 2 on Night Duty	Handover from day staff to night staff. This handover should include any admitted patients not previously handed over.
07:00-Completion of post take ward round	1. SHO 1 + 2 on Night Duty Registrar 1 on 24hr shift 2. SHO & Intern of team on take (It is expected that 1 SHO will be SHO from Extended Day previous day)	Night duty NCHDs to handover first.

Handover process (Weekends)

Time	Attendees	Procedure
Saturday Post take ward round	Registrar 1 + 2 on 24hr shift SHO 1 + 2 on 24hr shift Consultant for post take ward round	Outgoing Registrar 2 to handover to incoming Registrar 2. Following post-take ward round, outgoing Registrar 1 + SHO 1 and 2 to handover patients that require follow-up or review to incoming Registrar 2.
Sunday Post take ward round	Registrar 1 + 2 on 24hr shift SHO 1 + 2 on 24hr shift SHO 1 + 2 (incoming) on extended day Consultant for post take ward round	Outgoing Registrar 2 to handover to incoming Registrar 2. Following post-take ward round, outgoing Registrar 1 + SHO 1 and 2 to handover patients that require follow-up or review to incoming Registrar 2.
21:30 Sunday	Registrar 1 + 2 on 24hr shift SHO 1 + 2 on Extended Day	Handover from day staff to night staff. This handover

Time	Attendees	Procedure
	SHO 1 + 2 on Night Duty	should include any admitted patients.
07:00 Monday	See Mon-Fri process	
BH Mondays AM post take ward round	Registrar 1 + 2 on 24hr shift SHO 1 + 2 on Extended Day SHO 1 + 2 on Night Duty	Outgoing Registrar 2 to handover to incoming Registrar 2. Following post-take ward round, outgoing Registrar 1 + SHO 1 and 2 to handover patients that require follow-up or review to incoming Registrar 2.
BH Mondays 21:30	See Sunday process	

ERT pager

Cardiology Registrar takes ERT pager 09:00 Monday until 16:00 Friday
Medical Registrar 2 takes ERT pager 16:00 Friday until 09:00 Monday

Referrals

Referrals to AMAU 09:00-19:00 Monday – Friday.
Referrals to Registrar 1 (Admitting team) 19:00-08:00 Monday – Thursday; 19:00 Friday-08:30 Saturday; 08:30 Saturday-08:00 Sunday.

ED cover 09:00-13:00

Registrar 1 from the previous 24-hour shift to take emergency calls from ED in the following instances:

- AMAU unable to send SHO
- Patient requires Registrar input

These patients are then handed over to the current team on-call.

Appendix 7: Observational audit tool

Observation of Handover between Medical Staff adapted from the National Clinical Effectiveness Committee guidelines (2015) on clinical handover in Acute Adult and Children's Hospital Services

	Comment
Identification • Identify of the lead handover person evident • Identity of individual (s) receiving the handover • Identity of Patient (s)	
Situation • Location of patient (s) • Brief summary of current status • Was a problem identified	
Background • Concise summary of reason for admission • Summary of treatment to date • All base line observations (current admission) • EWS	
Assessment • Evidence of patient assessment	
Recommendations • Were recommendations made re: care of patient (s)	
Read-back • Is there evidence of read-back to confirm clinical handover information	
Risk • Is there evidence of acceptance of responsibility and accountability for patient care?	

Appendix 8: Diagnostic, Allied Health and Support Services online survey

Out-of-hours Service Questionnaire

Out-of-hours Clinical Decision-Making Research Study

The aim of this study is to develop a baseline understanding of the organisational processes surrounding clinical decision-making during the out-of-hours period in Tallaght Hospital. Out-of-Hours is defined as 5 p.m. - 9 a.m. weekdays and all weekend. The purpose is to identify what changes at a local level could improve clinical-decision-making during this service period. An important component of this study seeks to describe which departments operate out-of-hours and how they function in this period.

We would be most grateful if you or a staff member from your department could complete the short survey below. It should take no more than 5 minutes.

Thank-you in advance

* 1. Please choose your department from the list below

* 2. Do you provide services "out-of-hours" (i.e. after 5 p.m. or weekends)?

◯ Yes

◯ No

Out-of-hours Service Questionnaire

Out-of-hours Clinical Decision-Making Research Study

* 3. What is the main role of your service in the out-of-hours period?

* 4. What level of service does your service provide in the out-of-hours period (i.e. emergency

cover only/reduced service)

* 5. How many staff are usually assigned to work in your service in the out-of-hours period?

[   ]
[   ]

* 6. How do other hospital staff (e.g. nurses/doctors) contact your service in the out-of-hours period?

◯ Telephone

◯ Bleep

◯ Email

◯ Other (please specify)

[   ]

* 7. How do you store records of the jobs/queries/referrals that staff in your service are requested to undertake? (e.g. a request book/electronic version)

[   ]
[   ]

* 8. Do you have policies/procedures or guidelines (informal or formal) on how you respond to queries or accept referrals for your service during the out-of-hours period? (please give details in box below)

◯ Yes

◯ No

Please give details here

[   ]
[   ]

* 9. How are the referrals/requests received by your service in the out-of-hours period prioritised (i.e. how do staff decide which is emergency/urgent/routine)?

[   ]
[   ]

[ ]

* 10. Do you or staff in your service have any comments on how the out-of-hours period is currently organised?

* 11. Do you or staff in your service have any suggestions on how services in the out-of-hours period could be improved?

[ ]

Thank-you for taking the time to complete this survey. If you have any questions please contact Meabh Prendergast, Research

Assistant, Tallaght Hospital/TCD prendem3@tcd.ie or Dr. Mary Quirke, Healthcare Researcher Tallaght Hospital/TCD

quirkemb@tcd.ie

Out-of-hours Service Questionnaire

Out-of-hours Clinical Decision-Making Research Study

* 12. If your department DOES NOT provide services out-of-hours, please outline your working hours below

[ ]

Thank-you for taking the time to complete this survey. If you have any questions please contact Meabh Prendergast, Research

Assistant, Tallaght Hospital/TCD prendem3@tcd.ie or Dr. Mary Quirke, Healthcare Researcher Tallaght Hospital/TCD

quirkemb@tcd.ie

Appendix 9: Examples of on-call medical rotas

Sample Weekday DOCTORS ROTA FOR HOUSE Thursday June 2016[18]

SPECIALITY & POST	NAME
Adult Emergency Medicine	Dr. A
ARHC/Peamount	Dr. B
Telemedicine Stroke (Emergency Dept. Thrombolysis)	Dr. C
AMU Consultant	Dr. D
ICU Anaesthesia Consultant From 5p.m.	Dr. E
Theatre Anaesthesia Consultant From 5p.m.	Dr. F
Anaesthesia – 1st on-call for Theatre	Dr. G
Anaesthesia – 2nd on-call for ICU	Dr. H
Anaesthesia – 3rd on-call	Dr. I
Cardiology Consultant	Dr. J
Cardiology Registrar 9a.m. - 5p.m. (Mon -Fri) Consults	Dr K
Cardiology Registrar (on-call)	Dr L
ENT Consultant	Mr. M
ENT Registrar 8:00a.m. – 5:00p.m. (Mon - Fri)	Dr. N
ENT Registrar 8:00a.m. – 5:00p.m. (Mon - Fri)	Dr. O
ENT Senior Registrar – 2nd on-call rota (17:00 - 08:00)	Dr. P
ENT Registrar 5:00p.m. – 8:00a.m.	Dr. Q
Gynaecology Consultant	Dr. R
Gynaecology SPR	Dr. S
Haematology - Oncology Consultant	Dr. T
Haematology - Transfusion/Laboratory	Dr. U
Haematology - Oncology Registrar (17:00 - 09:00) Mon - Thurs	Dr V
Histopathology Consultant (PATHOLOGY)	Dr. W
Medical Consultant	Dr. X
Medical Registrar 1 (A&E) (17.00-13.00)	Dr. Y
Medical Registrar 2 (Wards) (09.00-21.00) See "Change to Medical Registrar on-call responsibilities memo"	DR YYY
Medical SHO 1 from 17:00 - 22:30 (arrest bleep 09:30 - 22:00)	Dr. Z
Medical SHO 1 from 22:00 - 10:00 (arrest bleep 22:00-09:30)	Dr. BB
Medical SHO 2 from 22:00 - 10:00	Dr. CC

[18] All names of doctors on-call have been replaced by codes.

Medical Intern 1	Dr. DD
Medical Intern 2	Dr. EE
Microbiology Consultant	DR FF
Nephrology Consultant	DR GG
Nephrology SPR (5p.m.-10p.m.)	Dr. HH
Neurology Consultant	Dr II
SPECIALITY & POST	**NAME**
Orthopaedic Consultant - Trauma	DR JJ
Ortho/Gen Surgery - SHO 1st on-call (17.00-21.00)	Dr. KK
Ortho/Gen Surgery SHO call (20:30-09:00)	Dr. LL
Orthopaedic - Trauma Reg (Mon- Thurs 17.00-8.00)	Dr. MM
Oncology Team See Haematology On-Call	
Palliative Medicine Contact Our Lady's Hospice, Harold's Cross	
Psychiatry Registrar	Dr. NN
Psychiatry Consultant	Dr. OO
General Radiologist on-call	Dr. PP
Interventional Radiologist on-call	Dr. QQ
Radiology Registrar	Dr. RR
Surgery (General) – Consultant	Dr. SS
Vascular Consultant	(Locum)
Surgery (General) – Senior Registrar	DR TT
Ortho/Gen Surgery - SHO 1st on-call (17.00-21.00)	Dr. UU
Surgical Intern 1	Dr. W
Surgical Intern 2	Dr. WW
Urology Consultant	Mr. XX
Urology SPR	Dr. Y
PAEDIATRIC CHILDREN'S SERVICES ROTA FOR HOUSE	**Thursday 9th June 2016**
SPECIALITY & POST	NAME
Emergency Medicine Consultant - Paeds	Dr. AAA (8a.m. to 6p.m.)
Emergency Medicine Consultant - Paeds	Dr. BBB (starts at 6p.m. onwards)
Medical Consultant - Paeds	Dr. CCC

Medical SHO 09.00 A.M. To 09.00A.M. (Mon-Sun)	Dr. DDD
Medical Registrar – 2nd on-call	TBA
Orthopaedic Consultant – Trauma Paeds	DR EEE
Radiology Consultant	Dr. FFF
Surgery – Consultant	DR GGG
Surgery – Registrar	Dr HHH

DOCTORS ROTA FOR HOUSE Saturday 2016

SPECIALITY & POST	NAME
Adult Emergency Medicine	Dr. 1
ARHC/Peamount	Dr. 2
Telemedicine Stroke (Emergency Dept. Thrombolysis)	Dr. 2
AMU Consultant	Dr. 3
ICU Anaesthesia Consultant From 5p.m.	Dr. 4
Theatre Anaesthesia Consultant From 5p.m.	Dr. 5
Anaesthesia – 1st on-call for Theatre	Dr. 6
Anaesthesia – 2nd on-call for ICU	Dr. 7
Anaesthesia – 3rd on-call	Dr.8
Cardiology Consultant	Dr. 9
Cardiology Registrar	Dr 10
ENT Consultant (weekend call cover from 5p.m. Fri to 9a.m. Mon)	Dr 11 (Pts adm under Dr 12)
ENT Senior Registrar – 2nd on-call rota	Dr. 13
ENT Registrar 8:00a.m. – 8.00a.m. (Sat-Sun)	Dr. 14
Gynaecology Consultant	Dr. 15
Gynaecology SPR	Dr. 16
Haematology - Oncology Consultant	Dr. 17
Haematology - Transfusion/Laboratory	Dr. 17
Haematology - Oncology Registrar (09:00 - 09:00) Sat & Sun	Dr 18
Histopathology Consultant (PATHOLOGY)	Dr. 19
Medical Consultant	Medical Prof. Unit (MPU) – Dr 20
Medical Registrar 1 (A&E) (13.00-13.00)	Dr. 21
Medical Registrar 2 (Wards) (09.00-09.00)	Dr. 22
Medical SHO 1 from 09:00-09:00 (arrest bleep 09:00-09:00)	Dr. 23
Medical SHO 2 from 11:00-11:00 (arrest bleep Sun 09:00-10:00)	Dr.24
Medical Intern 1	Dr. 25
Medical Intern 2	Dr. 26
Microbiology Consultant	Dr. 27
Nephrology Consultant	Dr 28
Nephrology SPR (8.00 -22.00p.m.)	Dr. 29

SPECIALITY & POST	NAME
Neurology Consultant	Dr 30
Neurology NCHD (**Weekend Cover from 9-2p.m. only**)	Dr. 31
SPECIALITY & POST	**NAME**
Orthopaedic Consultant - Trauma	Mr. 32
Ortho/Gen Surgery - SHO 1st on-call (08.30 to 08.30)	Dr.33
Orthopaedic Registrar – (08.00 - 08.00)	Dr. 34 (SpR)
Orthopaedic – Elective (**9a.m. - 9p.m. Sat/Sun**)	Dr. 35
Oncology Team See Haematology On-Call	
Palliative Medicine Contact Our Lady's Hospice, Harold's Cross	
Psychiatry Consultant	Dr. 36
General Radiologist on-call	Dr. 37
Interventional Radiologist on-call	Dr. 38
Radiology Registrar	Dr. 39
Surgery (General) – Consultant	Ms. 40
Vascular Consultant	Dr 41
Surgery (General) – Senior Registrar	Mr. 42
Surgery (Vascular) – Senior Registrar	Dr. 43
Surgical Intern 1	Dr. 44
Surgical Intern 2	Dr. 45
Urology Consultant	Mr. 46
Urology Registrar	Mr 47

PAEDIATRIC CHILDREN'S SERVICES ROTA FOR HOUSE	**Saturday 2016**
SPECIALITY & POST	NAME
Emergency Medicine Consultant - Paeds	Dr. 48
Medical Consultant - Paeds	Dr. 49
Medical SHO 09.00 A.M. to 09.00A.M. (Mon-Fri)	Dr. 50
Medical Registrar – 2nd on-call	Dr. 51
Orthopaedic Consultant – Trauma Paeds	Mr. 52
Radiology Consultant	Dr. 53
Child & Adolescent Psychiatry REG (9a.m. - 7p.m.)	Dr. 54
Child & Adolescent Psychiatry Sr. REG (9a.m. - 7p.m.)	Dr. 55
Child & Adolescent Psychiatry Cons (9a.m. - 7p.m.)	Dr. 56
Surgery – Consultant	Mr. 57
Surgery – Registrar	Dr. 58

Doctor Rota for House Sunday

SPECIALITY & POST	NAME
Adult Emergency Medicine	Dr. 1
ARHC/Peamount	Dr. 2
Telemedicine Stroke (Emergency Dept. Thrombolysis)	Dr. 2
AMU Consultant	Dr. 3
ICU Anaesthesia Consultant From 5p.m.	Dr. 59
Theatre Anaesthesia Consultant From 5p.m.	Dr. 5
Anaesthesia – 1st on-call for Theatre	Dr. 60
Anaesthesia – 2nd on-call for ICU	Dr. 61
Anaesthesia – 3rd on-call	Dr. 62
Cardiology Consultant	Dr. 9
Cardiology Registrar	Dr 10
ENT Consultant (weekend call cover from 5p.m. Fri to 9a.m. Mon)	Dr 11 (Pts adm under Dr 12)
ENT Senior Registrar – 2nd on-call rota	Dr. 13
ENT Registrar 8:00a.m. – 8.00a.m. (Sat-Sun)	Dr. 14
Gynaecology Consultant	Dr. 15
Gynaecology SPR	Dr. 16
Haematology - Oncology Consultant	Dr. 17
Haematology - Transfusion/Laboratory	Dr. 17
Haematology - Oncology Registrar (09:00 - 09:00) Sat & Sun	Dr 18
Histopathology Consultant (PATHOLOGY)	Dr. 19
Medical Consultant	Prof.63 / Prof 64
Medical Registrar 1 (A&E) (13.00-13.00)	Dr. 65
Medical Registrar 2 (Wards) (09.00-09.00)	Dr 66
Medical SHO 1 from 09:00-09:00 (arrest bleep 10:00-22:30)	Dr. 67
Medical SHO 2 from 10:00-22:30	Dr. 68
Medical SHO 1 from 22:00 - 10:00 (arrest bleep 22:00-09:30)	Dr. 69
Medical SHO 2 from 22:00 - 10:00	Dr. 70
Medical Intern 1	Dr. 71
Medical Intern 2	Dr. 72
Microbiology Consultant	Dr. 27
Nephrology Consultant	Prof. 28
Nephrology SPR (8.00 -22.00p.m.)	Dr. 29
Neurology Consultant	Dr 30
Neurology NCHD (Weekend Cover from 9-2p.m. only)	Dr. 31

SPECIALITY & POST	NAME
Orthopaedic Consultant - Trauma	Mr. 32
Ortho/Gen Surgery SHO 1st on-call (08:00-21:00)	Dr. 72
Ortho/Gen Surgery SHO call (20:30-09:00)	Dr. 73
Orthopaedic Registrar – (08.00 - 08.00)	Dr. 34 (SpR)
Orthopaedic – Elective (**9a.m. - 9p.m. Sat/Sun**)	Dr. 35
Oncology Team See Haematology On-Call	
Palliative Medicine Contact Our Lady's Hospice, Harold's Cross	
Psychiatry Consultant	Dr. 36
General Radiologist on-call	Dr. 37
Interventional Radiologist on-call	Dr. 38
Radiology Registrar	Dr. 74
Surgery (General) – Consultant	Dr. 40
Vascular Consultant	Dr. 41
Surgery (General) – Senior Registrar	Mr. 42
Surgery (Vascular) – Senior Registrar	Dr. 43
Surgical Intern 1	Dr. 75
Surgical Intern 2	Dr. 76
Urology Consultant	Mr. 46
Urology Registrar	Mr. 47
PAEDIATRIC CHILDREN'S SERVICES ROTA FOR HOUSE	**Sunday 2016**
SPECIALITY & POST	NAME
Emergency Medicine Consultant - Paeds	Dr. 48
Medical Consultant - Paeds	Dr. 75
Medical SHO 09.00 A.M. to 09.00A.M. (Mon-Fri)	Dr. 76
Medical Registrar – 2nd on-call	Dr. 77
Orthopaedic Consultant – Trauma Paeds	Mr. 52
Radiology Consultant	Dr. 53
Child & Adolescent Psychiatry REG (9a.m. - 7p.m.)	Dr. 54
Child & Adolescent Psychiatry Sr. REG (9a.m. - 7p.m.)	Dr. 55
Child & Adolescent Psychiatry Cons (9a.m. - 7p.m.)	Dr. 56
Surgery – Consultant	Mr. 57
Surgery - SHO	Dr. 78