Managing Outlying Patients

Exploring Hospital Staff's Challenges and Safety Considerations in Acute Patient Placement Decisions

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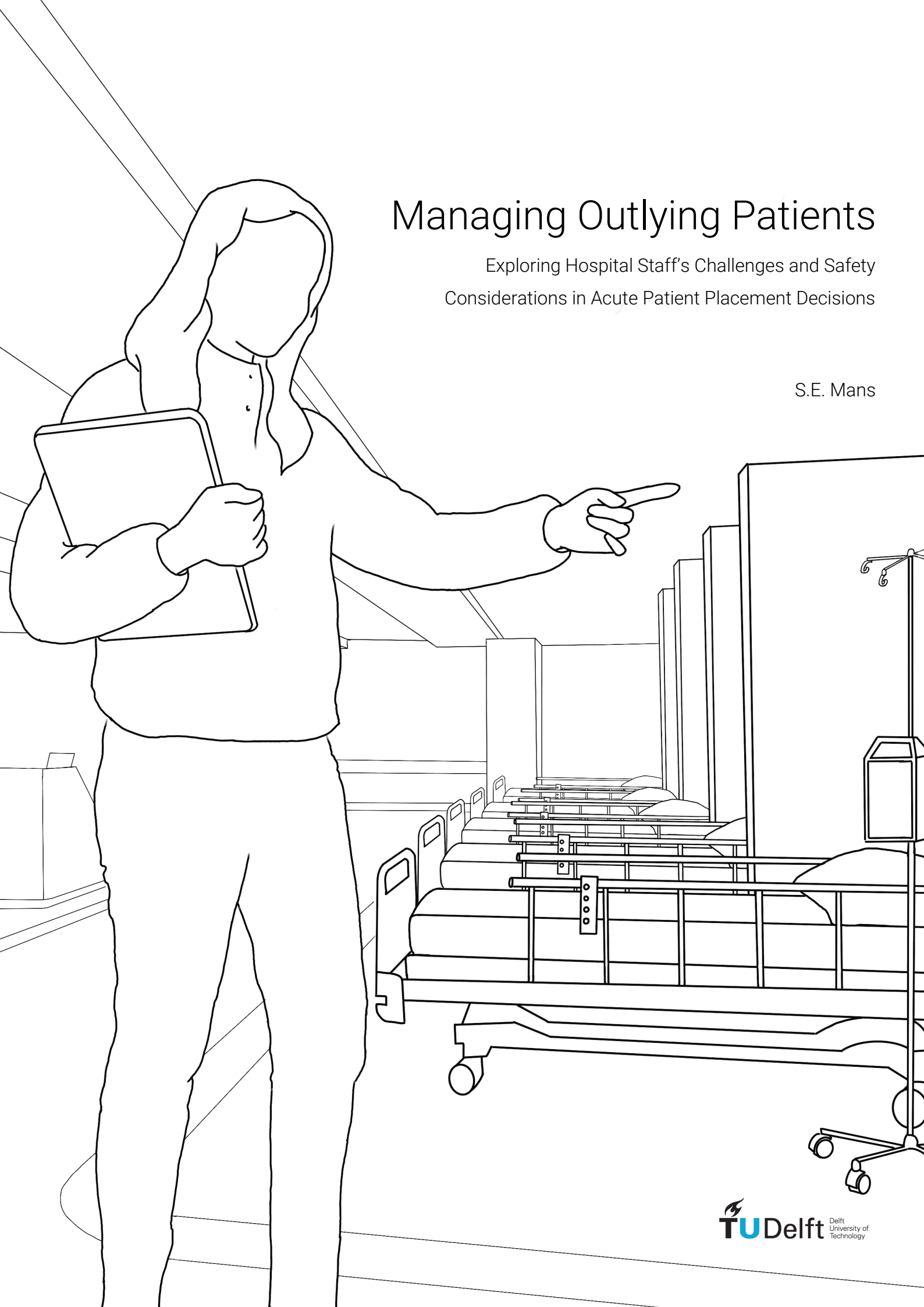

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by

S.E. Mans

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S.E. Mans
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Executive Summary

Imagine requiring urgent hospital treatment, only to find there are no available beds in the appropriate department at your local hospital. As a society, we want to prevent such scenarios, but various pressures—such as an aging population and rises in multimorbidity without additional resources to provide care—have made such scenarios a reality. One response to these pressures on the healthcare system is the practice of outlying patients: admitting individuals to hospital departments that do not align with their primary diagnosis due to bed shortages in the preferred department. While this approach maintains patient flow, existing literature suggests it may pose risks to patient safety and quality of care. However, little is known about how hospitals manage these risks in daily practice. This research aimed to bridge that gap by investigating the decision-making process behind outlier placements and identifying any measures used to maintain patient safety.

The study was aimed to answer the question: "How are patient safety challenges addressed within the daily decision-making process for placing patients on overflow beds?" and was guided by the following sub-questions:

1. What is the daily decision-making process for assigning patients to overflow beds at the hospital of focus?
2. What challenges do stakeholders face during the decision-making on overflow bed placements?
3. How is patient safety influenced by the decision-making process for overflow bed placements?

To answer these questions, a single-center study was conducted at a hospital in the Netherlands. Observations and hospital documentation informed the co-design of the research with advisors within the hospital. The primary data collection method consisted of semi-structured interviews with staff directly involved in patient flow coordination and care for patients in overflow beds.

Findings revealed a structured decision-making process, with the Patient Flow Coordinator playing a central role in determining outlier placements. The primary tools supporting this process were flowcharts that guided placement decisions based on clinical suitability. However, despite this structured approach, several challenges emerged. The hospital's departmental structure complicated interdepartmental collaboration, contributing to communication barriers, resistance to accepting outliers, and a lack of shared responsibility for patient flow. Additionally, the limited specialty-specific knowledge of nurses caring for outliers fostered concerns regarding patient safety, particularly in recognizing deterioration, following protocols, and informing patients about their conditions.

These challenges had direct implications for patient care, as staff identified increased length of stay, care delays—often caused by late ward rounds—and mistakes in care as risks for outlying patients. To mitigate these risks, the hospital employed strategies such as prioritizing the repatriation of outliers and signaling concerns in the daily Bed Availability Consultation, though preventing overflow placement remained the main strategy to maintain patient safety.

This research highlighted the need to improve interdepartmental collaboration and shared responsibility in managing overflow placements. Formalizing the daily Bed Availability Consultation, fostering professional relationships, and improving staff's understanding of overflow placement could contribute to safe care for outlying patients. Additionally, future research could confirm whether the themes established in this study interact as proposed and how placement decisions affect patient safety in quantitative terms.

This study provides a deeper understanding of outlier placement decision-making, the challenges it presents, and the hospital's strategies to maintain patient safety. The findings may inform policy improvements aimed at balancing operational efficiency with safety in patient flow management.

Keywords: Outlying Patient, Decision-Making, Patient Safety, Patient Flow, Overflow Bed.

Contents

Acronyms

AMU Acute Medical Unit. xiii, 9, 12, 15, 17, 18, 23–25, 35–41, 45–47, 66, 67

BAC Bed Availability Consultation. v, xiii, 26, 27, 38, 39, 43, 44, 47, 57, 66, 68, 70, 74

ED Emergency Department. 6, 8, 9, 12, 17, 18, 24, 28, 35–40, 42–44, 66, 67, 69

ICM Integral Capacity Management. 17, 23, 24, 26, 69

ICU Intensive Care Unit. 38, 46

IoM Institute of Medicine. xv, 9

IPC Integrated Planning Consultation. 26

IZA Integraal Zorgakkoord. 1, 7

LOS Length of Stay. 2, 10, 12, 13, 62, 69, 79, 81–83

OR Operating Room. 1, 26

PFC Patient Flow Coordinator. v, 15, 17, 21, 26, 31, 35–45, 47, 48, 50, 53, 57, 58, 63–66, 68, 69, 73, 88, 97

TPCIC Tactical Planning Consultation for the Inpatient Clinic. xiii, 26, 47

WHO World Health Organization. xv, 9

List of Figures

List of Tables

1

Introduction

Hospital capacity constraints have become an increasingly urgent issue in modern healthcare systems. Imagine arriving at a hospital in need of urgent care, only to face delays or be placed in a ward that lacks the specialized expertise required for your condition. As populations age and the prevalence of multimorbidity rises, healthcare systems worldwide are experiencing growing pressure to meet demand (Page et al., 2023). These trends have contributed to an increase in the number of complex patients requiring specialized care (Eggink et al., 2017; Skou et al., 2022; Valderas et al., 2009). In the Netherlands, hospitals struggle to adapt, leading to a heavier burden on healthcare personnel, increasing workloads, and decreasing job satisfaction. In response, the Dutch government introduced "The Integrated Healthcare Agreement" (Integraal Zorgakkoord, IZA), a policy designed to maintain accessibility, quality, and affordability of care while simultaneously enhancing the attractiveness of healthcare professions (Ministerie van VWS, 2024). The introduction of this policy underscored the urgent need for system-wide adaptations to mitigate capacity-related challenges.

From an operational standpoint, hospitals are usually structured into specialized departments that allocate their own resources, including personnel. Typically, hospital capacity is optimized for the most resource-intensive areas, such as the Operating Room (OR) or surgical departments (Goday et al., 2022). As a result, resource allocations in other departments are adjusted to fit this optimization, leading to inefficiencies or fluctuations in the subsequent demand for care and process. Ideally, patients are admitted to departments best suited to their medical needs, where staff possess the necessary expertise and the correct equipment is available. However, when demand exceeds available capacity, hospitals must adapt their operations, making real-time decisions regarding staff allocation, patient flow, and healthcare provision (Page et al., 2023). In such cases, ensuring that each patient is placed in an appropriate specialty department becomes increasingly challenging. To prevent treatment delays or patient refusals, hospitals frequently resort to reallocating existing resources, which may include adjusting staff assignments, re-purposing available spaces, and, notably, placing patients in departments that are not specialized for the treatment of their condition.

Patients who are admitted to non-specialized wards due to capacity constraints are commonly referred to as "outliers", "outlier patients", "outlying patients", "boarders", or "sleep-outs" (Goulding et al., 2012). In this thesis, the terms "outliers" or "outlying patients" will be used, with the beds they occupy referred to as "overflow beds". Literature suggests that outliers may experience increased safety risks (Cheung et al., 2020; Goulding et al., 2012, 2015), although the extent of these risks remains debated. Moreover, little is known about the decision-making processes that determine which patients are placed in alternative wards. Key questions remain unanswered: Who is responsible for these decisions? To what extent are patient safety and potential risks considered? What information, data, or tools inform these choices? While the literature acknowledges that outlier placement is a frequent occurrence in hospital settings, it provides limited insight into the real-world mechanisms that shape this practice.

1.1. Literature Gap

While the challenges of managing hospital capacity and the potential risks for outliers are acknowledged, little is known about the decision-making that leads to these patients' placements. To develop effective strategies for mitigating risks, it is essential to first understand who makes these decisions, what factors influence them, and how patient safety is considered. However, as this section demonstrates, the current literature offers limited insights into these critical aspects.

The gap in understanding the decision-making about outlier patient placements became evident in a literature review, which is extensively discussed in Chapter 2. The reviewed literature demonstrates that much of the existing research emphasizes patient outcomes, such as Length of Stay (LOS), mortality, and readmission rates. The occurrence of outliers itself can be viewed as a hospital-level outcome that results from the daily decisions made to manage capacity constraints. These decisions, often driven by the need to address immediate specialty bed shortages, require a deeper investigation in their real-life context to understand the process and considerations of the hospital staff.

While studies have explored the experiences of both staff and patients involved with the outlying phenomenon, they do not clarify which decision-making process results in patient placement on clinically inappropriate wards, which assumptions or agreements underlie this process, or the extent to which potential safety risks are considered. The contradictory findings in the literature also stress the need for a more nuanced understanding of the impact of outlier placements on quality of care. The field of research on outlying is still in development and shows very few studies explaining the mechanisms that affect the quality of care in this context. Consequently, even the replication of existing studies could yield valuable insights and help build a better understanding of the impacts on quality of care.

A notable gap in the current literature is the lack of clarity surrounding decision-making roles and responsibilities in managing outliers. Many articles use passive phrasing, like ”patients were moved”, indicating that the specific individuals or roles involved are often not identified. When decision-makers are mentioned, there is little clarity on their exact roles or on how they balance competing demands when making overflow decisions. For example, the literature mentioned several possible decision-makers—such as senior medical staff, junior doctors, or a house supervisor—but rarely specifies their role, responsibility, or the information that informs their choices (Cheng et al., 2022; Goulding et al., 2012). Proposed roles, such as the *outlier doctor* or *coordinator nurse* (Lepage et al., 2009), suggest potential solutions but lack detail on their practical responsibilities and how they would improve care for outliers. This gap points to the need for empirical research that focuses on the decision-making process and the roles related to the outlier phenomenon.

Addressing this gap is a crucial step toward advancing operational and patient safety practices. A better understanding of the decision-making processes could allow hospitals to proactively consider the safety implications of their capacity-management strategies. By identifying the actors, their considerations, and actions in real-world settings, hospitals could develop evidence-based protocols for outlying that prioritize patient safety. This knowledge could help guide management in their challenge to create more transparent and effective practices of bed management and help to assign patients to beds without posing additional safety risks. Additionally, the execution of research on this matter could promote more awareness among staff, prompting them to make more informed and safety-focused decisions under capacity constraints.

1.2. Research Questions and Objectives

Currently, overflow beds in hospitals are a vital mechanism for managing capacity issues, particularly during peaks in admissions. However, decisions surrounding the placement of patients on overflow beds are often made under operational pressure and they could significantly impact quality of care and specifically patient safety. Understanding how these decisions are made is essential to identify areas where quality and safety considerations potentially need to be integrated.

The decision-making process for assigning patients to overflow beds has received limited attention in the academic literature (Chapter 2). The available literature focuses on (quantitative) patient outcomes and staff experience caring for outliers, leaving a gap in the knowledge about the specific procedures and considerations involved in daily decision-making. This research addresses this gap by investigating how patient safety challenges are addressed within the daily decision-making process for placing patients on overflow beds in a Dutch hospital setting.

1.2.1. Main Research Question

To explore this issue, the following overarching research question was formulated:

"How are patient safety challenges addressed within the daily decision-making process for placing patients on overflow beds?"

This question seeks to uncover the mechanisms through which decision-makers navigate the tension between a peak in admissions and patient safety of those placed on overflow beds.

1.2.2. Sub-Questions

To address the main question, three sub-questions were developed. Each sub-question targets a specific aspect of the decision-making process, contributing to a holistic understanding of the issue:

1. **What is the daily decision-making process for assigning patients to overflow beds at the hospital of focus?**
   This sub-question seeks to map the workflow, including stakeholders involved, the tools and resources utilized, and any contextual factors influencing decisions. It provides a foundation for understanding the process and serves as the basis for further analysis.
2. **What challenges do stakeholders face during the decision-making on overflow bed placements?** This sub-question aims to identify practical and organizational hurdles that decision-makers encounter. Understanding these challenges is crucial for future avenues for improving the proactive consideration of patient safety and quality of care.
3. **How is patient safety influenced by the decision-making process for overflow bed placements?**
   This sub-question focuses on the integration of patient safety in the decision-making process. It examines which safety concerns the staff is aware of and the measures through which they are addressed.

1.2.3. Research Objectives

The primary objective of this research was to understand how decision-makers incorporate patient safety in the process of assigning patients to overflow beds. By identifying and analyzing the processes, stakeholders, tools, data, and challenges involved in these decisions, the research aims to achieve the following:

1. Provide a systematic description of the decision-making process for overflow bed placement.
2. Identify challenges or weaknesses in the current decision-making process where patient safety considerations may be improved.
3. Pinpointing which measures are currently in place for safeguarding the patient's quality of care.
4. Offer insight that can serve as a basis for future interventions aimed at proactively integrating patient safety considerations into daily decision-making.

In doing so, this study contributes both to the literature on hospital daily decision-making and to practical efforts to improve patient care in situations where capacity constraints necessitate overflow placements.

1.3. Context

1.4. Relevance for Master Management of Technology

This research aligns with the principles and objectives of the Management of Technology (MOT) program by demonstrating how technological, managerial, and human factors converge in addressing resource and process challenges within a large organization. A key focus of this study was knowledge management: clarifying processes and difficulties associated with outlying patients. By illuminating the current practices, existing measures, and remaining hurdles, this research provides insights that can inform innovative management of hospital operations, aligning with MOT's focus on fostering technological and organizational advancement.

Through the project, I explored how resources—such as staff and patient beds—are managed under constraints, reflecting MOT's emphasis on understanding strategy to optimize operations. This work involved engaging with multidisciplinary teams, including doctors, nurses, and organizational leaders, to integrate diverse perspectives. This mirrors the MOT program's emphasis on cross-disciplinary collaboration and merging different perspectives to address complex challenges.

As discussed before (Section 9.2), it became clear that the intended focus on tools used in the decision-making on outlier placement was not informative, as the interviewees could not report on data-driven digital tools that are currently in use. Therefore, this research shifted focus to gain an understanding of the current decision-making process to set the stage for the future implications of innovative technological tools.

Additionally, I employed scientific methods, including qualitative research techniques, to investigate these issues in a large organizational context, applying the teachings of the MOT program to structurally investigate this problem. Technology, such as electronic patient records and dashboards, though not the central focus of the research, played an enabling role in the decision-making and highlighted future opportunities for technological innovation in patient flow processes.

Ultimately, the study aimed to provide insights to aid in improving patient safety and operational efficiency. This goal emphasizes the responsibility embedded in outlier placement decision-making, resonating with the program's focus on balancing innovations with societal impacts.

1.5. Structure of this Thesis

This thesis is structured into ten chapters. Chapter 1 introduces the practice of outlying patients, the literature gap, and the research questions. Chapter 2 provides a literature review on hospital capacity constraints, the practice of outlying, and its impact on patient safety. Chapter 3 outlines the research methodology, including data collection, sampling strategies, and analysis techniques. Chapter 4 contextualizes the research within the focal hospital by describing its capacity management strategies and the role of outlier placements. Chapter 5 explains how themes emerged from coding, linking research questions to key findings.

The next three chapters present the study's findings. Chapter 6 details the decision-making process behind outlier placements, emphasizing the trade-off between clinical suitability and operational efficiency. Chapter 7 explores challenges in interdepartmental coordination. Chapter 8 examines how these challenges impact patient safety, identifying key risks and mitigation strategies. Each results chapter concludes with a reflection.

Chapter 9 synthesizes findings by comparing them to existing literature, discussing novel contributions, societal and managerial implications, study limitations, and research questions. It also provides recommendations for future research and hospital policy. The chapter concludes with a reflection on the researcher's positionality. Finally, Chapter 10 summarizes key findings, contributions to literature and practice, managerial implications, and directions for future research.

2

Literature

This chapter provides essential context for the research by addressing healthcare pressures on both global and national levels. It begins with a discussion of challenges that transcend national borders, before focusing on the Dutch healthcare system and illuminating its pressures. Then, the practice of outlying is introduced, offering a definition and situating it within broader issues such as hospital overcrowding and emergency department boarding. This chapter concludes with a synthesis of core literature on outliers, encompassing both qualitative and quantitative findings.

2.1. Approach to Literature Search

Before starting the literature search, some boundary conditions were established. First of all, the language of publication was limited to English and Dutch. English was chosen as many scientific publications on outlying were available in English. Dutch was chosen as the context of the research was a hospital in the Netherlands. Next to that, the year of publication was limited to 2000 and later to obtain the most recent insights. Lastly, the databases used for the search were PubMed and Scopus. PubMed was chosen due to its extensive collection of health, biomedical, and life science-focused research. Scopus was added to include a wider range of journals and publications, that may not be included in PubMed. The goal of the literature search was to identify a research gap while collecting existing information related to the practice of outlying and its safety implications.

The basis for the literature search strategy was formed by the research question: “How are patient safety challenges addressed within the daily decision-making process for placing patients on overflow beds?” From this research question, three topics can be distilled: patient safety or quality of care, decision-making, and patients on overflow beds. Synonyms for these terms were extracted from the literature and added to the search query. After initial trials, the topic decision-making was excluded, as it either made the results too broad (adding it with an OR operator) or too narrow and irrelevant (adding it with an AND operator). Additionally, the synonym ”overflow” was originally used in topic 2. This resulted in an abundance of irrelevant articles and was omitted to avoid manually removing large quantities of off-topic publications. Based on the two remaining topics, search queries were finalized for PubMed and Scopus. They can be seen in Table 2.1, respectively. In the table, the synonyms were separated by an OR operator and enclosed within parentheses. The topics were separated by AND operators. For both databases, topics 1 and 2 were identical. However, for Scopus, a third topic was added to the query to specify that the results must be applicable to the healthcare sector. For PubMed, this was not necessary as the database itself is focused on (bio)medical and life sciences publications.

When entering the query as described in Table 2.1 in PubMed, this yielded a list of 169 results. Entering the amended query as described in Table 2.1 in Scopus yielded 200 results. If topic 3 was removed, 247 Scopus results were found. Based on a quick scan of the results, including this topic improved the applicability. All 369 results were uploaded in EndNote. Duplicates were removed by applying the ”Find Duplicate” function that EndNote offers. After checking and manually deleting unidentified duplicates, 135 documents were removed. Ultimately, combining the records from both databases and removing duplicates resulted in 234 records. These were screened based on the title and abstract. If these gave a clear indication that the subject was not related to outlying patients, they were removed. Based on

Table 2.1: Topics for literature search in PubMed and Scopus databases based on the research question. Topic 3 was only used in the Scopus search to establish a healthcare focus.

	Topic 1	AND →	Topic 2	AND →	Topic 3 (Scopus only)
OR ↓	”Quality of Care”		”Outlier Patient*”		Hospital*
	”Care Quality”		”Outlying Patient*”		Clinic*
	Safety		Boarder*		Health*
	”Length of Stay”		”Sleep Out*”		
			”Inappropriate ward*”		
			”Bed-spacing”		
			”Bed-spaced”		

this, 168 records were excluded. The lump sum of the articles excluded in this step was focused on sleep quality research. This left 68 articles for full-text review. After review, 54 articles were excluded for various reasons, such as a singular focus on boarders in the emergency department instead of outliers on clinical hospital wards. For a list of all reasons, and a visual overview of the literature selection, see Figure 2.1. Eventually, 14 articles from the initial searches were included, based on their definition of outliers matching patient placement on beds out of the preferred ward. These papers had to address hospital overflow and bed capacity management, especially outlier placement and its effect on patient quality of care. Both qualitative and quantitative studies were included. Other key themes included patient safety or prognosis, staff perspectives, and resource allocation. Another important inclusion criterion was the accessibility of a full-text article. Moreover, based on bibliographies, 16 additional articles were included. In later re-evaluation, some literature on boarders in the Emergency Department was included in the literature review in Chapter 2, despite being excluded during the first stages of the literature selection. In hindsight, the research on boarding provided context for the practice of outlying that was deemed valuable. However, no additional search query was developed for this subject, the literature that was included was mostly based on references. Appendix A lists all papers included in this chapter.

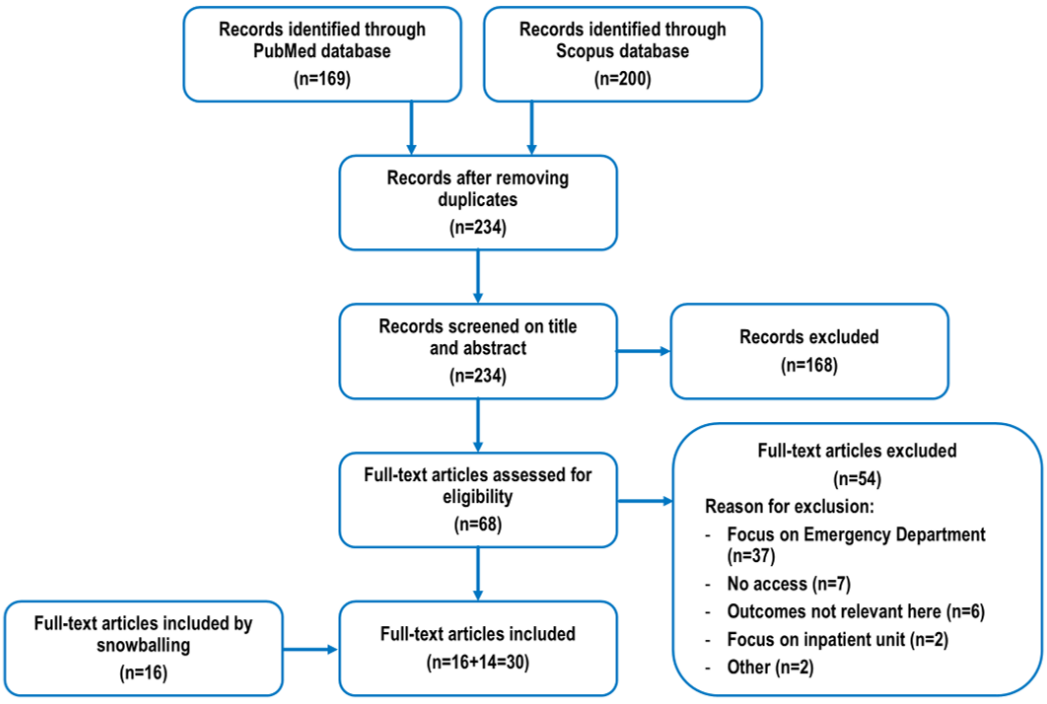

Figure 2.1: Overview of the literature search process.

A complicating factor that hindered the gathering of literature is the inconsistent terminology used to describe this phenomenon. Outlying patients are referred to by various terms, including outliers, overflow patients, sleep-outs, and boarders. Similarly, the wards or beds they are assigned to are sometimes called inappropriate wards, overflow beds, off-service placements, and borrowed beds, depending on the context. Additional terminology includes outlier status, bed-spaced patients, and the practice of bed-spacing. In Dutch, these patients are commonly referred to as *gastpatiënt* (guest patient) or *buitenbed* (out-of-ward or overflow bed), but alternative terminology also exists: *gastopname* (guest admission), *vreemdligger* (loosely translated: outsider) or *verkeerde bed* (wrong bed or bed blocker). However, this last term is seen as confusing, as it may also refer to a patient who is occupying a hospital bed without medical necessity due to lack of space in an outside care facility, e.g. a nursing home. To avoid confusion, this term was avoided throughout this research.

2.2. Context: Capacity Constraints Pressure Healthcare Systems

Healthcare systems worldwide are under increasing pressure due to a combination of demographic, economic, and operational challenges. Aging populations, rising rates of chronic illness and multimorbidity, and growing expectations for high-quality, innovative care are driving up demand for healthcare services (Page et al., 2023). At the same time, financial constraints and workforce shortages limit the capacity of healthcare systems to meet this demand effectively (Page et al., 2023). The rising cost of care, coupled with historic cost-saving measures such as reductions in hospital bed numbers, has had a lasting impact on capacity constraints (Hommel et al., 2008; La Regina et al., 2019).

Hospital overcrowding is a visible outcome of these systemic issues, with reports such as those from the UK's Royal College of Nursing highlighting patients being treated in corridors (Campbell & Vinter, 2024). These conditions compromise patient safety and dignity, illustrating the critical nature of capacity constraints. Social and medical frailty, particularly among patients who lack adequate community support, often leads to delays in discharge. Combined with reductions in community healthcare services and seasonal surges in demand, these factors exacerbate hospital overcrowding (La Regina et al., 2019). Approaches to managing these challenges often emphasize immediate, localized fixes rather than systemic solutions (Amalberti & Vincent, 2020). Adaptations made to staff allocation and patient flow are often aimed at minimizing the risk for patients and maintaining a reasonable quality of care (Page et al., 2023). But these adaptations are often improvised and vary widely depending on who is in charge at the time (Amalberti & Vincent, 2020; Page et al., 2023). Instead, long-term solutions need to be investigated to ameliorate this problem, though not all approaches are viable. For instance, while staffing shortages are recognized as a safety concern, simply increasing workforce numbers is not considered a feasible solution. Overstaffing, though it could theoretically ensure high-quality care, leads to excessive costs and inefficiencies, making it impractical in resource-constrained hospital systems (Cheng et al., 2022). Similarly, participants in a study by Hassen et al. (2018) highlight the complexity of addressing staffing issues, and often refrain from suggesting higher staffing levels due to perceived unrealistic. Instead, systemic changes in how resources are managed and allocated are required to improve outcomes while maintaining the accessibility and affordability of healthcare.

The Dutch healthcare system is also experiencing significant pressure, as outlined in the Healthcare Agreement (Integraal Zorgakkoord, IZA). This policy document was formulated by the Ministry of Health, Welfare, and Sport and various Dutch healthcare collectives. A key challenge is the increasing gap between the demand for care and the available capacity to provide it. The aging population has resulted in a higher ratio of older individuals to working-age adults and the prevalence of chronic illnesses and multimorbidity among patients has increased, adding to the complexity of care. These trends, combined with ongoing staff shortages, have led to longer waiting times, increased workloads for healthcare workers, and higher levels of staff absence (Ministerie van VWS, 2024).

Capacity issues are also reflected in acute settings, where seasonal peaks in demand and fully occupied wards have led to temporary closures of emergency departments (LNAZ, 2024; Ministerie van VWS, 2024). Without effective policy changes, healthcare costs are projected to triple by 2060, an unfavorable scenario given that care and welfare already account for 13% of the Netherlands' national income (Ministerie van VWS, 2024).

The IZA identifies differences in socio-economic status that lead to discrepancies in individuals' ability to access healthcare as an urgent area for improvement. It highlights the influence of factors like education, living conditions, and employment on physical and mental health. Therefore, the ambition

is expressed that healthcare should remain accessible, high-quality, and affordable for all (Ministerie van VWS, 2024). In the Netherlands, similar to the global context discussed earlier, expanding the workforce is not viewed as a viable long-term solution to the challenges the healthcare system faces. Projections from the Sociaal Economische Raad (SER) indicate that without intervention, one in four Dutch citizens would need to work in healthcare by 2040, a substantial increase from one in seven in 2020 (Sociaal Economische Raad, 2020). This underscores the need for alternative approaches to maintain the accessibility and affordability of healthcare in the Netherlands.

2.3. The Practice of Outlying Patients

As previously discussed, hospital systems worldwide face increasing pressure due to capacity constraints, which can lead to the practice of outlying patients. Hospital wards or departments are usually medical specialty-specific in order to concentrate knowledge and develop a shared body of expertise among the nurses in the specialty ward (Cheung et al., 2020). However, the scarcity of available beds in the appropriate specialty ward results in patients being placed in wards that are not aligned with their primary diagnosis, leading to what is referred to as outlying (Cheung et al., 2020; Serafini et al., 2015). This practice arises from the operational need to manage patient flow when clinical beds in the appropriate wards are unavailable.

So, outliers are patients hospitalized outside of the clinically appropriate ward due to a lack of free beds in that ward and therefore admitted to another ward with beds available (adapted from La Regina et al. (2019) and La Regina et al. (2021)). The ward where the patient is placed is termed the *hosting ward* or *inappropriate ward*, as it may not have the specialized resources required to treat the patient's specific condition. On the other hand, the *home ward* or *appropriate ward* is the specialized ward that would be better equipped to address the patient's needs.

A key challenge associated with outlying patients is the division of responsibilities. Although treatment responsibility remains with the home ward, the nursing care is often provided by the hosting ward (La Regina et al., 2019). This can result in inconsistencies in the quality of care, as the hosting ward's staff may lack the necessary expertise to manage the patient's condition effectively.

2.4. Operating at Near Capacity: Common Cause of Hospital Overcrowding and ED Boarding

The phenomenon of overcrowding in hospitals and emergency departments (EDs) is linked to the outlier phenomenon. Overcrowding arises when the number of patients waiting for healthcare services exceeds the facility's capacity, leading to compromised ED functionality (Sartini et al., 2022). This issue has been directly associated with poorer patient outcomes (Badr et al., 2022). A significant contributor to overcrowding is the lack of available inpatient beds, which forces patients needing hospital admission to remain in the ED for extended periods as "boarders" (Sartini et al., 2022; Serafini et al., 2015).

Boarding in the ED occurs when patients who require admission are retained in the department due to the lack of available beds in the appropriate wards. This creates a direct connection to the outlier phenomenon: boarders waiting in the ED for an inpatient bed may eventually be placed in a ward outside their specialty, becoming outlying patients. As such, ED boarders can be considered a subset of outliers—patients initially placed in an inappropriate ward due to operational constraints.

ED overcrowding depends on three key variables: the *input* of patients arriving, the *throughput* of patient treatments, and the *output* of patients leaving the department, either for hospital admission or discharge (Badr et al., 2022). Input factors include an increase in both high- and low-acuity presentations, greater complexity of care needs, and higher numbers of elderly patients (Sartini et al., 2022). Throughput is impacted by factors such as staff shortages, delays in diagnostics, and insufficient availability of ED beds. Output, however, is most directly influenced by bed availability in inpatient wards. When these beds are occupied—often by patients unable to be discharged due to age, comorbidities, socio-economic challenges, or unavailability of post-discharge care facilities—boarding and outlying increase (Serafini et al., 2015; Stowell et al., 2013).

The consequences of ED overcrowding ripple through the hospital system. Quality of care suffers as patients are treated in spaces not designed for care delivery, and boarded patients are often cared for by ED nurses rather than specialized teams, impacting staff and patient satisfaction (Badr et al., 2022). These disruptions can also have lasting effects on hospital operations, with impacts persisting

for several days (Taylor et al., 2018). Seasonal surges, regional ED closures, and reduced capacity during weekends or holidays further aggravate the problem (Sartini et al., 2022).

Efforts to alleviate overcrowding often emphasize rapid patient transfer to appropriate facilities– whether in or outside the hospital– to free up beds (Serafini et al., 2015). In addition, the establishment of Acute Medical Units (AMUs) can improve patient flow by creating dedicated spaces where patients can stay for a couple of days, reducing the burden on EDs and specialty wards (Jacobson et al., 2016; Sartini et al., 2022; Serafini et al., 2015). By treating patients in these units before transferring them to inpatient wards or discharging them, hospitals can improve both staff and patient satisfaction (Bornemann-Shepherd et al., 2014).

Though ED boarding and outliers are often viewed as separate issues, they share a common cause: hospitals operating at or near full capacity. Although it may seem intuitive, recent research by Asheim et al. (2022) confirms the relationship between overcrowded wards and the occurrence of outlying patients, in cardiovascular care specifically. The findings gathered in this section underscore the systemic nature of hospital capacity issues, highlighting the interplay between ED overcrowding, inpatient bed shortages, and the occurrence of outliers.

2.5. Quality of Care for Outlying Patients

The World Health Organization (WHO) defines quality of care as ”the degree to which health services for individuals and populations increase the likelihood of desired health outcomes” (WHO, 2020b). According to the Institute of Medicine (IoM), the modern healthcare system should improve on six dimensions of quality of care. It should be effective, safe, patient-centered, timely, efficient, and equitable (Institute Of Medicine, 2001, p. 5-6). The WHO complements these six dimensions with a seventh: health care should be integrated (WHO, 2020b). The explanations of these dimensions as given by the WHO (2020b) and Institute Of Medicine (2001) are listed in Table 2.2. In a further explanation, the WHO stresses the link between quality and resilience in healthcare. The system needs to be able to handle emergency situations, maintain quality during the situation, and improve it after the emergency has dissolved (WHO, 2020a). Though the WHO focuses on (inter)national health systems, quality resilience can also be found in a single hospital or perhaps even on a single ward. The ability of a hospital to provide quality care in an emergent situation where outlying patients are present is an aspect of quality resilience. Later in this chapter, it will be illustrated that various dimensions of quality listed in Table 2.2 could be compromised for patients who are placed in a clinically inappropriate ward.

Table 2.2: Dimensions for improvement of quality health services as defined by the IoM and WHO. Adapted into a table-based definitions given by Institute Of Medicine (2001) and WHO (2020b).

Aspect	Explanation
Effective	Providing evidence-based healthcare services to those who need them, avoiding under-use and overuse.
Safe	Avoiding harm and injuries to patients for whom the care is intended.
Patient-centered	Providing care that responds to individual preferences, needs, and values.
Timely	Reducing waiting times and sometimes harmful delays for those receiving and providing care.
Equitable	Providing care that does not vary in quality based on gender, ethnicity, geographic location, and socio-economic status.
Efficient	Maximizing the benefit of available resources and avoiding waste, including supplies, energy, and equipment.
Integrated	Proving care that makes available the full range of health services throughout the life course.

2.5.1. Quantitative Quality Indicators for Outlying Patients

Quantitative studies assessing the impact of outlying patients on quality of care often focus on mortality rates, Length of Stay (LOS) in hospital, and readmission rates. These indicators provide measurable insights into patient outcomes. This section reviews findings from various studies to establish whether outlying is associated with negative patient outcomes. By including this section, this research acknowledges that concerns about the practice of outlying affecting patient's quality of care are grounded in existing literature, demonstrating that this issue warrants further investigation from both qualitative and quantitative perspectives.

A common indicator of quality of care for outliers is mortality risk, which is particularly studied within the initial period of hospitalization. For example, Canadian research by Bai et al. (2017) found that general internal medicine patients placed in inappropriate wards faced a threefold increase in mortality risk during the first week of their stay. However, this risk normalized by the third week of admission as the patient stabilized clinically. Similarly, Perimal-Lewis et al. (2012) reported a 40% increase in mortality risk for outliers during the first 48 hours of admission, highlighting the critical nature of the early stages of admission for outlying patients. Santamaria et al. (2014) also found an increased mortality risk for outliers of 2.57% vs. 1.12%. Lastly, Italian research by Serafini et al. (2015) found double the risk of death for outliers. In contrast, Stylianou et al. (2017) found no significant association between outlier status and mortality risk, which suggests that this outcome may vary considerably across patient groups and healthcare settings.

The LOS for outlying patients has also been a focal point, with most studies indicating an increase in LOS compared to patients in appropriate wards. For instance, French research by Stowell et al. (2013) observed that outliers had an average LOS of 8 days versus 7 days for non-outliers. In a Spanish hospital, Alameda and Suárez (2009) noted that heart failure patients with outlier status had a LOS that was 2.6 days longer than their appropriately warded peers, although the authors attributed this increase to administrative delays rather than decreased quality of care. Similarly, Stylianou et al. (2017) found 2 days longer LOS for outliers. Kohn et al. (2020) find outliers in three US hospitals had a 5% longer LOS. Additionally, research by Hommel et al. (2008) showed that patients with hip fractures treated outside the orthopedic ward had an extended LOS of 3.7 days in hospital, along with an additional 13.6 days in rehabilitation. In contrast, Gomez-Rosado et al. (2019), Liu et al. (2014), and Serafini et al. (2015) found no significant differences in LOS between outliers and home-warded patients. Perimal-Lewis et al. (2016) find a shorted inpatient LOS, but clearly state that they do not infer improved quality of care from this outcome.

Readmission rates also tend to be higher for outlying patients, although the studies that are included here present mixed results. Serafini et al. (2015) found that outliers in Italy had a higher readmission rate within 90 days compared to patients admitted to their home wards (26.1% vs. 14.2%). Likewise, Stowell et al. (2013) reported a 26% readmission rate within 28 days for outliers in France, compared to 17% for non-outliers. On the other hand, Stylianou et al. (2017) found no differences in readmission rates and Perimal-Lewis et al. (2012) even found a decreased 28-day readmission rate for outlying patients. This may reflect differences in healthcare practices or the characteristics of patient groups studied.

In addition to these primary outcomes, studies have examined emergency care needs and other urgent interventions among outlying patients. For example, Santamaria et al. (2014) found that outliers required more frequent emergency calls for rapid response teams and had a higher incidence of cardiac arrest than patients assigned to appropriate wards. Gomez-Rosado et al. (2019) found that outliers presented with increased complications if their stay extended over 2.5 days. Hommel et al. (2008) also investigated the frequency of complications but did not find significant differences. Moreover, Patry et al. (2021) found that older outlying patients were less commonly discharged home (46% vs. 59%) and less likely to live at home 6 months after their hospital admission.

These findings reveal several detrimental patterns in quality of care outcomes for outliers. However, inconsistencies across the studies point to the complexity of the relationship between outlier status and patient outcomes. Moreover, studies have different ways of measuring these outcomes, which makes them less suitable for direct comparison. Though a single paper found better outcomes in outlying patients (Bogler et al., 2021), the general consensus among authors is that the practice of outlying negatively impacts the quality of care for the patient and that more research is required to find a more definitive answer on the effect of outlying on the quality of care and outcomes.

2.5.2. Factors Affecting Quality of Care for Outlying Patients

In addition to the quantitative studies on outcomes, several qualitative studies have explored why the quality of care for outlying patients may be compromised. Caring for outliers is generally viewed by healthcare professionals as an error-prone process (Hassen et al., 2018, 2019). Hassen et al. (2018) show that 61% of interviewed staff members identify it as such. Although a literature review by La Regina et al. (2019) does not reach a definitive conclusion about the effects of outlying on patient outcomes, it highlights that the outlier phenomenon may pose a serious threat to patient safety and quality of care. The qualitative studies covered here reveal recurring issues related to staff knowledge, time pressures, inappropriate ward environments, communication breakdown, and patient characteristics. Several studies propose strategies to mitigate these challenges. This section summarizes findings on these themes, which were adapted from Goulding et al. (2012), to shed light on the factors impacting the outlying patients' quality of care.

Lack of Knowledge. A consistent theme across studies is that staff on clinically inappropriate wards often lack the specialized knowledge required to care for outlying patients (Goulding et al., 2012, 2015). Knowledge of one specialty is oftentimes not sufficiently transferable to another, which presents issues such as unfamiliarity with equipment, medication, nursing tasks, and signs of patient deterioration (Cheung et al., 2020; Goulding et al., 2015). Furthermore, Ede et al. (2019) conclude that outlying patients are more susceptible to failure of escalation. Due to the staff's limited experience with these conditions, they may not recognize the patients' specialty-specific symptoms, thus hindering timely responses to the patients' deterioration. In the worst cases, lack of knowledge can lead to inappropriate or even harmful care, as noted by Lepage et al. (2009). Likewise, Lloyd et al. (2005) reports significant gaps in nursing care that could lead to situations where trauma patients treated outside their home wards receive inappropriate or harmful nursing interventions. In light of these findings, they recommend ceasing the practice of outlying patients until enhanced training programs have ensured that nursing staff can provide adequate care for outlying trauma patients.

Time Pressure on Staff. Studies indicate that the two-sided responsibility of taking care of both specialty and outlying patients leads to time pressures that can compromise the quality of care for both groups. Goulding et al. (2012) observed that nurses often struggle to balance the care for their specialty patients with the additional needs for outliers, resulting in frustrations. Cheung et al. (2020) stress that, due to their lack of familiarity with treatment plans for outlying patients, nurses find it difficult to anticipate and allocate time to outlying patients' care requirements. One nurse reported that caring for outlying patients significantly impacted the quality of care delivered to other patients on the specialty ward (Cheung et al., 2020). Not only nurses on the clinically inappropriate ward are affected by time pressures. Creamer et al. (2010) investigated the effect of outlying patients on ward rounds and found that medical consultations of the specialty team required almost twice as much time for outliers. This was primarily due to the time spent moving between wards. These extended and removed ward rounds not only burden medical staff but may also compromise timely attention to patients in the specialty ward.

Unsuitable Ward Environment. The environment of the inappropriate ward often lacks essential equipment, medications, and other resources that are commonly available in the specialty ward, which can hinder effective care for outliers. The lack of immediate access to these resources poses risks; for example, Ede et al. (2019) observed that outlying patients were more likely to experience delays in receiving medications, sometimes missing doses completely. These events were also noted by patients themselves, which contributed to them feeling forgotten by medical staff (Goulding et al., 2015). Moreover, Goulding et al. (2012) identify the physical distance between the outlier and their specialty ward as a logistical challenge, which can delay medical consultations. Pascual et al. (2014) explain that outlying patients sometimes have accumulated multiple issues before the care team decides to invest the time to cross the physical distance from the specialty ward to the clinically inappropriate ward to visit the outlying patient. Additionally, Holmes and Stratford (2021) report that only 15.9% of neurological outliers in their research were seen by a neurologist. Lepage et al. (2009) discuss similar concerns, noting that diagnostic test results from outliers are often not communicated to specialists and therefore miss specialist interpretation. Another significant process issue listed by Lepage et al. (2009) is the absence of assigned doctors who bear responsibility for outliers, as specialty wards do not designate a specific doctor to oversee care for outliers of their specialty.

Breakdown of Communication. Communication challenges between specialty and inappropriate wards present another challenge to the quality of care (Goulding et al., 2012). Lepage et al. (2009) note that specialists can be difficult to reach and crucial patient information can be missing or inaccurately

conveyed to the ward caring for the outliers. Lepage et al. (2009) further report that specialty staff were not always informed of the admission of outliers from their specialty. Additionally, the absence of face-to-face interactions and established professional relationships between teams on specialty and outlying wards impairs understanding of outliers' specific care requirements (Cheung et al., 2020). These communication breakdowns extend to patient-nurse interactions as well; outlying patients and their families may receive less information about their care, including post-discharge instructions, due to nurses' unfamiliarity with their conditions and the treating medical team's remoteness (Goulding et al., 2015). The lack of communication also manifests through the delayed completion of discharge summaries for outlying patients, complicating continuity of care and hindering the transfer to other community healthcare providers (Perimal-Lewis et al., 2012; Perimal-Lewis et al., 2016).

Characteristics of Outlying Patients. The characteristics of and assumptions about outlying patients can also influence the quality of care they receive. Goulding et al. (2012) observe that outliers are often perceived by caregivers as lower-priority cases due to the assumption that they are more stable or fit and can therefore be placed in a clinically inappropriate ward. Liu et al. (2014) support this view, noting that outliers are often discharged directly to home rather than to external care facilities. From this observation, it could be deduced that the severity of the outliers' ailments was lower. However, Perimal-Lewis et al. (2016) challenge this assumption, finding that outliers with delirium or dementia generally have higher Charlson Morbidity Index scores than their home-warded peers, suggesting greater acuity and healthcare needs. Misconceptions and wrongful assumptions about the acuity of outliers may contribute to an unintended lack of vigilance in their monitoring and treatment, potentially impacting the quality of care they receive.

To address these challenges, some researchers propose adjustments to improve the quality of care for outliers. Lepage et al. (2009) recommend appointing specific outlier doctors and coordinator nurses to facilitate communication between specialty and clinically inappropriate wards and ensure accountability for outlying patients. Additionally, a surgical assessment unit—similar to the AMU but intended for surgical patients—introduced in New Zealand was associated with a reduced number of outliers (Jacobson et al., 2016). Predictive models to assess bed demand and support decision-making have also been developed, but their success in reducing ED boarding time and outlier placements has been mixed (Cheng et al., 2022; Novati et al., 2017). While various models have been proposed-which will not be considered here- a common critique is that their focus is often limited to a single department instead of the hospital as a whole (Baru et al., 2015; Humphreys et al., 2022; Novati et al., 2017). Finally, Rae et al. (2007) demonstrated that changing discharge practices led to reduced LOS and fewer outliers, highlighting how staff discharge behavior can affect bed availability. Discharge behavior is posed as a hidden dimension of hospital care.

These qualitative findings reveal multiple interrelated factors that contribute to compromised quality of care for outlying patients. Staff face challenges due to a lack of specialty knowledge, increased time pressure, missing ward resources, and poor communication, which can all negatively impact the quality of care and patient outcomes. Misconceptions about the characteristics of outliers further complicate their care. Various solutions and avenues for improvement have been proposed, and although some show promise for improvement, further research is needed to understand the impact of outlier placement on quality of care.

2.5.3. Reflection on Quality Dimensions and Focus on Patient Safety

As mentioned in the introduction of Section 2.5, the concept of quality in healthcare is multifaceted, encompassing the dimensions effectiveness, efficiency, patient-centeredness, timeliness, equity, and safety (Institute Of Medicine, 2001). Each of these dimensions is relevant to ensuring that healthcare services meet the needs of patients while minimizing harm and optimizing resource use. However, the interplay of these dimensions is complex, as improvements in one may have an adverse effect on the other. For instance, efforts to optimize efficiency by increasing bed turnover could unintentionally compromise patient-centered care or safety if not carefully managed.

In the context of outlying, patient safety is a particular concern. Without deliberate attention, unsafe practices—such as delayed interventions or communication gaps—can lead to adverse outcomes, including medication errors, treatment mistakes, or clinical deterioration. Over time, such events have the potential to undermine patient trust in the healthcare system, prolong hospital stays, and increase readmission rates, all of which drive up healthcare costs and strain resources. Additional risks include the erosion of staff morale and a decrease in patient satisfaction. Addressing these potential issues proac-

tively is essential to maintaining operational stability and ensuring positive patient outcomes. However, focusing on safety is not solely about mitigating risks. It provides an opportunity to strengthen care processes, enhance communication, and promote a culture of learning and improvement. By embedding safety as a core consideration, hospitals can address the challenges associated with outlying through a preventative and constructive approach.

Recognizing the complexity of quality in outlier management warrants the focus on patient safety to maintain a practical and actionable scope.

2.6. Summary of the Findings in Literature

The reviewed literature provided an examination of hospital capacity constraints, the practice of outlying patients, and its impact on the quality of care. In the beginning, global and national healthcare pressures were outlined, emphasizing how aging populations and financial limitations contribute to hospital overcrowding.

The practice of outlying—placing patients in departments not aligning with the specialty of their diagnosis—emerges as a response to capacity shortages. Literature suggests that outliers face increased risks, commonly expressed in Length of Stay (LOS), mortality rates, and readmission rates, but findings on these outcomes remain inconsistent across studies.

The literature on outlying showed that this practice is not unique. It has been studied in a plethora of countries: the United Kingdom (Goulding et al., 2012, 2015; Holmes & Stratford, 2021; Stylianou et al., 2017), Italy (Serafini et al., 2015), Spain (Gomez-Rosado et al., 2019), Canada (Liu et al., 2014), Australia (Perimal-Lewis et al., 2012; Santamaria et al., 2014), New Zealand (Jacobson et al., 2016; Rae et al., 2007) and France (Stowell et al., 2013). The widespread nature of this practice and the lack of clarity about its consequences for patients calls for more research into the subject of outlying. (For a complete overview of all countries, see Table A.1 in Appendix A.)

Qualitative studies identified key challenges in outlier care, such as lack of specialized knowledge among staff, time pressures, inadequate ward resources, communication breakdowns, and misconceptions about patient acuity. Some studies propose solutions, such as appointing dedicated outlier doctors, improving discharge practices, or implementing predictive bed management models, but these strategies remain under-explored.

The literature review served as the foundation for identifying the research gap in decision-making on outlier placement (discussed in Chapter 1), particularly who makes these decisions and how safety considerations are incorporated. By providing a comprehensive overview of the literature pertaining to outlying, this chapter offers valuable context and insight for developing this research. Furthermore, it highlighted the widespread practice of outlying in hospitals across different countries, emphasizing its relevance as a research topic. Addressing the gap in decision-making on outlier placement could contribute to informing hospital policies, enhancing operational efficiency, and improving patient outcomes.

3

Methods: Data Collection and Analysis

This chapter outlines the research methods used for data collection and analysis. The study employed a qualitative approach, incorporating ethnographic methods, co-design, and semi-structured interviews to gain an in-depth understanding of the decision-making regarding outlier placements. Furthermore, this chapter illuminates ethical and data management considerations and the tools used throughout the research.

The research was conducted in four phases: (1) research co-design, (2) interview design, (3) data collection, and (4) conclusion development. Each phase built upon the previous one. Figure 3.1 provides a visual representation of these phases. Throughout the study, the checklist for qualitative interviews by Tong et al. (2007) was used to improve the research's transparency and validity (see also Appendix B).

3.1. Phase 1: Research Co-Design

The first phase involved gathering internal documentation on outlier placement and observing staff in their meetings and daily operations. This phase involved the immersion of the researcher in the hospital setting. The researcher was authorized to be present daily, granted access to meetings, and was able to shadow key staff members, allowing for an in-depth understanding of the decision-making process. These methods, detailed in Section 3.1.1, provided foundational insights that shaped the research focus. Through discussions with hospital and university supervisors, an initial research question and sub-questions were formulated, iterated, and refined (see 3.1.2). By the end of Phase 1, the research focus and finalized questions were established (see Chapter 1). Key observations and their influence on the sub-questions are further discussed in Chapter 4.

3.1.1. Observations

The study began with passive observations of decision-making processes, defined as "systematic watching of behavior and talk in naturally occurring settings" (Greenhalgh & Taylor, 1997, p.2). Field notes captured these observations, which were supplemented by ad-hoc questions to participants. These were posed only after the event to avoid disruption. The primary observational activities included: shadowing a nurse in the Acute Medical Unit (approx. 5 hours), attending meetings (approx. 10 hours), and shadowing the Patient Flow Coordinator (approx. 7 hours).

Observing meetings provided a broader understanding of hospital operations, particularly capacity planning. Shadowing the Patient Flow Coordinator—a role that will be extensively discussed in this thesis—helped capture their decision-making regarding overflow bed placements and the associated meetings. Given the irregular occurrence of outlier placements, observations were conducted over October and November of 2024, on varying weekdays. Shadowing the Patient Flow Coordinator mostly took place in the mornings, when they consistently spent time monitoring bed availability status and a central meeting about patient flow coordination took place.

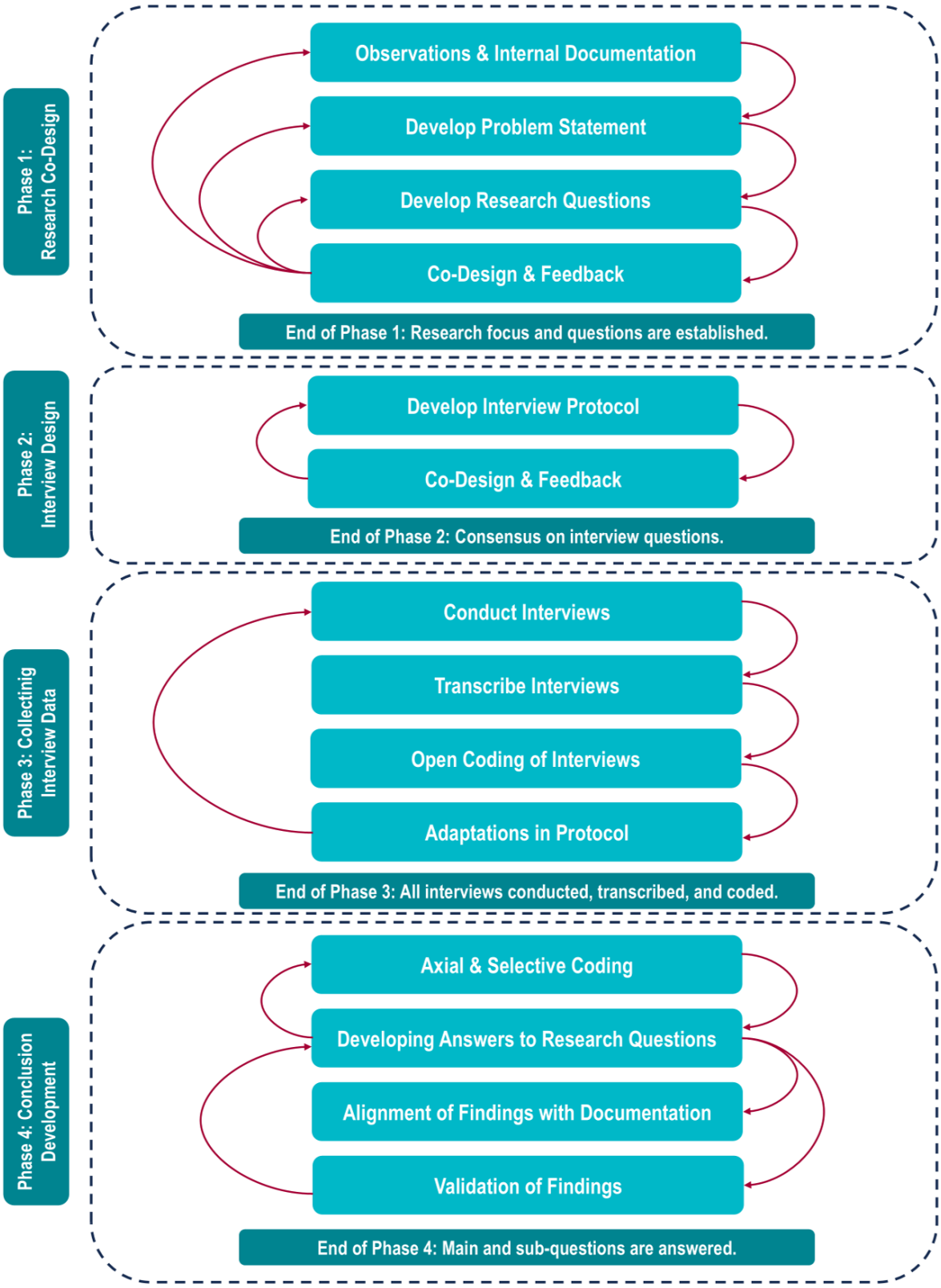

Figure 3.1: The research consisted of four phases, starting with observations and co-design of the research questions, followed by co-designing the interview questions, then conducting and processing the interviews, and finally analyzing the data and answering the research questions.

3.1.2. Co-Design of the Research Questions

The initial research questions and sub-questions were developed collaboratively with stakeholders at the focal hospital. The main aim of this co-design approach was to improve the relevance of the research for the hospital (Redman et al., 2021). These stakeholders included advisors from the quality and safety department and the Integral Capacity Management department.

Through multiple iterations, stakeholders provided feedback on question formulation, leading to significant refinements that better aligned with the hospital's (research) priorities.

The initial research question, sub-questions, and interview questions were further developed in cooperation with stakeholders at the focal hospital. The main aim of this co-design was to improve the relevance of the research for the hospital (Redman et al., 2021). The stakeholders involved in the co-design were advisors from the quality and safety department and the ICM department. Throughout various iterations of the research questions, these stakeholders were asked for their opinions and views on the formulation. By seeking direct and detailed feedback, significant changes in formulation and research direction could be made to effectively address the concerns of the focal hospital.

These observations, alongside discussions with staff, and the co-design approach directly informed the research questions. These influences are detailed in Chapter 4.

3.2. Phase 2: Interview Design

Building on the research questions developed in the previous phase, Phase 2 focused on designing semi-structured interviews to explore the outlying patient decision-making process in greater depth. The interview protocol, including both questions and prompts, was developed collaboratively with hospital supervisors to ensure relevance and clarity. As in Phase 1, a co-design approach was used to reiterate and refine the content. The finalized interview questions, found in Section 4.4 and Appendix C, marked the conclusion of this phase.

3.2.1. Developing Semi-Structured Interviews

The interview questions were directly informed by insights gained during Phase 1 of the research. Through observations and co-design discussions, the interview questions were refined to align with both hospital-specific terminology and practices and the research questions.

The interviews were to be conducted with employees of the focal hospital in the Netherlands, with the primary inclusion criterion being their involvement in the decision-making process for placing patients on overflow beds. This focus ensured that interviews captured detailed insights from those most knowledgeable about the subject. More details in Section 3.2.2.

The use of in-depth interviews was a deliberate choice, aligned with the exploratory nature of the research, to study the decision-making without using restrictive predefined questionnaires.

Each interview followed a structured, yet flexible format. While the core questions provided the main topics of discussion, the open formulation invited interviewees to elaborate on their experiences, perspectives, and insights. The full interview protocol, including prompts for guidance, is available in Appendix C. Since the research took place in a Dutch-speaking hospital, all interviews were conducted in Dutch.

3.2.2. Participant Selection

A purposive sampling strategy was used to identify key participants. This approach aimed to consciously select participants who were able to provide information on the subject of interest (Robinson, 2023). Through consultations with hospital advisors and recommendations from the interviewees, staff members with the most experience in daily decision-making on outliers were invited. This targeted approach was chosen to not only obtain the most relevant data but also to respect the time constraints of hospital staff and the limited time frame of this research project. Unlike studies aiming to represent an average staff opinion, this research sought individuals with expertise in the topic (Etikan, 2016).

By prioritizing those with direct experience with outlier placements, the primary target interviewees included Patient Flow Coordinators, Emergency Department floor managers, and Acute Medical Unit managers. In addition, decision-makers from four inpatient departments—Pulmonary Care, Cardiology, Internal Medicine, and Minor Surgery—were included based on early observations and input from hospital advisors, as these departments frequently encounter outliers. Pulmonary Care and Internal Medicine often have their patients placed in overflow beds elsewhere, while Cardiology and Minor

Surgery regularly receive and accommodate outlying patients from various specialties. Targeting these departments, along with diverse professional roles such as nurses and medical specialists, ensured that different perspectives on outlier placements were represented.

Potential participants were contacted via e-mail, either directly or through department managers or medical managers, requesting introductions to relevant staff. The invitation e-mail is included in Appendix D.

3.2.3. Data Saturation and Expected Limitations

A common objective of interview-based research is to reach data saturation—the point at which new interviews no longer yield new insights (Hennink & Kaiser, 2021). To track this, the interviews were transcribed and analyzed continuously, to avoid the collection of unnecessary redundant data. However, achieving saturation was challenging due to two main reasons. First, the limited time frame of the research restricted the number of interviews that could be conducted. Second, the heterogeneous sample included different roles, making it difficult to reach full saturation for each stakeholder group. These limitations are further discussed in Chapter 9.

3.3. Phase 3: Data Collection

The third phase focused on conducting, transcribing, and initial coding of the interviews while allowing for potential adjustments to the questions. The data collection and the final sample are detailed in Section 3.3.1 and 3.3.2. The completion of all interviews and their initial processing marked the end of the data collection phase.

3.3.1. Collecting the Interview Data

All interviews were conducted in person at the focal hospital, ensuring a private and controlled setting. Most took place in a confidential space within the interviewee's department, or in a neutral private room reserved by the researcher. Each interview was attended only by the participant and the researcher, maintaining confidentiality and minimizing external influence.

All interviews were conducted in Dutch. To maintain the nuances of language and avoid potential translation errors, the transcripts were analyzed in their original language. This decision also helped streamline the research process by eliminating the need for translation and verification of this process.

Interviews were audio-recorded and initially transcribed using Microsoft Teams' automatic transcription feature. However, due to the frequent use of acronyms and medical terminology, the transcripts required extensive manual revision to ensure accuracy. This process included verifying the recorded conversation, correcting transcription errors, and anonymizing personal details. Identifiable information such as names and specific work experience was removed. Additionally, department numbers were replaced with department names to protect the hospital's identity and ensure that interviewees' statements were contextualized correctly. Once finalized, transcripts were imported into ATLAS.ti for qualitative analysis.

3.3.2. Composition of the Interview Sample

A total of 12 interviews were conducted, covering a diverse range of departments and professional roles (see Figure 3.2). Each of the target departments identified in the co-design—Cardiology, Pulmonary Care, Internal Medicine, and Minor Surgery—was represented by at least one interviewee. Additionally, crucial departments such as the AMU and ED were included due to their roles in hospital-wide patient flow.

All interviews were conducted in November and December of 2024, with durations ranging from 15 to 45 minutes and an average duration of approximately 28 minutes. In terms of professional background, six nurses participated, likely reflecting both their high availability and willingness to engage during shifts. Two medical specialists, both of whom held managerial responsibilities, were also interviewed. Other participants included specialty department managers, a specialty department secretary, and a care unit manager.

Despite multiple outreach efforts, no residents were available for interviews. Four residents contacted via e-mail did not respond to the invitation. None of the participants refused or withdrew from the study. No repeat interviews were conducted.

To further ensure participant anonymity, the overview in Figure 3.2 does not link professions and

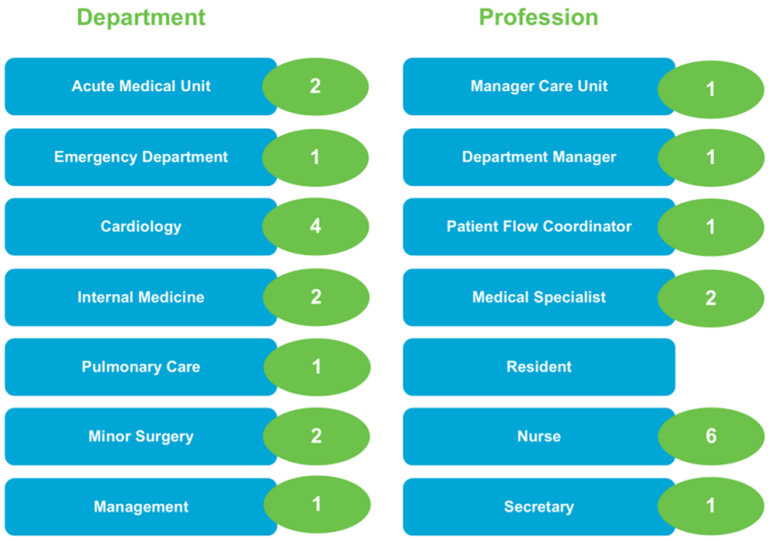

Figure 3.2: The distribution of interviewees over departments and professions. The columns in this figure are not related to each other to avoid potential identification of interviewees.

departments. Instead, it aimed to balance transparency with privacy, ensuring that interviewee identities remain protected.

Next to conducting and transcribing the interviews, Phase 3 also consisted of the initial open coding of the transcripts. Since some overlap occurred between Phases 3 and 4 in terms of coding, the complete coding approach, including open coding, is described in Section 3.4 to avoid breaking up this information over multiple sections.

3.4. Phase 4: Conclusion Development

The final phase of this research involved synthesizing findings through axial and selective coding to develop answers to the research questions. The themes and findings that emerged were compared with the documentation collected in Phase 1 to ensure consistency and contextual understanding. This phase focused on analysis of the data and addressing the research questions.

3.4.1. Analyzing the Interview Data

Thematic analysis was conducted following an inductive approach, allowing the themes to emerge from the data rather than being predefined (Braun & Clarke, 2006; Naeem et al., 2023). Open, axial, and selective coding were applied consecutively (Williams & Moser, 2019). Given the limited prior literature on outlier placement decision-making, this approach was chosen to ensure flexibility in identifying new factors.

Step 1: Familiarization with Data

To become deeply acquainted with the interview content, the transcripts were initially generated using Microsoft Teams' transcription function and then extensively corrected manually. This process allowed for thorough engagement with the data before starting the formal analysis.

Step 2: Open Coding

In ATLAS.ti, each transcript was coded using an open coding approach. Descriptive codes were assigned to sentences or short text fragments, reflecting the content of the text. Most pieces of text have at least one, but often multiple codes attached to them. This process was applied for the first four interviews, ensuring that most of the relevant concepts were captured. After these four interviews, codes with similar meanings were combined and the resulting list of codes was used as the basis for coding the rest of the transcripts. When new codes or concepts emerged in later interviews, they were added to the initial list.

Step 3: Axial Coding
After coding the first four interviews, axial coding was applied to identify relationships between codes and refine categories. Frequently occurring codes were merged or clustered into broader concepts, reducing redundancy and highlighting patterns within the data. The list of codes was developed to include these categories of codes. Later interviews were coded primarily using the existing categories and codes, only adding new codes when necessary.

Step 4: Selective Coding and Theme Development
Once all interviews were coded—marking the formal end of Phase 3—selective coding was used to identify overarching themes that directly contributed to answering the research questions. Initially, codes were grouped based on the research sub-questions. However, as the analysis progressed, higher-order concepts emerged, such as interdepartmental collaboration and shared responsibility, which better encapsulated the underlying mechanisms at play. A visual representation was created to map the relationships between the codes and themes, aiding the final organization of the results (Chapter 5).

Step 5: Ensuring Reliability and Validity
While independent coding by multiple researchers was not feasible within the scope of a master's thesis, several strategies were implemented to enhance trustworthiness. First, the coding of the initial transcript was reviewed with the thesis supervisor to improve accuracy and consistency. Second, themes and coding structures were discussed in supervision meetings to resolve ambiguities. Finally, a validation meeting was held with the hospital advisors (see Section 3.6) to assess the credibility of the findings and adjust where necessary.

3.4.2. Triangulation

To enhance the credibility and validity of the research findings, triangulation was employed. According to Noble and Heale (2019), four types of triangulation are commonly used in qualitative research: data, investigator, theory, and methodological triangulation.

Data triangulation was achieved by including a diverse sample of roles and departments in the interviews. This ensured multiple perspectives were represented, strengthening the findings. Investigator triangulation, which involves multiple researchers analyzing the data, was not feasible within the scope of a master's thesis. However, this limitation was partially mitigated by incorporating co-design and validation meetings.

Methodological triangulation was implemented through the integration of the results from semi-structured interviews, documentation, and observations. Observations and documentation not only informed the research questions but the interview findings were also compared against these sources to identify alignment or discrepancies. This approach ensured that the conclusions that were drawn were grounded in multiple forms of evidence.

Theory triangulation, which involves applying multiple theoretical perspectives to interpret findings, was not utilized in this study.

For the analysis, field notes and collected documentation were uploaded into ATLAS.ti alongside the interview transcripts. While these materials were initially coded using the same coding list as the interviews, this approach did not yield additional insights. Instead, a more effective strategy was to directly compare documentation excerpts with interview findings and observations, as was ultimately done in the results section. This comparative approach reinforced the study's conclusions.

3.5. Researcher's Characteristics

The research, including observations and interviews, was carried out by Sophie Mans (BSc). At the time of this research, she was a full-time student in the Master Management of Technology at Delft University of Technology. Previous education included a BSc in Life Science & Technology at Delft University of Technology. The researcher had no prior experience with scientific interviews or autonomous research, though research techniques were covered in the mandatory covered during the MSc courses. The researcher did not have any previous experience with working in a hospital. The researcher did have experience working in the healthcare sector, as a vaccinator for the public health service. No relationships were established with the interviewees, advisors, or other hospital staff before the com-

mencement of the research project. The interviewees were extensively informed of the researcher's goals in the informed consent letter. This included the goal of publication of this research as a master's thesis.

3.6. Validation and Reflections on the Research Co-Design

Multiple validation steps were incorporated throughout the study to enhance the credibility and confirmability of the research. These efforts ensured that the findings accurately reflected hospital practices while mitigating potential researcher bias. A central component of this process was the co-design methodology, which guided the iterative refinement of the research focus, research questions, and interview structure in collaboration with hospital stakeholders.

3.6.1. Validation Meeting

A validation meeting was conducted in January 2025 with key stakeholders involved in the research co-design. This meeting served to assess preliminary findings, verify the coding approach, and refine interpretations of the results. Feedback from participants confirmed that the study captured relevant perspectives but also highlighted areas for further clarification:

- **Stakeholder Representation:** The absence of residents in the interview sample was noted, given their role in outlier care. It was recommended to explicitly clarify how insights regarding residents were obtained.
- **Clarification of Diagnosis Assignment:** Questions arose about how a patient's main treating specialty was assigned, as this classification determined their preferred specialty ward. This aspect remained unclear to some participants.
- **Focus on Care Over Decision-Making:** While research sub-questions 2 and 3 aimed to explore challenges and patient safety in decision-making, the findings leaned more toward the care of outliers after placement. This discrepancy was acknowledged and addressed in the discussion.
- **Overall Methodological Consensus:** Participants confirmed that the interview structure, sample selection, and coding methodology were appropriate. The coding approach was considered transparent and traceable.

3.6.2. Validation of Documentation and Findings

To further ensure reliability, the interpretation of formal documentation was verified. Strategic-level staff reviewed the interpretations of hospital documents to ensure consistency between these documents and the descriptions in this research. This also revealed ambiguities in the documentation that could be addressed.

Additionally, a preliminary report was shared with select stakeholders, such as the Patient Flow Coordinator (PFC), to verify the accuracy of findings and ensure alignment with real-world practices.

As discussed before, the interview data and results were reviewed and discussed in the validation meeting.

3.6.3. Impact of Co-Design Approach

The co-design methodology not only strengthened the study's validity but also influenced its direction. For instance, insights from a department manager revealed that medical specialists had varying levels of experience with caring for outliers, depending on whether their patients were frequently placed in overflow beds. For example, the cardiology department often received outlying patients, thus the nurses were experienced in providing care for outliers. However, cardiology patients very rarely were placed in another ward. As a result, cardiology residents and specialists had little experience caring for outliers. This insight, based on stakeholder recommendations, adjusted which medical specialists were contacted to be part of the research sample, ensuring that the study focused on the most relevant perspectives.

The co-design methodology strengthened the study's validity by ensuring alignment with hospital practices and refining the interpretation of findings. This approach highlights the value of collaborative research to improve applicability and usability in healthcare settings.

3.7. Ethics and Data Management

As this research was carried out in cooperation with a hospital, an exemption needed to be obtained that showed this research was not subject to the Medical Research Involving Human Subjects Act (Wet Medisch-Wetenschappelijk Onderzoek met mensen, WMO)). To do so, an application was submitted to the Medical Ethics Committee (METC) serving the regions of Delft, Den Haag, and Leiden. The exemption from the WMO was granted, as this research cannot be classified as medical research and does not involve imposing rules of behavior or subjection to actions for human subjects.

Additionally, a submission was drafted for the Human Research Ethics Committee (HREC) at Delft University of Technology (DUT). This committee checks the data management protocol and informed consent materials to make sure that participants of the research are treated according to regulations. The HREC approved the submission (application number 4812).

The data management plan explained that the main location for data storage was the hospital's internal server. Data were safely stored in a directory with limited access and automatic back-ups. The audio files of the interviews were deleted after transcription, by the end of the research project at the latest. The automatically generated transcripts were adapted, so that the final transcripts did not include any aspects that can be directly traced to the interviewee or the hospital. Moreover, the transcripts were labeled with a code, which was used to identify the files belonging to the various subjects. The key matching the code and the interviewee was stored in the same secured directory on the hospital server and was protected with a password. The consent forms that were signed at the beginning of the interview were paper files. The copies kept by the researcher were stored in a locked cabinet at the hospital.

As this research is a collaboration between the focus hospital and DUT, some data that is essential for future publication was shared with DUT. This data included pseudo-anonymized transcripts of the interviews, but excluded the audio files-which are deleted- and the pseudonymization key. This process was explained in the informed consent materials, and the subjects could indicate whether they allow their data to be used for future publication outside of this thesis.

3.8. Tools and Software

The software in this research includes, but is not limited to:

- ATLAS.ti 25, version 25.0.0.32864, under Delft University of Technology License, used for the coding and analysis of interview data and the generation of Sankey diagrams (see Appendix E).
- Microsoft Teams, version 24335.208.3315.1951, for the recording and initial transcription of the interviews
- Microsoft PowerPoint, version 2501, under Delft University of Technology License, used for the visualization of the majority of the images in this work.
- Google Translate, for the initial translation of interview quotes, which were adapted based on insight.
- Clarivate | EndNote 21, for reference management.
- Thesaurus.com, for synonyms and definitions.

3.8.1. Use of Artificial Intelligence

Artificial Intelligence, specifically OpenAI's ChatGPT, was utilized as a supportive tool throughout this research process. AI assistance included editing and restructuring text for clarity, brainstorming about titles, and aiding in developing introductions and summaries for each chapter. All outputs generated were critically reviewed and modified to align with the research objectives, ensuring intellectual integrity and alignment with academic standards. Appendix F contains a comprehensive reflection on the use of ChatGPT.

4

Results of the Research Co-Design Phase

This chapter sets the stage for the results by redefining the term inappropriate ward, introducing the focal hospital's practices concerning outliers, and explaining the meetings involved in determining the bed capacity of the hospital. These meetings provide the context for the daily decision-making that is discussed in later chapters. This chapter also highlights the observations made during the first phase of the research, that helped shape the research and interview questions. The findings in this chapter were based on Phase 1 (see Figure 3.1), during which observations and co-design were central.

4.1. Redefining the Inappropriate Ward

In Chapter 2, the term *inappropriate ward* was frequently used to describe patient placement outside their designated specialty ward. However, this term carries a negative connotation, suggesting the unsuitability or inferiority of this ward, which may not accurately reflect the reality in this study. While negative impacts on patient safety and quality of care have been reported elsewhere, no such effects have been established in this case.

To maintain objectivity and acknowledge the current unknowns, this report adopts a more neutral terminology from this point forward, such as *overflow bed* or *designated/preferred specialty ward*. This adjustment underscores the need for unbiased exploration of outlier effects while retaining clarity in describing the placement of patients outside their designated wards.

4.2. Capacity Management at the Focal Hospital

Hospital capacity management is a complex challenge, requiring careful coordination of resources to ensure high-quality care while maintaining efficiency. These resources include operating rooms, staff of various specialties, space in hospital departments, and more. As hospitals shift from siloed resource planning to a more integrated approach, Integral Capacity Management (ICM) has emerged as a strategy to optimize patient flow and resource allocation.

As illustrated in Chapter 2, managing outlier patients is a known challenge in many hospitals. The hospital that was studied had already implemented several measures to address this issue. Initiatives such as the ICM Department, the establishment of an Acute Medical Unit (AMU, Acute Opname Afdeling), and targeted efficiency programs such as black belts demonstrated the hospital's proactive approach to improving patient flow and bed management. These efforts reflected a focus on operational excellence and commitment to continuous improvement. The integrated capacity management approach provided a foundation for addressing challenges such as patient placement, including the effective handling of outliers. Therefore, the focal hospital's ICM department was relevant for the context of this research.

The focal hospital has demonstrated its commitment to operational improvements through the restructuring of its ICM department. In the aftermath of the COVID-19 pandemic, the hospital recognized the need for renewed approaches to enhance operational resilience and efficiency. ICM's goal was to

balance service, quality of care, financial constraints, and staff resources while providing clear advice on resource allocation.

Internal training materials explained that *capacity* was defined as the hospital's operational ability to provide care. *Capacity management* involved translating strategic goals into tactical and operational decisions, ensuring a cohesive approach across departments. This included ongoing monitoring and adjustment of resources to meet changing demands.

A distinctive aspect of ICM is its *integrative* approach, focusing on consensus throughout the entire chain regarding care production, turnover, costs, and resource allocation. Moreover, ICM aims to minimize variability in operations and make the process more agile. It promotes alignment between departmental and managerial strategies, ensuring that objectives–such as improved patient flow and quality of care– are unified. This approach also harbors the potential to center care around the patient, aligning institutional processes with patient needs while maintaining operational efficiency (Goday et al., 2022; Schneider, 2020).

The focal hospital has employed a data-driven approach and developed several dashboards that provide an overview and guidance for the medical practitioners and management. These dashboards were used to compare healthcare provision targets—as agreed upon with health insurance companies—with the realized production in the outpatient clinic. A similar dashboard was being developed at the time of this research to survey the available beds in each department and indicate reasons for the unavailability of beds. The ICM department has also expressed the wish to move towards more widespread use of data-driven capacity models in the future.

The focus of this research was established at the hospital's request, highlighting its dedication to continuous improvement and a willingness to engage with evidence-based insights. By understanding and potentially optimizing the decision-making process around outlier placement, the hospital aimed to enhance the quality and safety of care further while offering valuable lessons for other institutions facing similar challenges.

4.2.1. Patient Flow and Outliers at the Focal Hospital

This research focused on the placement of patients requiring acute care in the inpatient clinic, where outlier placements were a recurring practice. The inpatient clinic comprised several specialized wards, each structured to provide care for specific medical or surgical conditions. The flow into the inpatient clinic consisted of two distinct parts: acute and planned care. Acute care is defined by the Dutch National Institute for Public Health and the Environment as all care that needs to be provided as soon as possible—within minutes to hours—to avoid harm to the patient's health or prevent their death (RIVM, n.d.). Patients requiring acute attention and care were admitted through two pathways. Primarily, through the Emergency Department (ED): Patients presenting at the ED may arrive via referral from their primary care physician, through emergency services (112-call), or the general practice center at the hospital (*huisartsenpost* in Dutch). If admission was required for ongoing care, they were transitioned from the ED to the inpatient clinic. Secondarily, patients may be admitted from the outpatient clinic. Those patients visiting the outpatient clinic typically require diagnostics, consultations, or treatments that do not require overnight care. However, when a patient's condition was identified as requiring more extensive care, they were admitted to the inpatient clinic. Usually, they are placed directly in the preferred specialty department, but when it is at full capacity, they can be placed in an alternative ward. There were other, less common paths through which patients could potentially be admitted to the inpatient clinic, which were not covered in this research. Moreover, the inflow of planned care was also not covered in this research, as these patients were usually directly placed in the correct specialty ward or the short-stay department and can potentially—when absolutely necessary—be rescheduled in case of extreme capacity constraints.

Admission through the ED generally involved an intermediary step through the Acute Medical Unit (AMU), which acts as a transitional ward between the ED and the specialty wards. As was covered in Chapter 2, the AMU was identified as a remedy for boarding in the ED. It provided the medical teams with up to 48 hours for diagnostic work and initial treatment. This increased the probability that patients were transferred to their designated specialty wards. Figure 4.1 shows a simplified representation of the standard patient flow into the hospital. There are examples of exceptions that skip the intermediary step in the AMU. These are usually based on medical indications that require treatment in the preferred specialty ward. The focal hospital had several nursing departments that each had associated specialties. When a patient's designated specialty ward had available beds, the patients were transferred

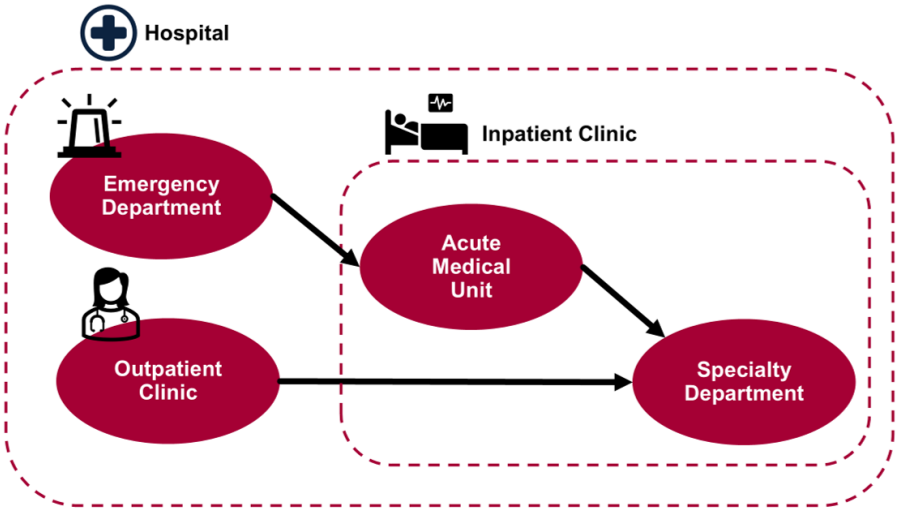

Figure 4.1: Simplified, partial representation of the flow of acute patients into the inpatient clinic of the hospital. Patients can be admitted to the inpatient clinic through the outpatient clinic or the emergency department. ED patients of the participating specialties were first admitted to the AMU, before transfer to the specialty department.

directly from the AMU to that ward. If all available beds were occupied, however, outliers could occur. The following were various possibilities that were identified to contribute to outlier placements:

1. **Overflow due to Full Wards:** If the designated specialty ward had no more available beds, the patient may be placed in an overflow bed on a different ward that did not align with their primary diagnosis.

2. **Limited Availability of Single Rooms:** Certain conditions, such as infectious diseases, delirium, or terminal illness, require single-room accommodations. When single rooms were unavailable in the designated specialty ward, patients may be placed elsewhere.

3. **Specialty Reassignment without Physical Relocation:** In some cases, a patient's primary specialty team changed during their stay, but the patient remained on their initial ward.

4. **Impact of Plannable Care:** Beds reserved for planned procedures or admissions could limit capacity for emergent cases, which indirectly led to outliers. This emphasized the importance of planning to balance acute and scheduled care.

4.2.2. Relevant Consultations based on Documentation and Observations

This research focused on the daily decision-making processes surrounding outlier placement. However, before refining this focus, a broader examination of the entire chain of decisions—including those made at higher, strategic levels—was conducted. This section outlines the formal decision-making structures as described in hospital documentation and observed during the research process.

An overview of the formal processes in bed capacity planning was drafted based on internal hospital documentation. Bed capacity planning was particularly relevant in the context of outliers, as it determined the number of available beds in both the hospital as a whole and in individual specialty departments. This formal process comprised five different meetings at varying organizational levels, each occurring at different frequencies, as illustrated in Figure 4.2.

At the strategic level, the Board Consultation and the Management Consultation played key roles in shaping hospital policies, including those related to capacity management. While these consultations covered a broad range of topics beyond capacity planning, many strategic decisions had direct implications for bed availability. The attendees of the Board Consultation were responsible for high-level policy development. The Management Consultation also included managers of care units—groups of medical specialties organized under broader operational divisions—as well as managers of various supporting units. Both consultations operated at the strategic level, focusing on long-term hospital

improvements. In alignment with the hospital's internal definitions, strategic planning typically encompassed a time horizon of one to five years. Although capacity planning was not a standard agenda item in every meeting, these consultations established key frameworks and guiding principles within which the stakeholders at lower levels operated.

At the boundary between strategic and tactical planning, the Integrated Planning Consultation (IPC) functioned as a central decision-making body. Its primary objective was to monitor and adjust hospital-wide capacity planning, ensuring alignment between care production, costs, and turnover. Within the constraints set by the Management Consultation, the IPC was responsible for decisions regarding capacity planning for the Operating Rooms (ORs), inpatient wards, outpatient clinics, and supporting departments. The composition of this consultation was similar to the Management Consultation, with the addition of a representative from the Integral Capacity Management (ICM) department (see Figure 4.3). The ICM representative provided expert input on capacity management and served as a liaison between strategic and tactical decision-making levels.

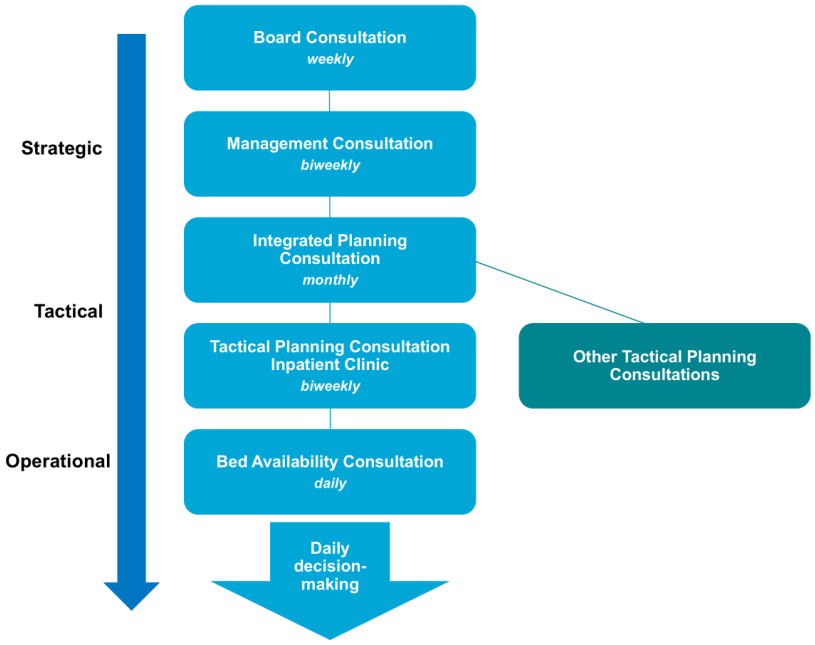

Figure 4.2: Meetings and consultations on various levels that feature Bed Capacity Planning.

At the tactical level, which spanned a planning horizon of three to twelve months, multiple consultations addressed different aspects of hospital operations. These included meetings focused on the inpatient clinic, outpatient clinic, and support divisions. Given the scope of this research, emphasis was placed on the Tactical Planning Consultation for the Inpatient Clinic (TPCIC), as outliers primarily affected the inpatient clinic. The TPCIC was directly linked to the IPC through the participation of an ICM representative. Other attendees included department managers, the head of the flex bureau, and the Patient Flow Coordinator (see Figure 4.3). This consultation reviewed the planned bed capacity, staffing levels, and anticipated deviations, and facilitated discussions on potential solutions to any emerging issues.

Observations of both the IPC and TPCIC meetings confirmed that discussions aligned with the documented processes. Topics frequently covered in the IPC included financial considerations, allocation of OR time slots, and broader hospital capacities. In contrast, the TPCIC primarily addressed issues such as staffing formations, expected shortages, and adherence to predefined bed capacity plans.

At the operational level, the Bed Availability Consultation (BAC) took place daily, although no formal documentation detailing its structure or mandate was found. This consultation played a central role in short-term patient placement decisions. Participants included the Patient Flow Coordinator, representatives from each inpatient clinic department, and the Transfer Bureau. Discussions focused on real-time bed availability, the current distribution of outliers, and any immediate staffing constraints.

While the formal structure of decision-making was well-documented up to the TPCIC, the daily decision-making process remained less formally specified. The BAC had become an established daily

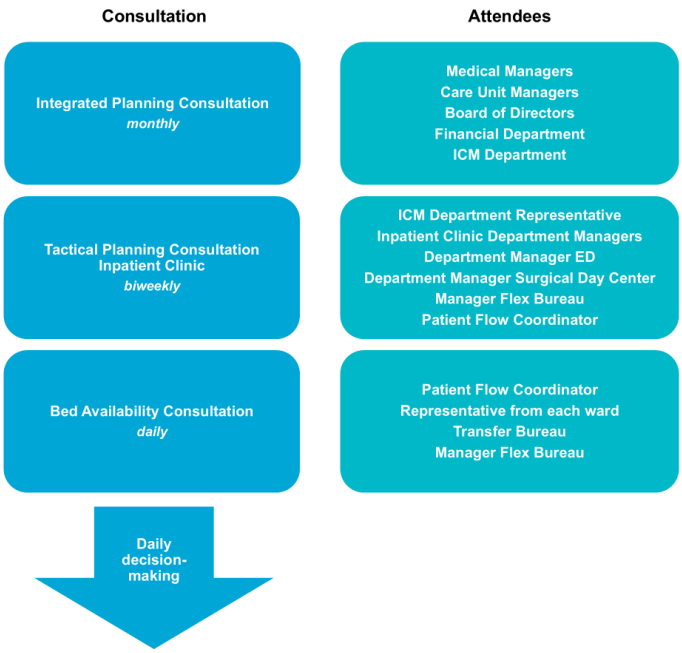

Figure 4.3: Attendees of consultations at the tactical and operational level of Bed Capacity Planning.

meeting despite the absence of formal documentation. However, the specific decision-making activities beyond the BAC and the involvement of various stakeholders in real-time, daily decision-making were less clearly defined. This lack of formalization is indicated by the arrows in Figures 4.2 and 4.3. Understanding these informal yet crucial processes was established as a key aspect of this research's focus.

4.3. Resulting Research Questions

The main research question and accompanying sub-questions were influenced by the observations. As mentioned before, the request by the hospital was to investigate the safety and quality of care for outliers, but there was no definitive research focus established yet. The approach already is to avoid overflow beds, but they do still occur in daily operations. Therefore, the decision was made to focus on the daily decision-making about outliers.

To understand the decision-making, a clear overview of those involved and their roles needed to be established. The need for clarification of this subject stemmed from the documentation-based finding that during a normal week, many individuals executed the role of patient flow coordinator. At least three different employees fulfilled that role in a single, normal working day: one during the day shift, one during the evening shift, and one during the night shift. These people did usually not work in the same department and did not have the same/similar job descriptions. It is also not a full-time role, each of the staff fulfilling it, does this next to their regular job. These observations lead to the need to create a clearer perspective of the persons involved and their roles.

Another reason warranting a clear overview of the decision-makers was the seeming omission of some stakeholders in the documentation. The official documentation mostly covers the tasks of the patient flow coordinator and their main point of contact for escalation: the on-call manager. The perspectives or potential influence of nurses, doctors, and the patients themselves were not covered in the documentation.

These observations influenced the first sub-question: "What is the daily decision-making process for assigning patients to overflow beds at the hospital of focus?"

Next to that, questions were posed about the tools available for decision-makers and the challenges they have encountered in working with those tools. Based on observations from shadowing the patient flow coordinator, it was clear that they were using various tools to support their decision-making, such as flowcharts, bed/capacity policies, and the hospital administrative system.

From the conversations during the co-design of the research, it was apparent that for the staff operating at the strategic and tactical levels, it was not clear what issues occurred during outlier placements and which measures were taken by medical staff to mitigate these issues.

It was observed that it is sometimes hard for the patient flow coordinator to place a patient in a selected department. Alternatively, the secretaries have at times mentioned in the bed consultation that they were ”forced” to take these patients. This has led the questions to focus on the experience of this process and the challenges that come with it.

These observations informed the following research question: ”What challenges do stakeholders face during the decision-making on overflow bed placements?”

Lastly, the safety aspect was considered. This did not stem as much from observations but from conversations and co-design of the research. An important topic of discussion that influenced the questions was the variation in the (subconscious) definition of patient safety. There appears to be a spectrum that moves from individual patient safety to hospital-wide safety. For example, for patient X, it may be the safest option to stay admitted to the hospital for an additional day to make sure discharge is appropriate. However, at the same time, patient Y is in the Emergency Department (ED) and needs to be admitted to the same ward as patient X. Due to lack of space, patient Y cannot be admitted to the preferred ward, or in the worst case cannot be admitted to the inpatient clinic at all. This example illustrates that what may be the best for a single patient, may not be in the best interest of the entirety of patients. Based on their orientation on the spectrum, decision-makers—perhaps unconsciously—appear to make a trade-off between the safety of one patient versus the safety of all patients in that ward or even the hospital. The interviews aimed to determine the interviewee’s definition of safety, specifically their approximate location on this spectrum, and any existing measures to maintain patient safety. This discussion led to the last question: ”How is patient safety influenced by the decision-making process for overflow bed placements?”

4.4. Resulting Interview Questions

The interview questions were designed to investigate three primary themes that aligned with the sub-questions: (1) the structure and key stakeholders involved in the decision-making process, (2) the challenges encountered by staff in managing patient placement, and (3) the integration of patient safety considerations in this process. Additionally, interviewees were encouraged to reflect on their experiences and perspectives regarding these themes.

A semi-structured interview protocol was developed, consisting of six core questions:

1. Can you describe the process in your hospital for admitting a patient and determining the appropriate department?
2. Can you explain how this decision-making process changes when a specific department is full, but there are new patients requiring care from that specialty?
3. What is your opinion on the decision-making process for placing patients in an overflow bed?
4. What tools are available to support your decisions about overflow beds?
5. Can you elaborate on your experiences with tools that support your decision-making?
6. How is the quality of care for the patient factored into the decision to admit them to an overflow bed?

The order of these questions was intentionally chosen to facilitate a logical flow in the discussion. The first question served as an introductory, relatively straightforward prompt, ensuring familiarity for all participants by focusing on general patient admission procedures. The second question introduced a comparison between standard patient placement and the adaptations required when specialty departments reach capacity. Prompts belonging to this question focused on variations in the decision-making, the involvement of additional stakeholders, and modifications in the procedures.

The third question shifted towards subjective perspectives, inviting participants to share personal insights and firsthand experiences related to overflow bed placements. The fourth and fifth questions explored the availability and practical utility of decision-support tools. First, the focus lay on identifying existing resources and then moved on to their effectiveness in daily practice. Finally, the last question

focused on patient safety, emphasizing perceived risks that staff associated with overflow placements and the strategies implemented to mitigate adverse effects.

This structure ensured that interviews remained comprehensive while allowing flexibility for participants to elaborate on key topics. The full interview protocol, including detailed prompts, is provided in Appendix C.

4.5. Concluding Remarks

In this chapter, the context for the research was established by introducing the hospital's operational practices and exploring the consultations that determined the bed capacity in the specialty departments. These insights have laid the foundation for understanding patient placement challenges and informed the research sub-questions, and complementary interview questions, addressed in the subsequent chapters. The observations discussed here provide a nuanced picture of the context that is essential for understanding the environment in which the stakeholders, discussed in the following results chapters, operate.

5

Code-to-Theme Development

The research questions and sub-questions presented in Chapter 4 formed the foundation for the interview protocol. The execution of these interviews yielded rich qualitative data, which was systematically analyzed to identify recurring patterns and central themes. This process led to the emergence of three overarching themes that structure the findings of this research. The relationship between the research questions, the collected data, and the themes is depicted in Figure 5.1.

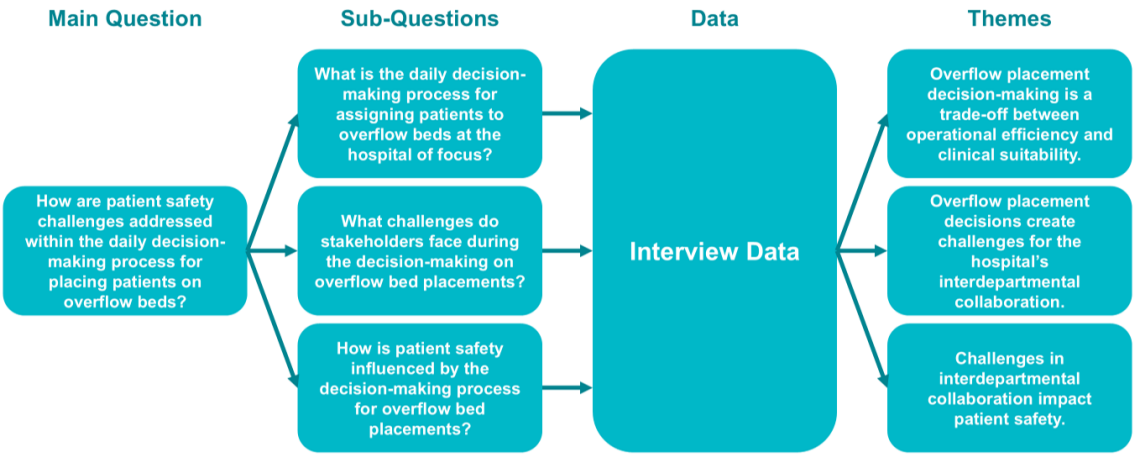

Figure 5.1: Overview of how research questions informed data collection and theme development.

Following the inductive thematic coding approach, interview data was categorized into codes, which were subsequently grouped based on conceptual similarities to derive themes. Figure 5.2 illustrates how the three main themes emerged from the coded data. Figure 5.3 shows the themes, comprising of all codes mentioned in 5.2, and the stakeholder profession groups they were mentioned by.

The first theme, *overflow placement decision-making is a trade-off between operational efficiency and clinical suitability*, encompassed all codes related to the daily decision-making process for outlier placement. This includes the challenges faced in decision-making, the expressed preference among staff to avoid overflow beds, and hospital strategies designed to prevent overflow placements. This theme is further elaborated in Chapter 6, which provides a structured explanation of the decision-making process. This chapter will illuminate the Patient Flow Coordinator as the central decision-maker, which was reflected by the strong relationship between this stakeholder and Theme 1 in Figure 5.3.

The second theme, *overflow placement decisions create challenges for the hospital's interdepartmental collaboration*, included codes linked to organizational barriers and difficulties experienced by staff that arise from the hospital's departmental structure. These challenges are explored in Chapter 7, which highlights how the segmented nature of hospital departments contributed to coordination challenges and inefficiencies.

The third theme, *challenges in interdepartmental collaboration impact patient safety*, captured codes associated with patient safety risks stemming from the challenges identified in Theme 2. This theme is detailed in Chapter 8, which explores how safety risks such as delays in care, mistakes in treatment, and increased length of stay were influenced by the organizational constraints and coordination issues discussed in the previous chapter.

It is important to note that some codes could be assigned to both the second and third themes. Given that staff-related challenges directly influence patient safety, there is an inherent connection between these two themes. To maintain analytical clarity, codes primarily reflecting staff experiences and operational inefficiencies were assigned to Theme 2, while codes linked to patient experience and safety concerns were categorized under Theme 3.

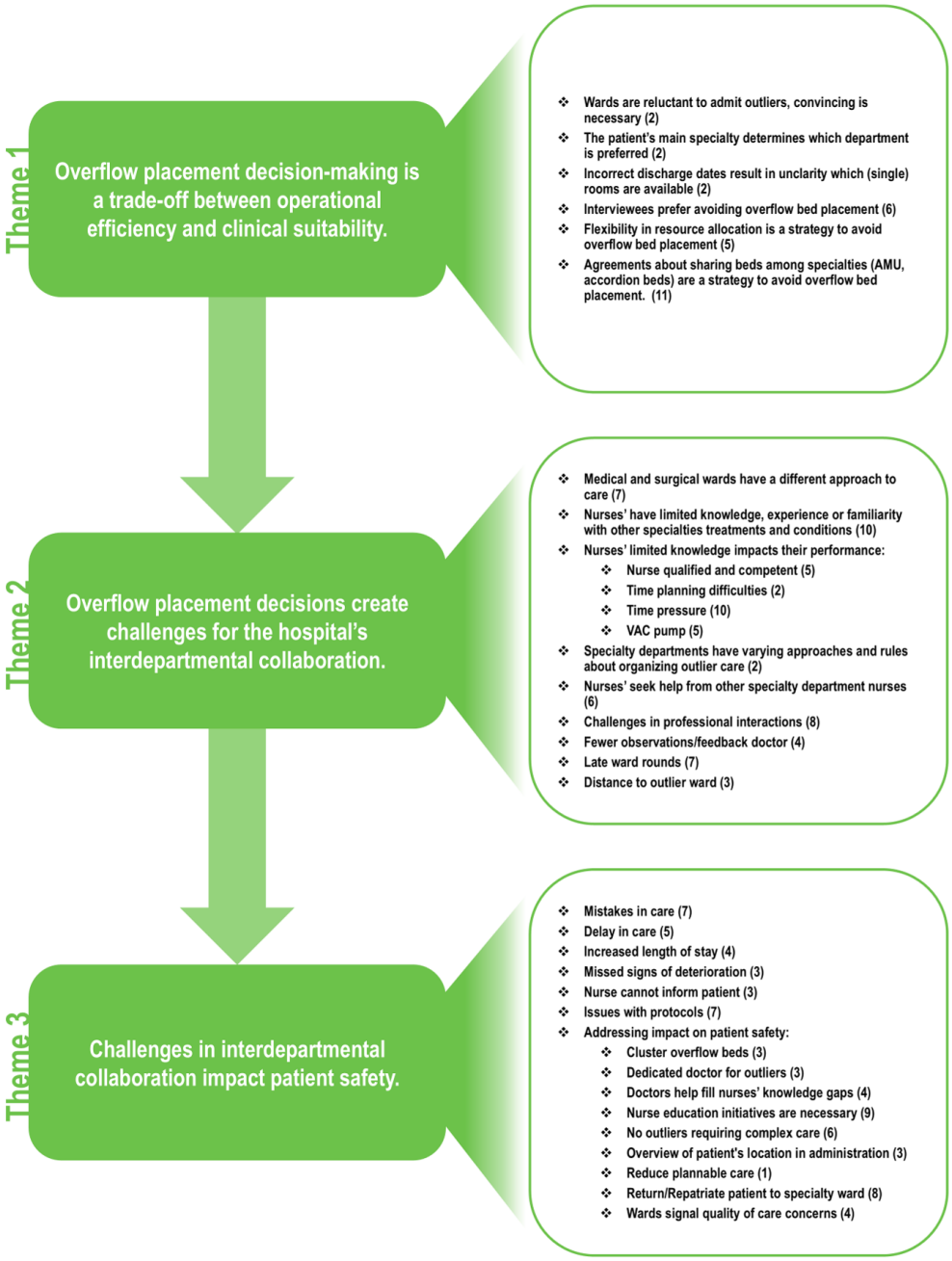

Figure 5.2: Visual representation of how themes emerged from coded interview data. Numbers indicate how many out of 12 interviewees discussed this subject.

By structuring the analysis this way, the study systematically traces the connection between decision-making, operational challenges, and patient safety outcomes, offering a comprehensive view of the implications of overflow bed placements.

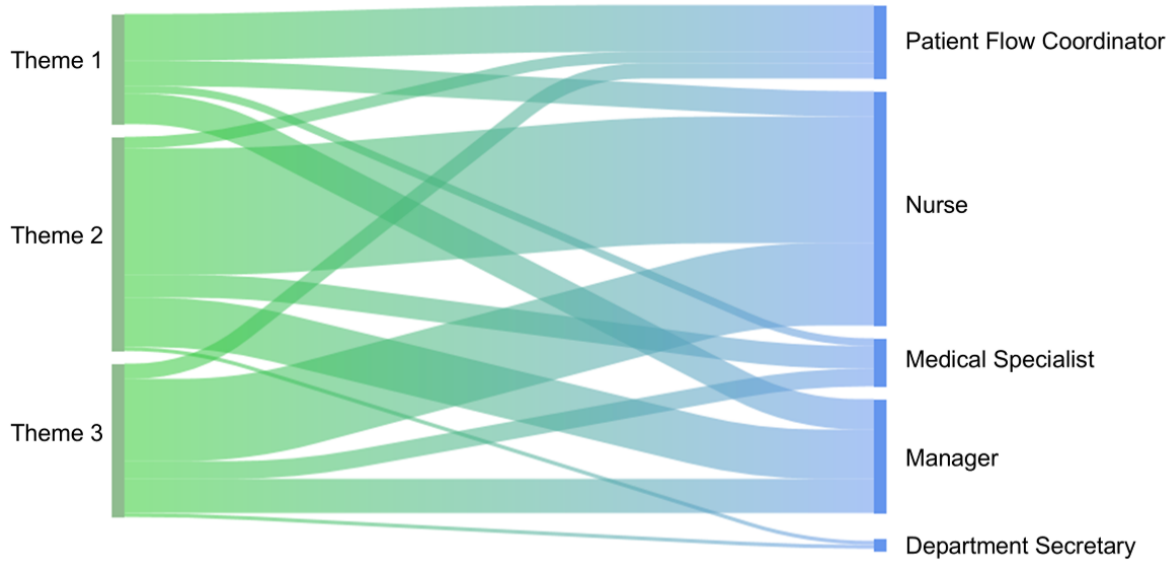

Figure 5.3: Sankey diagram with themes on the left, which comprise all of their respective codes as mentioned in 5.2, and on the right the professions mentioning these themes.Generated with ATLAS.ti.

6

Decision-Making: Trade-Off between Operational Efficiency and Clinical Suitability

The literature indicated that financial and economic limitations set the boundaries within which hospitals can provide care. Examples of these included national policies and agreements with health insurance companies. When these factors are limiting demand for care can exceed availability, in this case specifically the availability of beds in the preferred specialty department. Overflow bed placements are a strategy to manage demand surges and these placements are the result of the preceding decision-making process. This decision-making process considered an essential trade-off: balancing operational efficiency—every patient has a bed—with clinical suitability—the patient is placed in the preferred specialty department. This chapter introduces essential elements that influence overflow bed placements: stakeholders, tools, power dynamics, challenges, and mitigation strategies.

6.1. Stakeholders and their Responsibilities in Overflow Placements

This section covers the stakeholders that were involved in the patient placement in chronological order of appearance in the decision-making. Here the focus lies on the most common way of admission: via the Emergency Department (ED). First, the ED staff made an initial assessment of the patient and could decide to admit them. Secondly, the PFC functioned as the central decision-maker. Next, the AMU or ED secretary coordinated the patient transfer with the specialty department secretary. And lastly, the departments received the outlying patient.

Based on the interviews and formal documentation, a schematic overview of the outlier patient placement was developed. Though it was a simplification of the process, it may give additional insight into the roles of the stakeholders described in Section 6.1. The process is shown using the Business Process Modeling Notation (BPMN) (Camunda, 2023).

The process started with the presentation of the patient in the ED. The patient was assessed by the medical staff—the nurse and doctor—who decided whether a patient needed to be admitted. If not, the process ended. If yes, the ED secretary was notified and checked for bed availability in the specialty department. If there was an available bed, the patient was placed in that department. If not, the flowchart (discussed in Section 6.2) was followed to decide in which alternative department the patient should be placed. The department was contacted and the patient was transferred. If, however, complications occurred, which can be caused by various factors including busy ED, AMU, and specialty departments, the ED secretary contacted the Patient Flow Coordinator (PFC).

> *"The ED secretary will contact the PFC if there is a problem with the flow to the departments, this mainly concerns the single rooms." -Work Explanation Evening PFC*

The PFC gathered relevant information about the patient, such as diagnosis, and used the tools available to them (discussed in Section 6.2) to make a decision. This was identified as the central decision

point, where the PFC determines the outlier patient placement. The PFC then informed the ED or AMU and specialty department secretaries, who coordinated the transfer of the patient. The next steps taken by the specialty department secretary were purely to facilitate the transfer: reserve the bed for the patient and update the responsible nurse that a patient was expected. The specialty department nurse then picks up or receives the patient and provides care.

This schematic overview shows the central placement decision was made by the PFC after the ED decided that admission was necessary. The upcoming subsections describe the role and responsibilities of the stakeholders, supported by quotes from interviews and documentation.

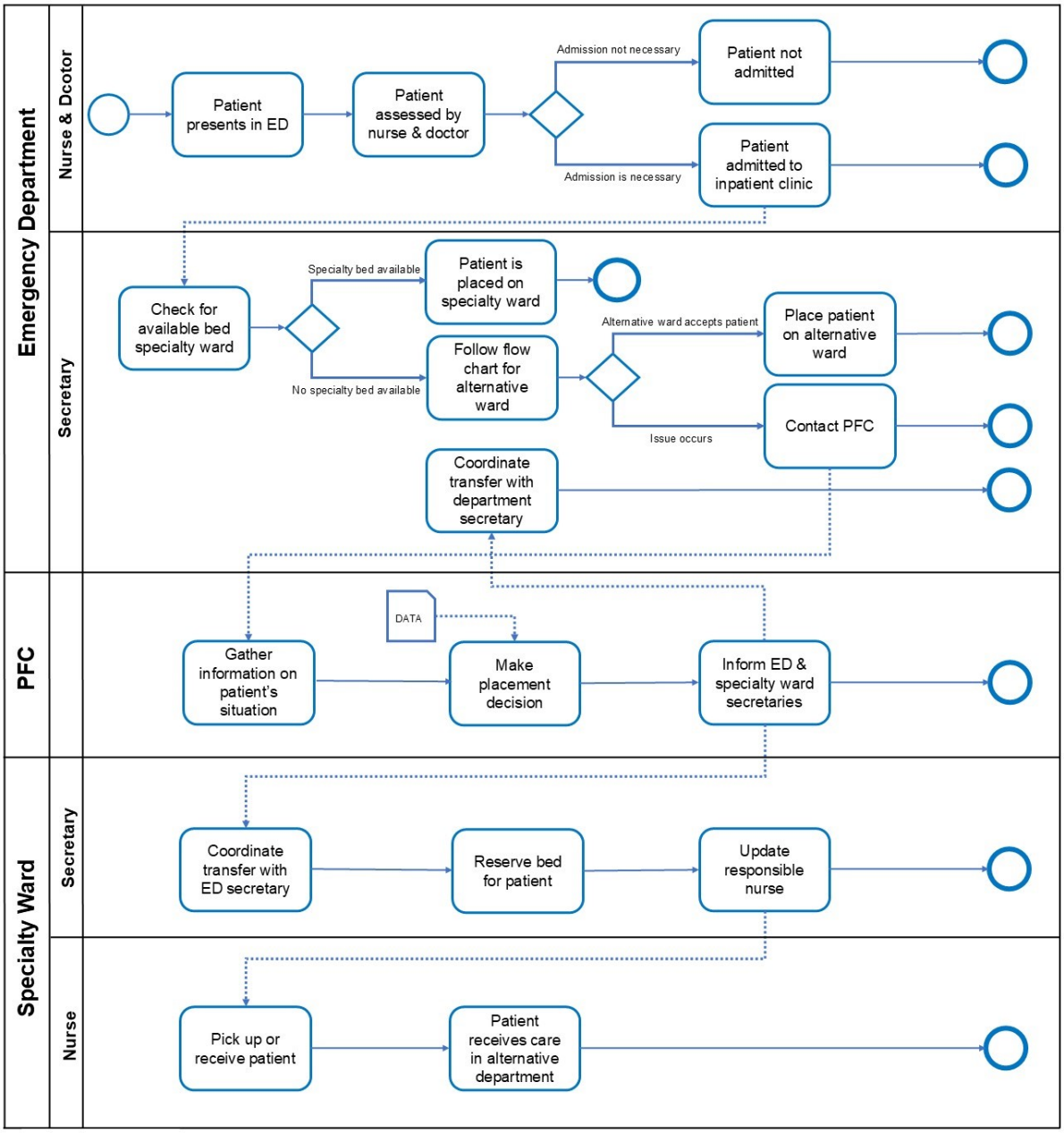

Figure 6.1: Simplified overview of the outlier placement process, in business process modeling notation.

6.1.1. Emergency Department: Determining admission to Inpatient Clinic

The ED was a pivotal component in the hospital's patient flow. The decision of whether a patient needed to be admitted to the inpatient clinic, or whether their care could be managed at home or otherwise

was central at this stage. The decision-making in the ED included multiple roles that contribute to the process of placing patients on beds. The ED floor manager was officially responsible for managing the flow of patients from the ED to the inpatient clinic. The documentation explained their role as follows:

> *"The ED will look for a place for the patient who needs to be admitted. The first choice is the preferred department for the patient (if applicable AMU). If not possible, the ED will look for a place in another department (taking into account the flow chart for that specialty) and remains responsible for placing the patient." -Bed Policy Document*

Next to the floor manager, the ED nurse could play an influential role in the admission decision, particularly in assessing the patients' suitability for discharge or hospital admission. While the final decision lay with the resident or supervising medical specialist, nurses provided critical input based on patient mobility, home support, and personal circumstances, helping ensure that patient-centered factors were considered.

Lastly, the ED secretary played an essential operational role, especially during night shifts or peak hours. Though not mentioned in any of the official documentation, the ED secretary was mentioned regularly in the interviews. She identified available beds for patients requiring admission, both normal admissions and outliers, and in case of complications, she contacted the PFC for assistance. The PFC mentions:

> *"Especially in the evenings, I interact [with the ED desk secretary], not really with the floor manager."-PFC*

Based on the interviews, it seemed that the ED secretary was the main point of contact for the PFC, not the floor manager. The importance of their role was stressed by the location of the hand-over between the day and evening PFC:

> *"Hand-over of the day PFC to evening PFC at the ED front desk, ED floor manager can join this." -Work Explanation Evening PFC*

When comparing the placement on a specialty bed versus on an overflow bed, the only change that was mentioned was that the "best place for the patient" needed to be chosen. According to the ED nurse, this was done by the PFC during the daytime, by the evening PFC during the evening hours, and by the ED secretary at night. Only when the ED secretary is too busy with other tasks, the nursing staff may assume the responsibility of coordinating overflow bed placement.

6.1.2. Patient Flow Coordinator: Central Decision-Maker

The role of the Patient Flow Coordinator (PFC) was not a dedicated, full-time position, but was instead distributed among various individuals across shifts, who took it on as an additional responsibility. During the daytime, three individuals rotated in this role on different days of the week. During the evening shift and weekends, the responsibility transitioned to a coordinator of the AMU, and during nights, it lay with the ED floor manager. However, in practice, the ED secretary often assumed responsibility for finding patient placements.

The PFC played a crucial role when hospital occupancy was high, especially during surges in the ED admissions or when wards were nearing full capacity. They were responsible for maintaining an overview of the available beds in each specialty department and ensuring that patient placements were optimized across all departments. This may include creating additional capacity by moving patients or clustering them based on e.g. infections to avoid excessive use of single rooms. The role of the PFC was particularly valued by staff for its central oversight of patient flow and its ability to take the time to communicate with departments to achieve consensus on resource allocation. Officially, the PFC had an advisory role, while the ED floor manager retained formal responsibility. However, in practice, the PFC often assumed the responsibility for placement decisions, particularly during complex situations or busy periods.

Based on documentation, the PFC's role entailed:

> *"The PFC gives advice (including to the ED) about placing patients. The PFC keeps an overview of the availability of beds in the hospital. [] The nursing departments follow the instructions of the PFC, which are based on the principles in this document. In the event of imminent shortages/stagnation, the PFC escalates to the on-duty care unit manager." -Bed Policy Document*

Based on observations and discussions with the PFC, their primary tasks included:

- Deciding on priorities for relocating patients from high-pressure areas such as the ICU or AMU to specialty wards.
- Managing the clustering of patients with similar conditions—usually requiring isolation in a single room (e.g. COVID-19)—in multi-patient rooms to free up single rooms for critical cases.
- Overseeing patient flow to ensure ED overcrowding is mitigated and adequate capacity is available in the AMU to facilitate nighttime admissions.
- Reviewing patient diagnoses to reallocate patients from single rooms to shared multi-patient rooms when rooms are sparse.

The key tools for the PFC's decision-making were the flowcharts. These outline options for outlying patient placement based on similarities in treatment and experience on these specialty wards. The decisions were also guided by the principle of minimizing unnecessary patient transfers to avoid confusion and improve patient experience. More detail on the flowcharts is provided in Section 6.2.

There was a notable difference between the PFC's role and responsibilities during different shifts. During the daytime, the PFC was part of a managerial, administrative role, proactively addressing staffing issues, bed closures, and ensuring sufficient capacity for the night. As a result, evening, night, and weekend PFCs typically needed to intervene less frequently. This may be a logical disparity, as during evenings, nights, and weekends, the role is often assumed by individuals in clinical roles who have less time to focus on patient flow.

Bed Availability Meeting

The PFC led the daily Bed Availability Consultation (BAC) (also discussed in Subsection 4.2.2), which was attended by a representative from each department, usually the department manager or secretary. Before the meeting, the PFC gathered data from the patient administration system and the bed availability spreadsheets that were filled by each department. These spreadsheets detailed the current occupancy, anticipated discharges, planned admissions, and any outlying patients. The ICU and AMU also reported how many patients can be transferred to specialty wards. During this meeting, the PFC used this information to:

- Identify potential challenges in patient transfers.
- Coordinate with department representatives to resolve issues, such as lack of space for planned admissions.
- Assist with decisions on reallocating staff among wards based on staff availability.
- Facilitate decisions on moving outlying patients to the correct specialty ward.

If necessary, concerns about safety and quality of care for outlying patients could also be discussed. These patients may then be prioritized for reallocation to their specialty wards. Moreover, the PFC reported to find the BAC useful to promote shared responsibility for patient care:

> *"I think that the bed consultation in the morning is also really valuable, so that you can get together and think about: what is the workload, who has sick staff, can we help each other? So that we make it a shared problem and not an individual problem." -PFC*

Perception by Other Staff

Interviews with nurses, department managers, and medical specialists consistently highlighted the importance of the PFC for patient placement decisions. Most staff members regarded the PFC as a central figure in the decision-making process, though there was some variation in perceptions. While some described the PFC as the primary decision-maker, others viewed them as an advisor or coordinator. This reflected the discrepancy between the formal description of the PFC's role and its practical execution.

> *"The PFC, they decide which transfers proceed."-Department Manager*

"Who makes those choices [about who is admitted where]?"
"The PFC or the ED at night." -Nurse 4

Interviewer: "And in your view, who is the one who makes the choice, where that patient ends up?"
"I think in the case of overflow beds it is up to the bed coordinator." -Nurse 1

Interviewer: "Who else is involved in this decision-making process besides the PFC?"
"Actually no one." -Medical Specialist 2

6.1.3. Secretaries: Coordinating Transfers

Similarly to the ED secretary, the secretaries from the AMU or specialty wards were not mentioned in the documentation. However, in practice, they served as important points of contact, because they kept an overview of the bed availability in the specialty departments, and the ED or AMU secretary coordinated the transfer of patients with the secretary of the specialty department. This oversight was highlighted in this quote about the AMU secretary:

> *"The secretary has a perfect overview of who goes to the departments and when, because she makes the appointments [] she knows exactly which patients are going to be discharged [] so how many places we ultimately have available." -PFC*

The department secretary received a call from the ED secretary, AMU secretary, or the PFC, that a patient will be placed in their department. The next steps for the specialty department secretary were to facilitate the patient transfer:

> *"I reserve a bed for the patient and then I inform the nurses." -Department Secretary*

6.1.4. Specialty Departments: Receiving the Outlying Patients

The specialty departments played a critical role in the patient flow by admitting outliers and providing their nursing care. Various professionals involved at this stage had a vital role in ensuring quality of care and patient safety.

The department manager was responsible for the care that was provided in the department. They served as the point of contact between their department and the PFC. They were involved in discussing concerns related to outlying patients during the Bed Availability Consultation. If, for example, there were worries about the quality of care that could be provided to an outlying patient or challenges due to lack of experience on the nurse's side, the department manager could discuss this at the BAC.

Department nurses were primarily responsible for the clinical care of both specialty and outlier patients in their department. Interview questions focused on their responsibility in the outlier admission process were answered with explanations of medical actions, such as retrieving the patient, information hand-over, checking vitals, and ensuring the treatment plan was executed. There were managing nurses (*regieverpleegkundigen* in Dutch) who had more responsibility, specifically the coordination of the transfer of the patient with the ED or PFC, for example during night shifts when there is no department secretary on duty. From the interviews with nurses it became clear that both types of nurse had little power in the decision-making about patient placement:

> *"It is announced to you by the PFC or the ED front desk [] Then you just have to pick that person up. You don't have much choice in that." -Nurse 4*

Medical specialists only determined whether patients require admission—not where—and, in some cases, may influence placement decisions. According to the documentation available for this research, medical specialists had no role in outlying patient placement. This conclusion was based on the lack of any description of their role. Both medical specialists interviewed for this research asserted that they have no role in determining to which department the patient was admitted.

"What's your role in the whole [search for beds]?"
"Nothing." -Medical Specialist 2

While the specific department assignments were decided by the PFC, specialists could provide input for that decision, especially when the patients had complex needs or specific risks. For example, a specialist may request prioritization for transferring a high-risk patient back to the preferred specialty department from an overflow bed:

> *"The specialists themselves also respond to this and say, for example: I have a patient there and I really want them specifically in the [specialty] department." -Department Manager*

Alternatively, the PFC may decide that a patient can be placed on an overflow bed, because there was no medical affliction that excludes them, based on the AMU-regulations. However, if the medical specialist expected that this individual ran a high risk of developing one of these excluding afflictions, they could advise the PFC not to place this patient on an overflow bed:

> *"After the consultation [] in the emergency room, and I expect someone to go in the direction of these treatments [] then I say, the patient must go to the [specialty] department." -Medical Specialist 1*

One of the interviewees explained a situation where medical specialists did have the decision-making power to place outliers. This was in the case of repatriation to the specialty ward:

> *"If there are multiple overflow beds of the same specialty, the doctor decides in principle who should be transferred [to the specialty ward] first. This is often the most complex patient for that specialty." -Nurse 4*

The residents oversaw the daily care of admitted patients, both in their specialty ward and on overflow beds. Their responsibilities included conducting ward rounds to monitor the patients' progress. They were the first point of contact for medical questions from the nurses in the receiving specialty department. They were supervised by a medical specialist and for more complex patients, coordinated with their supervisor.

6.1.5. Hospital Management: Oversight and Adjustment

The care unit manager operated on the tactical and strategic levels of patient flow management (as discussed in Chapter 4), focusing on long-term planning and hospital-wide interventions. The care unit manager was not involved in the daily decision-making on outlier placements. However, they were called upon occasionally to address situations that required decisions outside the scope of the operational roles discussed in the preceding sections. For example, the care unit manager may be involved in deciding to close beds on a certain ward because few admissions were expected or there was a shortage of staff. The occurrence of outliers was a potential consequence of these decisions and was taken into account as such. Another responsibility could be deciding to deviate from protocols in exceptional situations.

6.1.6. The Outlying Patient: No Role in Placement Decision

The outlying patient was not part of the interview sample. As it was of interest, the interviewees were asked about the patient's role in outlier placement. The consensus among the interviewees was that the patient has no influence on the placement decision.

> *"Does the patient have any influence on which department he is in?"*
> *"No. [] It really depends on where there is room and preferably that is always the department of the specialty. And if not, then unfortunately no." -Nurse 1*

The patients were usually made aware of the fact that they were placed on an overflow bed.

> *"We always mention: you have been placed in a [different] department and if there is room in the department where you actually belong, you will be transferred to that department." -Nurse 5*

Regarding the question of whether patients noticed or complained about being placed on an overflow bed, the interviewees answered negatively. The findings in this section were not directly based on patient interviews, and should therefore be interpreted with caution.

6.2. Tools for Decision-Making

The PFC–and the ED secretary–had various tools available to support them in the decision-making about outlier placement. The first and foremost tools were the **flowcharts**. These flowcharts showed the preferred department for each specialty, and the route to select the best alternative ward. Which

one was the best alternative was based on similarities in the care delivered in these departments. The flowcharts also listed the diagnoses that excluded the patient from being suitable for an overflow bed. The decision-making was streamlined by the adherence to these flow charts:

> *"It's just really nice that we have that flowchart because it gives us handles on where to place the patient if a department is full. That gives clarity to the nurses of other departments because we can fall back on the flowchart if they say, yes, but that patient doesn't belong here. Then we can say, no, but the AMU is full and according to the flowchart, you are the next department. So it gives clarity from both sides, for the emergency department and the other department. And there is less discussion going on, he can't be here with us, because we can then fall back on the flowchart." -Nurse 6*

The flowcharts were well-known among the interviewed staff. Nine out of twelve interviewees discussed them. Also, they were known among each interviewed profession (Table 6.1).

Table 6.1: Overview of the frequency with which the tool flow charts were mentioned in the interviews with various employees.

Function	#Mentions Flow Chart	#Mentions Dashboard
Managers	7	0
Medical Specialist	1	0
Nurse	11	0
PFC	5	4
Secretary	2	0
Total	26	4

Another tool was a **digital dashboard** for the capacity of the inpatient clinic that was under construction at the time of this research. It showed the number of occupied beds, expected admissions, expected discharges, and the number of closed beds, and calculated the number of available beds in each department. It could be used to support decisions on outlier patient placement, and the closure or opening of beds in the inpatient clinic. It was an alternative to the bed availability spreadsheet, which at this time required manual inputting of these numbers. The dashboard was able to retrieve the information from the patient administrative system and automatically input this in the dashboard. However, the dashboard did not function as a tool for decision-making at this time, because the information it used from the patient administrative system was incomplete or inaccurate quite often, and it did not match the information in the bed availability spreadsheet.

> *"Of course, we are building the dashboard. If everyone would fill in the discharge date correctly, then it will be correct. That is not yet the case, so we are trying to pay attention to that with the department managers." -PFC*

The mentioning of this dashboard only occurred by those involved in developing it, e.g. the PFC and staff on the tactical level. Department managers or nurses have not mentioned it, so it may not be known to them.

The **patient administration system** was not often mentioned as a tool during the interviews. However, based on documentation and observations, it was relevant for the decision-making. The documentation stated that the PFC had their own access to the patient administration system. During observations, it became clear that one of the most important uses of the patient administration system was to check whether patients residing in single rooms still had an indication that necessitated the single room.

Though not explicitly mentioned, the patients' diagnoses, which could be described as part of their administration file, determined whether they could be placed on an AMU or overflow bed.

The **bed policy documentation** explained the procedures, rules, and agreements about the general placement of patients, including outliers. Several quotes can illuminate why it was defined as a tool for decision-making:

> *"Outlying patients are clustered as much as possible per room/department/floor." -Bed Policy Document*

"Single rooms are also sometimes limited available. In those cases, the following priority is used:

1. *Isolation patient;*
2. *Terminal patient;*
3. *Patient with delirium;*
4. *Confused patient."*

-Bed Policy Document

"Outlier admissions: these patients are transferred back to the department of the relevant specialism as soon as possible." -Bed Policy Document

The flowcharts were the main tool for determining the alternative department in which a patient was placed. The digital dashboard was not yet in use, but in the future could serve as an alternative for manually checking the patient administration system for available beds. Rules about patient placement were also established in the bed policy documentation, and therefore a decision-making tool.

6.3. Power and Interest in Overflow Placement Decisions

To clarify which stakeholders influenced outlier placement decisions, a Power-Interest Grid was developed (Figure 6.2). This framework categorized stakeholders along two dimensions: power, representing their ability to influence decisions, and interest, reflecting their level of concern or relevance to the issue (adapted from Bryson (2004)). Based on the interviews and stakeholder's perceptions of their roles, the grid visualizes their relative positions.

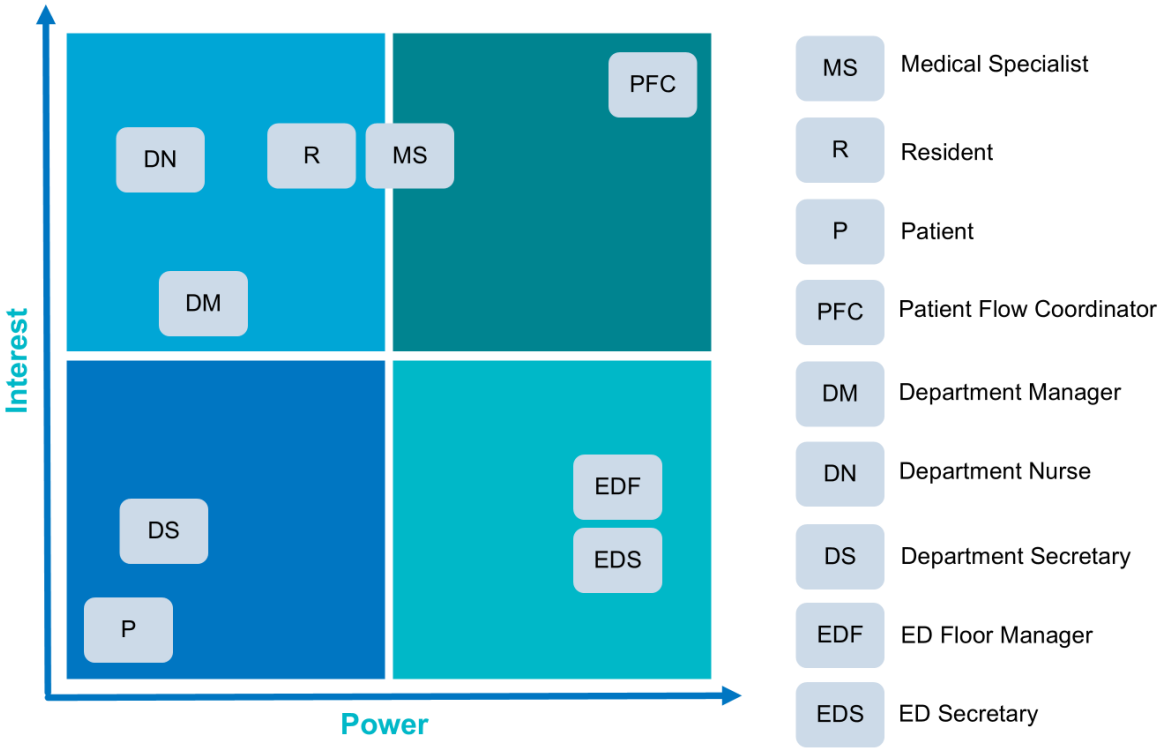

Figure 6.2: Power Interest Grid for the stakeholders involved in outlier placements.

The PFC occupied the top-right quadrant, which indicated high power and interest. This placement reflected the PFC's crucial advisory and executive role in placement decisions. While the formal responsibility lay with the ED floor manager—though often executed by the ED secretary—the PFC exerted influence through their coordination with the specialty departments. This was facilitated by their

authority to allocate beds, such as moving patients from single to multiple-patient rooms. At the edge of this quadrant, the medical specialist and resident were situated. They shared a similar level of interest, as they were both responsible for the patient's care. The hierarchical differences between these roles meant that the specialist had more power. Both of these stakeholders had a role in determining the patient's suitability for outlying, based on which they could advise the PFC. This was not common though, since documentation established the situations in which outlying was unacceptable.

Department nurses and department managers were placed at high interest and low power. Nurses shared a high level of interest due to their direct care provision responsibilities. Department managers, while less directly involved in patient care, were responsible for the care in their department and could influence placement decisions through participation in the BAC, grating them higher power relative to nurses.

The ED floor manager and secretary formed a combined stakeholder group in this figure, as too few interviews were done to separate them. Their formal authority to place patients granted them significant power. However, their interest in specific outlier locations was lower, as their focus is on maintaining patient flow and freeing up ED capacity.

The lower left quadrant indicated a low power and low interest. Department secretaries and patients occupied this quadrant. Secretaries' distant role in patient care and focus on the facilitation of transfers minimized their influence, though their responses to inquiries about bed availability may indirectly impact placements. Based on responses by nurses, patients generally expressed gratitude for admission and minimal concern over their outlier placement, despite being directly affected.

An important method for determining the stakeholders that were to be considered in the Power Interest Grid was asking the stakeholders: in each interview, the question was posed about who needed to be interviewed to understand the outlier placement process. Table 6.2 shows the number of times each stakeholder was mentioned as an answer to this question. The PFC was mentioned 12 times, so clearly stakeholders were aware of their central role in outlier placements. Most of the mentioned stakeholders were placed in the Power Interest Grid. Only the bottom three—Care Unit Manager, Policy Advisors, and the Board of Directors—were not included. The main reason why they were not covered, was the fact that they did not have a role in the daily decision-making on outlier placement, but they operated on tactical and strategic levels (as discussed in Section 4.2.2).

Table 6.2: The number of times each stakeholder was named as a relevant interviewee during the interviews.

Stakeholder	# suggestions
(Evening) PFC	12
Specialty Department Nurse	7
Medical Specialist	6
Resident	6
Department Manager	4
ED Floor Manager or Nurse	4
Specialty Department Secretary	2
Patient	2
ED Secretary	1
Care Unit Manager	1
Policy Advisors	1
Board of Directors	1

6.4. Challenges in Decision-Making

This section identifies key challenges faced during the decision-making for placing outliers, derived from interview data. Two significant issues emerged: the difficulty of convincing departments to admit outliers and inaccuracies in patient administration. Both were reported almost exclusively by the Patient Flow Coordinator (PFC)—as can be seen in Figure 6.3—reflecting their role as the primary decision-maker in the placement process. The third challenge in this figure, determining the main specialty, originated from a single interview, but was deemed interesting and therefore added.

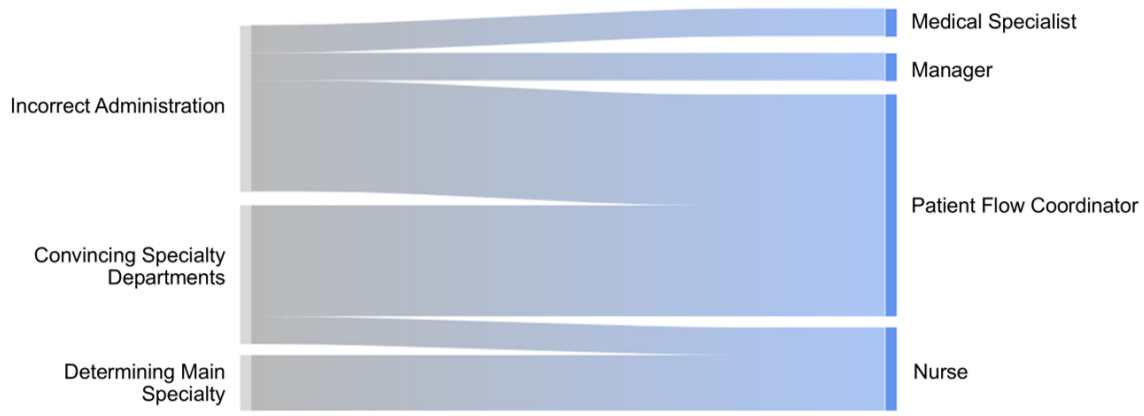

Figure 6.3: Challenges in decision-making on outlier placement, as reported by various professions. Generated with ATLAS.ti.

6.4.1. Convincing Specialty Departments

One primary challenge identified was persuading specialty departments to admit outlying patients, particularly during high-capacity situations in the Emergency Department (ED) and inpatient clinic. The PFC described resistance from department staff:

> *"Then they are not so cooperative when I say: [the AMU is] really full, in the ED they are lying in the corridor, come and get those patients. I sometimes really have to pull on that." -PFC*

This resistance was corroborated by specialty department staff, who expressed frustration regarding the disruption to planned admissions caused by unanticipated outliers. Time pressures, especially during night and evening shifts when there were more patients per nurse, worsen this challenge. Nurses reported an added workload due to the complexity of caring for patients from other specialties, which diverged from their primary training and preferences:

> *"Because it [the care for outliers] is really completely different from what we as nurses have chosen in terms of care. And of course, you are trained, but also really only at a very basic level. So [] people did not like to be in that room. That is completely different care than what we like. So in terms of job satisfaction that is also less." -Nurse 5*

Another contributing factor was the perception that placement decisions by the ED seem to prioritize single room availability over suitability for the patient's condition:

> *"They [the ED] just look at which department has room, and I have to move this patient now []. Often they don't really look at which department this patient fits into." -Nurse 5*

> *"I think that especially during the evening and at night, the emergency department really forces that a patient needs to be admitted and that it has to be with us." -Nurse 4*

6.4.2. Incorrect Administration

The PFC depended on accurate and timely information for effective decision-making. However, they noted frequent delays and inaccuracies in updating bed availability spreadsheets and patient administration systems. These issues hindered the decision-making on patient transfers during the Bed Availability Consultation (BAC), which cannot be properly prepared, and beyond:

> *"We often notice in the evening shift, that there is someone discharged from a single room, but the patient is left in the system for a while, then no one can see that the room is free." -PFC*

These lapses in information can lead to unnecessary outlier placements and, in an extreme situation, to transfers to other hospitals.

6.4.3. Determining the Main Specialty

Another challenge involved the initial determination of a patient's primary specialty. Though only mentioned once, this decision influenced which specialty the patient was allocated to, and therefore the preferred specialty department. Thus, this decision could influence the care the patient receives and the patient's outcomes. One nurse highlighted a case where, in her view, the chosen specialty did not align with the patient's most pressing medical needs:

> *"A patient is admitted [to the Internal Medicine department]. It is a dysregulated diabetic. Diabetics sometimes get wounds on their feet that do not heal [] very complex wound care is necessary. We are not specialized in that.[] It would be ideal when such a patient is admitted to a surgical department []. But the surgeon says that the main problem is dysregulated diabetes, an internal problem, so the patient should stay in the internal medicine department. But if you look at the quality of care, I think that it would be better to place that patient on a surgical ward because the wound is the main problem and not diabetes." -Nurse 4*

This example illustrates the effect on quality of care that could arise when the main treating specialty may not be optimal. The decision determining the main specialty was made by medical staff, not by the PFC. It was not within the scope of this research to clarify this process, but the combined decisions of the main treating specialty and the placement determined whether a patient was an outlier and the care that the patient received.

6.5. Measures to Avoid Overflow Beds

The core strategy to ensure patient safety and maintain quality of care in the inpatient clinic was to avoid the use of overflow beds as much as possible. Staff consistently emphasized this during interviews:

> *"You're going to try to prevent it anyway." -PFC*

> *"They are continuously working on limiting the number of overflow beds. So, for example, in the winter you often see that number of lung beds increases a lot. So we have opened a lung room here and we have been trained to know a little about the clinical picture of influenza or COVID." -Nurse 5*

> *"That means trying to limit those overflow beds as much as possible." -Medical Specialist 2*

Centralized coordination of the patient flow led by the PFC supports this strategy. This role is highly valued by staff for its clear point of contact and dedicated focus on coordinating patient placements:

> *"I always find it very pleasant that there is one coordination point. [] it is just very nice that you just have one number that you can call to ask what's going on." -Nurse 4*

> *"So it's just really nice that the PFC has time to sit down with the departments to arrange things properly." -Nurse 6*

These examples illustrate that avoiding overflow bed placement was the core objective for maintaining patient safety. Efforts to prevent the use of overflow beds included two key measures: the implementation of adapted bed types and the adoption of flexible resource allocation.

6.5.1. Adapted Bed Types to Prevent Outlier Status

The use of adapted bed types, such as the Acute Medical Unit (AMU) and "accordion" beds, played a relevant role in avoiding outlier status for patients.

The AMU served as a buffer, providing short-term capacity and facilitating admission capacity during evenings and nights. The presence of the AMU allowed for:

- Reducing time pressures on specialty department staff, particularly during evenings and nights, by avoiding admissions to these departments.
- Due to clear admission criteria stating the departments that utilize the AMU, outliers of these specialties are avoided.

- An additional decision moment after 48 hours, the maximum admission duration in the AMU, to assess whether patients can be discharged or transferred to their specialty ward, reducing unnecessary inpatient clinic admissions.

Before the introduction of the AMU, each specialty department reserved beds for acute admissions, resulting in outliers. The centralization of the acute admissions in the AMU avoided these outlier placements.

Specific types of beds were used to avoid giving a patient an outlier status. The two most frequently mentioned types of beds were the AMU and "accordion" beds.

> *"The advantage is that we have an AMU that you cannot consider as an overflow bed, but where you do have [] a kind of buffer capacity, which means that you can sometimes leave patients there a little longer to ensure that they ultimately end up in the correct department." - Care Unit Manager*

> *"In the decision-making process the preferred department is initially the acute admission unit because they simply have the availability and staffing 24/7 to deal with these kinds of disruptions. The regular nursing departments are namely less staffed in the evening and the night shift. So that is also a considerable disruption of their regular process at the moment that an admission would come there during those hours." -Care Unit Manager*

> *"People can also be admitted to the acute admission department for an average of a maximum of 2 days. So you build in an extra step of considering, am I going to transfer someone to the nursing department of their own specialty after 48 hours or is someone fit enough and can someone go home? Then it turns out that a lot of people can be discharged home after forty-eight hours." -Medical Specialist 2*

Accordion beds, located at the intersection of two specialty departments, were reported as an effective measure to avoid outliers. This multi-patient room allowed admissions of patients from both departments. This enabled the doctor rounding on the specialty department to seamlessly visit the patients on these accordion beds:

> *"With the accordion beds you see that it is very nice that the doctor or resident walks straight on with the ward rounds. For an overflow bed, you have to wait for the consulting doctor and that is a disadvantage because they do not come until late in the afternoon." -Department Manager*

Additional adapted bed types, such as emergency beds on specialty wards, overflow beds on the ICU, seasonal specialty beds, and the multidisciplinary medical unit, were also reported to further minimize the need for overflow beds.

Adapted bed types offer both benefits and challenges for capacity management. They enhance flexibility by accommodating patients from multiple specialties. For example, in the case of accordion beds, allowing patients from two specialties increased resource availability. However, if strict admission criteria limit patient eligibility, these beds may remain unused despite overall capacity pressures.

6.5.2. Flexibility in Resource Allocation

Flexibility in resource allocation, especially staffing, was another approach to avoid overflow beds. Reassigning personnel and adapting bed usage based on patient needs helped prevent placing patients in other departments. Staff mentioned:

> *"Because it is quiet this past period, we are going to close beds somewhere. There is no supply, and of course, it costs money: deploying staff, but there is no one in those beds." -PFC*

> *"I have the idea that departments are a bit more flexible in moving beds. [] For example, two single room patients are on their way, let's close the multi-person room and open the single rooms. So I have the idea that there is a bit more flexibility in thinking about that." -Nurse 4*

> *"When a department is completely full, or I expect it to become full, my primary preference is to ensure that additional support is provided to the department in question in the short term to prevent us from creating a lot of overflow beds in the 24-48 hours afterwards." -Care Unit Manager*

The flexibility in moving staff to other departments was also observed during the Tactical Planning Consultation for the Inpatient Clinic (TPCIC) and Bed Availability Consultation (BAC) and recorded in the field notes. The co-occurrence of meetings and flexibility in staff in the field notes was analyzed and visualized in Figure 6.4. This figure shows that the (re)distribution of staff was discussed in both the TPCIC and the BAC. These field notes included:

> *"The most discussed problem is staff planning." -Field note during TPCIC*

> *"Flex nurse and specialty nurse from one department are moved to another department with an acute shortage." -Field note during BAC*

Figure 6.4: Co-occurrence analysis of the codes flex and meetings BAC and TPCIC. Overlap with the BAC occurred 4 times, overlap with the TPCIC occurred 3 times. Generated with ATLAS.ti.

As mentioned in Chapter 4, the lack of single rooms was a common contributing factor to overflow bed placements. Proactive measures to free up single rooms, such as relocating patients from single rooms to multi-patient rooms, were initiated by the PFC:

> *"Sometimes there is a patient in a single room who should not be. We can see this in the patient administration [] then we can contact the department or the PFC [] to create an available room." -Nurse 6*

The implementation of adapted bed types, such as the AMU and accordion beds and the flexibility in resource allocation, both in terms of staff and closure of beds, reduces the need to place patients on overflow beds.

6.6. Reflection on Findings

The decision-making process surrounding outlier placements was aimed at balancing clinical suitability—ensuring that patients receive care in the most appropriate specialty ward—and operational efficiency—maximizing hospital bed utilization to accommodate patient flow. In normal operations, patients were placed based on clinical suitability only. During extreme surges, such as the COVID-19 pandemic, the approach shifts to the opposite end of the spectrum, prioritizing operational efficiency. In this situation, nearly any available bed could be considered a viable option to accommodate the demand for care. During seasonal, or other less extreme surges, the hospital must find a middle ground, ensuring patient flow continues while maintaining a standard of clinical appropriateness.

When striking this balance, the flowcharts served as the main decision-support tool and guided the PFC in making placement decisions. These flowcharts incorporated multiple considerations, such as the patient's specialty and diagnosis, similarities between specialties to determine acceptable placements and contraindications that make outlier placement unsafe. These contraindications included, for example, specific diagnoses requiring specialized equipment or expertise.

To make informed decisions, the PFC gathered data from the patient administration system, including diagnoses, clinical indications relevant for single rooms, and real-time availability of beds across departments. The PFC thus acted as the central node, balancing operational constraints with clinical considerations to make this trade-off.

Despite the structured approach enabled by the flowcharts, tensions arose when theoretical decision-making met the reality of daily practice. While most staff were aware of the flowcharts, their application in real-time was not always effortless. When the PFC contacted specialty departments for overflow placements, resistance from the receiving department was common. This resistance could stem from several factors:

- **Competing Department Priorities**. While the PFC aimed to optimize overall patient flow, individual departments prioritize their own operations, patient load, and staffing limitations. The placement of outliers has the potential to disrupt the normal internal operation of the department (e.g. due to nurses' lack of knowledge or barriers in professional interactions, illuminated in Chapter 7). As a result, departments could prioritize the functioning of their department and the care for the core patient population.
- **Lack of Shared Responsibility**. The departmental hospital structure contributed to a fragmented sense of responsibility. While patient flow was a system-wide challenge, the specialty wards may perceive overflow bed placement as an external problem, rather than a shared duty. Moreover, the shortage of single rooms was a significant contributor to outlier placement, as indicated by staff. This often required the PFC to initiate internal transfers on the specialty wards—moving a patient from a single to a multi-patient room to free up space. While the PFC could frequently prevent outlier placements by employing this strategy, it also underscored a lack of shared responsibility in managing patient flow. Instead of being a specialty departmental or collaborative effort, the burden of identifying and initiating these moves fell primarily on the PFC. This reactive approach suggested an opportunity for more proactive, department-led strategies that emphasize collective responsibility in bed management.
- **Power and Interest in Decision-Making**. The PFC had the decision-making authority but did not have the power to enforce the placements unilaterally. To facilitate the placement, the cooperation of the specialty ward was necessary. Extensive resistance by the specialty department could shift the distribution of power and how consistently the flowcharts were applied in practice.

The quote from Nurse 4 in Subsection 6.4.1 encapsulated the aspects contributing to the need to convince departments. Her statement that the department was ”forced” to admit a patient reflected the PFC's decision-making authority, which was perceived negatively in this case. Additionally, her phrase ”has to be with us” reinforced the department-centric mindset, highlighting the lack of feeling of shared responsibility for hospital-wide patient flow and stressing the perceived separation between departments.

Ultimately, outlier placement decisions reflected a core trade-off between operational efficiency and clinical suitability. The hospital must balance the need to place every patient in a bed as quickly as possible against ensuring the patients receive specialized care in the preferred department. While tools like flowcharts provided structure and central coordination via the PFC helped to make decisions systematically, resistance to placement decisions—likely related to the departmental organization of the hospital—remained a barrier.

This discussion of the hospital's departmental structure and its relation to fragmented responsibility is deepened in the next chapter, which examines how hospital departmental structure and interdepartmental coordination challenges further complicate outlier care.

7

Overflow Placement Decisions Create Challenges for Interdepartmental Collaboration

Outlier is a response to hospital capacity constraints, ensuring that patients receive care even when specialty departments reach full capacity. However, placing patients outside their designated specialty wards introduces coordination and structural challenges due to the hospital's department-based organization. Differences in departmental policies, procedures, and professional expertise can complicate the care of outlying patients, requiring additional collaboration across units. This chapter explores two key areas of concern: structural challenges that stem from the hospital's departmental organization and the operational difficulties that arise as a result.

7.1. Challenges Indicating a Departmental Organization

The hospital's inpatient clinic was structured around specialty departments, each with its own procedures, expertise, and approach to care. Overflow bed placements required patients to be treated outside their designated specialty wards, compelling departments to collaborate beyond their usual boundaries. This process exposed structural barriers within the hospital, particularly in the differences between medical and surgical departments, limitations to nurses' knowledge and experience, and inconsistencies in departmental approaches to outlier care. These challenges illustrate the fragmented nature of the hospital's organizational structures, affecting the care coordination and management of the outlying patients.

7.1.1. Differences between Medical and Surgical Departments

The differences in approach to care between medical and surgical departments complicated the care for outliers. These differences were perceived as large among interviewees. As mentioned earlier, surgical departments worked with protocols to provide care, while medical departments' approach to care could be described as more experience-based. When an outlier crossed the boundary between these departments, this further complicated the provision of care. The flowcharts took these differences into account and aimed to avoid this cross-over. These findings originated party from this conversation with a nurse from a surgical department:

> *"With internal patients you often have less [protocols], because it is often not clear what the patient has. And you can't really draw up a protocol for that, but you do have protocols, but not for everything."*
> *Interviewer: "So in a medical department it is more about experience, if I may say so."*
> *"Yes, I think so. With surgical too, of course, but a lot is also written down per patient and per procedure, what it exactly entails. That is less with medical patients. They have different kinds of problems going on. Surgical patients usually come in for just one major*

surgery and no other things that are acute at the moment. So that makes it more difficult, I think, for surgical departments to have an outlying patient." -Nurse 5

The PFC also recounted this difference in protocol use:

"Surgical often follows a protocol. You can look it up, it is recorded. But medical is not protocol-based. That is not possible." -PFC

7.1.2. Nurses' Knowledge and Experience

The most frequently mentioned challenge in caring for outliers was the nurses' limited specialized knowledge and experience, required to treat patients from other specialties. Two key codes emerged from the data: the general gap in *knowledge and experience* and the lack of *familiarity with treatment and illness* specific to the outlier's specialty.

One medical specialist highlighted how repeated exposure fosters expertise within a specialty, but such opportunities were absent when treating outliers:

"I think it is mainly the expertise of nurses. Every specialty has its own expertise and [as] nurse you are skilled in certain actions. And if you work in a certain field a lot, you simply become better at it than if you only occasionally see a patient with a certain condition." -Medical Specialist 1

Nurses echoed this concern and emphasized the lack of knowledge posed a risk. They also noted the need for additional effort to navigate unfamiliar protocols and treatments:

"Lack of knowledge can be a real risk."-Nurse 4

"You don't really know how and what. [] Protocols can be different for certain patients and departments and specialisms, so you really have to delve into that." -Nurse 3

Managers further acknowledged the challenge of balancing generalist training with specialized demands:

"Nurses have general training, but yes, everyone has their own specialty." -Department Manager

Figure 7.1 illustrates the distribution of staff roles reporting these challenges, including nurses, PFC, medical specialists, and managers from departments and care units. This distribution underscored the widespread recognition of this challenge across the organization. In short, the lack of specialized knowledge and experience among nurses emerged as the most prevalent challenge in outlier care, as highlighted by various professional roles.

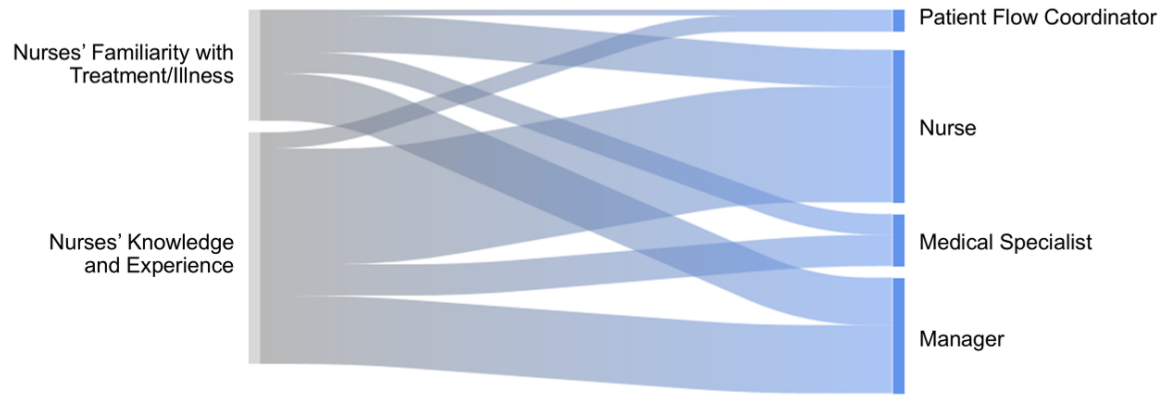

Figure 7.1: Sankey Diagram of the links between nurse's knowledge and experience nodes and the staff mentioning these issues. Generated with ATLAS.ti.

7.1.3. Differences in Approach Between Departments

Differences in organizational policies between departments also affected the care for outliers. This pertains mostly to the medical specialist or resident responsible for the outliers. For instance, the Internal Medicine departments restricted residents in training to become specialists from caring for outliers due to educational regulations, while other departments did not have such rules. Although this issue was only mentioned twice, investigating these departmental differences in organizing outlier care may provide insights to optimize care practices.

7.2. Challenges Resulting from a Departmental Structure

The separation between hospital departments not only shaped patient placement decisions but also influenced interdepartmental collaboration once an outlier was admitted. This structural division introduced practical challenges that affected the nurses' confidence and performance, increased reliance on other departments, complicated professional interactions, and impaired effective patient monitoring.

7.2.1. Impact on Nurses' Confidence and Performance

Nurses' confidence and performance were influenced by their limited knowledge of the specialized care required by outliers. Three main subjects were identified: time pressure, feeling qualified and competent, and using the VAC-pump.

Time Pressure

The nurses limited experience with outliers' specialties resulted in added time pressure. Nurses reported that the necessity to consult unfamiliar protocols increased the time required to deliver care.

> *"Surgeries [] we just have less knowledge of. Look, you can look up everything, but that still takes time and then you read it, but you don't really feel competent because you just don't do it often." -Department Manager*

> *"If you just don't have that much experience in that, it just takes more time." -Nurse 1*

> *"It takes us more time to look everything up." -Nurse 5*

The extra time demand also affected the nurses in the preferred specialty department, who may be asked to assist but face their own time constraints. This is discussed under "Dependence on Other Departments".

Feeling Qualified & Competent

Nurses have reported not feeling qualified and competent when providing specialized care for outlying patients, which caused feelings of insecurity. Various nurses expressed their concern:

> *"But in my view that is not the safest and best way, also because we often simply do not feel competent, or do not feel fully competent, to do that." -Nurse 1*

> *"Nurses are also insecure [] you notice that when you have patients where you have less knowledge of." -Department Manager*

> *"We are allowed to [use a piece of equipment] as a nurse, but being qualified and competent is another story. And if we do not feel that, and something can go wrong if we do not [execute] that well, then the patient has a longer hospital stay." -Nurse 3*

These insecurities also led to hesitations in decision-making and could lead to reduced job satisfaction.

VAC-pump

Nurses frequently highlighted the challenges of using vacuum-assisted closure (VAC) pumps. VAC is a method that uses a vacuum pump to promote wound healing (Agarwal et al., 2019). Specific training was compulsory to perform this treatment, but infrequent exposure to patients requiring this treatment led to knowledge decay on the nurses' side. The VAC pump was a prevalent subject: it was mentioned eight times on the interviewee's initiative. For example:

> *"If we get patients here with a VAC-pump, you have to have specific training for that. Well, people follow that, but if it doesn't happen again for two years, then you simply lose that knowledge. And I think that's a great danger, because that is really risky for the patient. Because if that wound healing doesn't go well, then there can be very serious consequences." -Department Manager*

These findings illustrate what challenges arose for nurses due to the separation of departments that impacts their knowledge of other specialties.

7.2.2. Dependence on Other Departments

To address their knowledge gaps, nurses caring for outliers frequently consulted their colleagues in the preferred specialty departments. While these consultations were described as accessible, they came with challenges. Telephone consultations were seen as effective, but requests for in-person assistance added significant time pressure for both parties. Nurses noted that specialty department staff may not always have time to immediately provide help, complicating the care delivery.

> *"The nurses can always easily consult with the nurses of the relevant department." -Nurse 6*

> *"So then you also have to involve nurses from other departments to do that for you. and that only costs them more time, they don't always have time for that." -Nurse 1*

7.2.3. Professional Interactions and Communication Barriers

A lack of preexisting professional relationships and logistical barriers hindered effective communication between nurses and doctors. Nurses reported spending time searching for contact details of the responsible specialist or resident, while doctors noted the difficulty in locating the nurse caring for an outlying patient during ward rounds. A lack of familiarity between the nurses and doctors further complicated interactions. It was unclear for both parties if they truly understood each other, for example, because they did not know whether the other was relatively new at their profession or experienced in caring for certain specialty patients.

> *"And when you go there, it is often that you do not know that nurse well [] then you first have to look, where is that nurse? Or first look, where exactly is that patient? [] in your own department you know a lot more about, what are the daily things like and then you know the nurses personally better, so the contact is also easier. And then you also talk about patients more easily than in another department. [] It is not all insurmountable, but there are some obstacles and I think it is also a bit more error-prone because of that." -Medical Specialist 1*

Moreover, outliers were confronted with additional transfers compared to specialty-warded patients. Though only mentioned in one interview, the involvement of multiple teams could increase the chance of errors in patient care.

> *"So the fact that you create an extra move for the patient, and often that goes hand in hand with another team that cares for that patient, both in terms of nursing and doctors, you can't record everything equally well in your file. So it could be that you're going to miss information, or that you mean information differently or you interpret it differently than it is written down. That is a potential risk." -Medical Specialist 2*

7.2.4. Late Ward Rounds and Fewer Observations

Late ward rounds were a recurring issue that often delayed the determination of patient treatment plans. Nurses may wait for extended periods, resulting in delayed interventions. The postponement resulted in shifting the execution of the treatment plan to the evening and night shifts, which typically operate with less staff, so more patients per nurse. One of the nurses explained:

> *"They [doctors] are kind of stuck in their department and overflow beds often have less priority for them. Suppose it's [a patient] from the lung department, then they first go and do rounds in the entire lung department. And then they only come here late in the afternoon, while we've been sitting with questions all day. That's a problem." -Nurse 5*

Doctors tended to review patients more frequently within their own departments. For outliers, however, these observations may be limited to a single visit per day. As a result, subtle changes may be missed and it becomes harder for nurses to ask for clarification or feedback. This issue may be related to the distance the doctor must travel to visit the outlying patient.

> *"So if a patient is in your own department, you have the chance, the possibility, that the resident will look at them a couple of times a day, or walk by, whatever. In other departments, that is often only once a day." -Medical Specialist 2*

> *"You're less likely to ask things as a nurse then. Unless at some point it really escalates or it becomes really serious, then you're going to call, while normally in a department where those doctors are present, you're going to communicate things much more easily and will ask small questions." -Medical Specialist 1*

7.3. Reflection on Findings

Hospitals are structured into specialized departments to provide optimal care services for patients. However, the placement of outliers challenges this model by requiring collaboration between departments that typically function independently. These findings illustrate that this fragmented structure contributed to inefficiencies, inconsistencies, and additional burdens on staff involved in outlying patient care.

One important indicator of a departmental hospital structure was the contrast in approaches to care between medical and surgical departments. Medical departments tended to rely on experience-based decision-making, whereas surgical departments followed detailed protocols. According to nurses, this discrepancy became particularly problematic when an outlier crossed the boundary between medical and surgical departments, as the receiving department may lack the appropriate expertise to manage the patient effectively. Flowcharts have been implemented to mitigate this issue by guiding placement decisions and reducing crossovers. However, this measure cannot completely prevent this type of crossover.

Another sign of the separation in the hospital organization was the variation across departments. The main example that came forward during this research was that certain departments restrict residents training to become specialists from caring for outliers, while others do not impose such limitations. Further research could bring to light more discrepancies across departments that result in inconsistencies in outlier care, as their treatment depends on the policies in both specialty departments rather than a hospital-wide standard.

Similarly, the nurses' knowledge and experience were often confined to their specialty areas, meaning that they may lack the necessary familiarity with the outlying patient's condition and treatment protocols. This not only affected the nurses' confidence and ability to deliver timely care but also increased their reliance on staff from other departments, increasing time strains on both departments.

Professional interaction and communication barriers further highlighted the separate nature of the departmental organization. The lack of preexisting relationships between staff from different departments made it more challenging to facilitate the care for outliers. Nurses struggled to identify the appropriate doctor responsible for an outlier, and doctors conducting ward rounds had trouble locating nurses responsible for their patients in other departments. These inefficiencies contribute to delayed decision-making, time pressure, and increased workload.

The physical distance to other wards resulted in fewer observations by doctors. Combined with late ward rounds, these factors may influence the safety of the patient on the overflow bed, which will be the focus of the next chapter.

Perhaps the most direct consequence of the hospital's structure is the resistance from departments to accepting outliers, as discussed in Chapter 6. The reality that the PFC often needed to convince wards to accept an outlier underscored the lack of shared responsibility for hospital-wide patient flow. Departments primarily focus on managing their own resources and workflows rather than considering the broader hospital capacity. This reluctance to accommodate outliers reflected a structural issue in which hospital-wide processes, such as patient admissions, were not perceived as collective concerns but rather as burdens shifted between departments.

Ultimately, the challenges identified in this chapter revealed that outlier placement is not only a logistical issue, but is rooted in the way hospitals are structured. The findings demonstrated that the

separation of hospital departments, while beneficial for specialized care, created barriers to effective interdepartmental coordination and patient flow. These interdepartmental challenges not only complicated the placement process but also led to inefficiencies that placed additional strain on staff and potentially compromised patient safety. The next chapter will further explore how these organizational challenges translate into risks for outlying patients.

8

Challenges Impact Patient Safety

The challenges associated with overflow bed placements extend beyond organizational or logistical inefficiencies. They have a direct influence on patient safety and quality of care. Staff identified central risks, including delays in treatment, mistakes in care, and prolonged hospital stays, which stem from the challenges outlined in the previous chapter. This chapter pays special attention to the nurses' limited specialty knowledge, which contributed to patient safety concerns by impeding effective communication with patients, early recognition of deterioration, and proper protocol adherence. This chapter explores these risks and examines the strategies implemented to mitigate them, highlighting the ongoing tension between capacity-driven decision-making and patient-centered care.

8.1. Overflow Placement Safety Risks

During the interviews, staff identified several patient safety risks associated with overflow bed placements. The most frequently mentioned concerns were mistakes in care, delayed treatment, and increased length of stay. Figure 8.1 provides an overview of these risks and the professional roles that highlighted them during the interviews. This section explores each of these three risks.

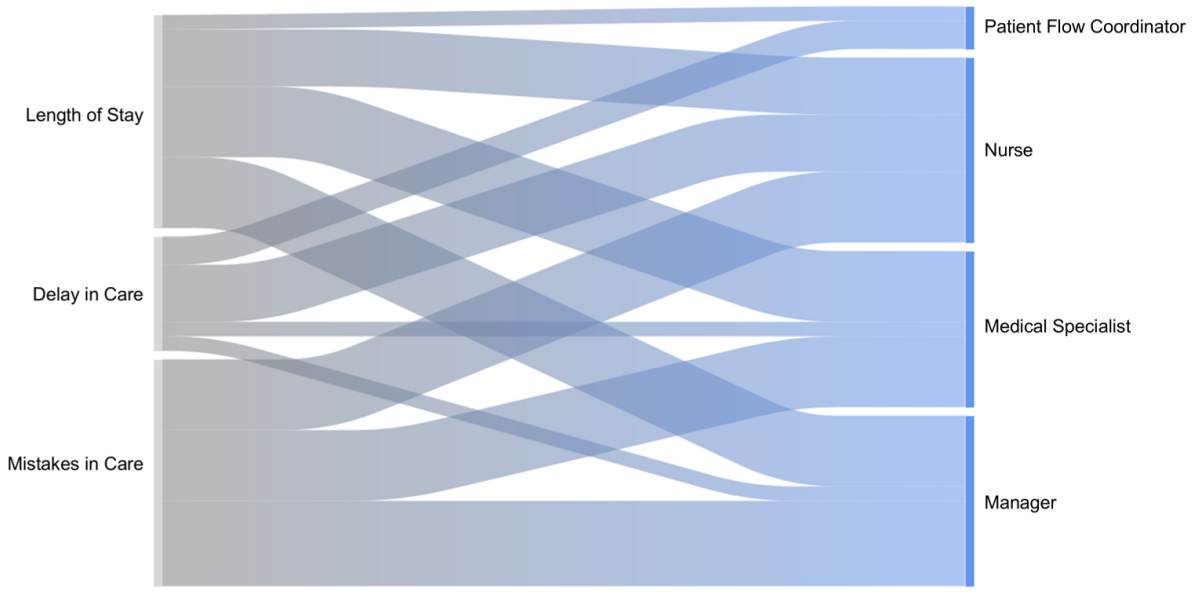

Figure 8.1: Sankey diagram of three risks for outlying patients and the professions that mentioned these risks. Generated with ATLAS.ti.

8.1.1. Mistakes in Care

Mistakes in care were reported as a risk for outlying patients. Examples of mistakes stem from nurses' unfamiliarity with the protocols and medication regimens of specialty departments. For instance, nurses lack knowledge about critical timing or combinations of medications, potentially leading to errors. However, these mistakes were generally described as minor and not life-threatening for patients.

> *"And of course mistakes are made everywhere, but the feeling is that this happens more often on overflow beds than on a normal ward."-Medical Specialist 1*

8.1.2. Delay in Care

Delays in care were another commonly reported risk. Staff noted that treatment may proceed more slowly for patients on overflow beds due to the doctors' late ward rounds, the staff's unfamiliarity with specific medical procedures, or the need to consult nurses in other departments. This delay could impact the timely treatment of the patient.

> *"I do think that in the department of the specialty itself, everything would have been quicker and easier and that such a patient might have received all the medication needed more quickly because it would not have been necessary to first look up how long it should take to run in and how it should be prepared." -Nurse 1*

8.1.3. Increased Length of Stay

An extended hospital stay was also frequently highlighted as a risk. Delays in ward rounds or consultations could postpone treatment decisions, resulting in patients remaining hospitalized longer than necessary.

> *"With an overflow bed you have to wait for the consulting doctor and that is a disadvantage because they always come in the afternoon because they are just too busy. So then you have your treatment plan very late, with the result that people are here longer than necessary." -Department Manager*

While delays in care and increased length of stay were interrelated, they were analyzed separately, since delays in care do not necessarily lead to prolonged hospitalization. There was some overlap in the fragments belonging to these codes, but it was confirmed that both aspects were named separately, for example:

> *"At most someone might have to stay in hospital for a day longer, because for example a blood test is not known []. Whereas if you take it in the morning it can be known in the afternoon and otherwise you have to wait another day. So maybe the length of stay is a negative thing about it." -Nurse 2*

8.2. Consequences of Nurses' Knowledge and Experience

Nurses' limited familiarity with specialty-specific treatments and protocols emerged as a significant challenge in overflow bed placements. This lack of expertise affected their confidence and efficiency. Nurses experienced increased time pressure and reliance on other departments for guidance. Additionally, issues directly influencing patients stem from the nurses' limited knowledge. This section explains how gaps in knowledge led to gaps in informing patients, missed signs of deterioration, and issues with protocols.

Gaps in Informing Patients

Nurses commonly answer questions from patients about their condition and care plan. However, nurses caring for outliers have reported issues with informing patients and their families. Nurses lacked the depth of knowledge required to answer these questions. This challenge was clear in statements such as:

> *"You do notice that patients from other specialties miss some information from us." -Nurse 2*

"I also think that you can't give the patients the right information, because then you look it up [] and I think that the patient can sometimes see through it, like, well, you just read that brochure yourself. I think that the information is also less than in a department where they are specialized." -Department Manager

Missed Signs of Deterioration
Both nurses and medical specialists expressed concerns about delayed recognition of critical signs of patient deterioration. The lack of familiarity with specific illnesses increased the risk of overlooking subtle changes. One nurse reflected:

"Perhaps complications because we notice things too late in terms of points of attention. I have not experienced this yet, but I could imagine that something like this could happen. I think that knowledge is the biggest disadvantage." -Nurse 2

And a medical specialist confirmed this view:

"In the department where the nursing staff also has less experience, that is a potential risk for that patient, that it is not recognized quickly enough that there is a problem in this and that area and it may be that people are lagging behind the facts. And that you need longer recovery time to be able to go home again with discharge, for example." -Medical Specialist 2

Protocol-Related Issues
Protocols were an essential tool for nurses dealing with unfamiliar conditions. However, challenges included retrieving the correct protocol and interpreting its application. Medical specialties often lacked protocols, while surgical specialties usually worked with detailed protocols. Errors or difficulties in applying protocols could result in care delays and increase time pressure for the nursing staff.

8.3. Measures to Mitigate Risks for Outlying Patients

As discussed in Chapter 6, the hospital's primary goal was to prevent overflow bed placements whenever possible. However, when capacity constraints necessitated the use of overflow beds, additional measures were taken to mitigate risks and maintain patient safety. These measures aimed to minimize the impact of outlier placement by ensuring that only suitable patients were placed in overflow beds, repatriating patients to preferred specialty departments, and supporting nursing staff in providing specialized care.

Avoiding Complex Outliers & Signaling Care Concerns
The placement of patients requiring complex care on overflow beds was actively avoided. The flowcharts that support decision-making detailed scenarios where outlier placements were unacceptable. In more ambiguous situations, the PFC evaluated and determined the most appropriate course of action. If, despite these precautions, a complex-care patient was placed on an overflow bed, the receiving department had the responsibility to signal concerns about maintaining safe care for that patient. These concerns could be raised during the BAC, where department representatives communicated these challenges, and the PFC incorporated this feedback in their patient placement decisions. For example, these patients could be given priority for repatriation to the preferred specialty department.

"Sometimes you have very sick internal patients who are in a surgical ward, that is a world of difference. Then they say in the morning: this patient is just not in the right place with us, we cannot provide the right care." -PFC

"You look at that per patient. If someone is really very sick and has complex problems, which we really can't do, then we say, we won't do that. It has to be less complex patients on the overflow bed." -Nurse 5

Proactive communication by the care team was essential to identifying such placements. One nurse noted:

Interviewer: "Who do you report to, this is too complex?"
"Usually the doctors report it too [] and the PFC too. Often it is intercepted before they even admit someone [as an outlier]."-Nurse 5

Timely Return to Specialty Department
A core principle adhered to in the patient flow management in the focal hospital was to prioritize the return of outliers to their designated specialty ward. Both the interview with the PFC and the documentation reflected this policy:

> *"In principle [I move them] back as soon as possible. Or if I see tomorrow he is discharged, then I will not move the patient again."-PFC*

> *"Outlying patients are transferred back to the department of the relevant specialty as soon as possible." -Bed Policy Document*

This policy was nuanced, as illustrated by the earlier quote from the PFC: in cases where a patient's discharge was imminent (e.g. within one to two days), transfer to the preferred specialty department may be deemed unnecessary and could be exposing the patient to additional risks (e.g. Goldberg et al. (2015)). Transfers also imposed logistical burdens on the nursing staff, requiring time to physically transfer the patient and to build familiarity with the patient's treatment and medical history. Therefore, during periods of high occupancy, prioritization decisions aimed to reduce transfers while optimizing bed allocation.

> *"You simply cannot avoid the reality that a patient sometimes ends up on an overflow bed. We always try to avoid that as much as possible and because it is not pleasant for anyone. And if it does happen, we simply ensure that the care is as good as possible and that the patients return to their own ward as quickly as possible." -Nurse 6*

Doctors Accommodated Nurses
Nurses reported a positive experience with medical staff who addressed their knowledge gaps associated with outlier care. Doctors actively supported nurses by providing clear instructions and step-by-step care plans. These efforts improved nurses' confidence in managing patients outside of their specialty:

> *"Well, a whole step-by-step plan, so I could really do something with that. Then I also felt confident: okay, I'll pay attention to this, if this changes, I'll call, if this changes, I'll call too. This is part of it and this is what I have to do now. So I found that very pleasant." -Nurse 3*

Nurses' Education
Nurses recognized their limited knowledge and experience with caring for outlying patients and have taken the initiative to develop peer education. For instance, one department nurse recalled recording specialized procedures, enabling colleagues to review these recordings:

> *"Eventually, we called the specialty department and asked if they would take a look for a moment. They did come eventually, a bit later, but they did help. We filmed that for the next time, with the patient's permission, so that we could watch it together and wouldn't have to go to the department [to] ask for it the next time, provided that those who were there felt competent to do it." -Nurse 1*

Moreover, nurses reported having a proactive approach to researching any unfamiliar illnesses and treatments through consulting protocols and the Internet.

Dedicated Doctor for Outliers
Nurses reported improved communication when dedicated doctors were assigned to oversee outlying patients. Chapter 7 identified challenges due to varying approaches to outlier care, but ensuring a clear and accessible responsible doctor could be an improvement:

> *"Well what they sometimes do, which is very nice, is that you just have a separate resident for overflow beds, so that you just have clarity and know who you can approach." -Nurse 5*

Clustering Outlier Patients
Clustering outlier patients of the same specialty within a single location, when feasible, reduced the inefficiencies in doctors' ward rounds. However, patients requiring single rooms may limit the applicability of this strategy.

”[I] try to cluster them as much as possible, but if we are talking about single rooms that is not feasible.”-PFC

Finding Patient Location
Finally, the patient administration system supported operational efficiency by tracking patient placements. This feature enabled doctors to quickly locate outlying patients of their specialty.

”In terms of communication, patient administration matters, that also works well. [] In that sense you can always see where the patient is.”-Medical Specialist 1

This subsection has outlined multiple strategies to maintain safety for outlying patients. These measures aimed to reduce risks for patients and enhance operational efficiency.

8.4. Reflection on Findings

The challenges outlined in the previous chapter directly influence patient safety, highlighting their impact on the safety of outliers. The placement of patients on overflow beds deviated from the standard organization of hospital care and required interdepartmental collaboration. The deviation from normal operations fostered risks related to mistakes in care, delays in care, and longer hospital stays.

One of the most pressing concerns is the knowledge gap among nurses regarding specialty-specific protocols and treatments. Nurses unfamiliar with an outlier’s condition must frequently consult protocols, delaying care and increasing the likelihood of minor errors. Additionally, a lack of familiarity with medications and procedures can lead to incorrect administration or postponed interventions as nurses look up information or seek guidance from specialty departments. While protocols were important safety mechanisms, they could also act as a barrier when misinterpreted or difficult to apply in practice.

The reduced presence of medical specialists on outliers’ wards further exacerbates these issues. Doctors reported conducting fewer observations for outliers compared to patients in their own departments, which reduced the opportunities for early detection of clinical deterioration and adaptations to the treatment plan. With ward rounds often occurring late in the day, after the doctor finished rounding on the specialty department, outliers were subject to delayed treatment plan development. This not only results in immediate delays in care but can escalate, for example, if essential diagnostic tests or procedures have to be postponed to the next day, leading to an increased length of hospital stay. Extended hospital stays can have a systemic impact, harboring the potential to exacerbate capacity constraints by making bed shortages become more persistent.

The most frequently mentioned challenge—nurses’ limited specialized knowledge—affected multiple aspects of patients’ safety. Nurses may struggle to recognize early signs of deterioration in outliers, leading to delayed escalation measures. Additionally, their ability to inform patients about their conditions and treatments was diminished, potentially impacting patient satisfaction. These findings pointed not only to a lapse in patient safety but also in patient-centered care, as outliers likely do not receive the same level of tailored attention as those in their designated specialty departments. This lapse in patient-centered care was previously observed in the Power Interest Grid in Section 6.3. While patient-centered care, as defined by Institute Of Medicine (2001), prioritizes alignment with patient needs, preferences, and values, these findings suggest that outliers may experience a diminished level of tailored attention, information, and safety compared to patients placed on the designated specialty ward.

Ultimately, these safety concerns highlighted a tension between operational efficiency and patient safety. While overflow bed placements allowed hospitals to maximize bed utilization and accommodate surges in demand, they also introduced risks that challenged the quality of care and patient safety. The findings suggested that striking a balance between these competing priorities is essential to ensure that patient safety remains uncompromised in efforts to optimize capacity management.

9 Discussion

This chapter reflects on the study's findings, situating them within the broader literature and highlighting their implications for both research and practice. It begins with a comparison to existing studies, emphasizing areas of alignment and novel contributions. The chapter then discusses the managerial and societal implications, followed by recommendations for the focal hospital and directions for future research. Finally, it reviews the researcher's positionality, considering how their role may have influenced data collection and interpretation.

9.1. Reflection on Results

This section critically reflects on the study's findings by comparing them to existing literature and highlighting novel contributions. The comparison to the literature situates the results within the broader body of research on overflow placements, hospital workflows, and patient safety. Additionally, this study contributed new insights, particularly in mapping the placement decision-making process, stakeholder roles and responsibilities, and the challenges of interdepartmental coordination.

9.1.1. Comparison to Existing Literature

This section situates the study's findings within the broader research on outlier placement and hospital operations. This section underscores how the findings contradict, align with, or expand upon prior research, offering a deeper understanding of decision-making, interdepartmental coordination, and patient safety in the context of overflow bed placements.

Theme 1: Overflow placement decision-making is a trade-off between operational efficiency and clinical suitability

To the best of the author's knowledge, no prior studies have provided a detailed description of how outlier placement decisions are made in hospital settings. The roles and responsibilities of staff in this process have not been comprehensively documented in the literature. Existing studies have recommended the appointment of a central coordinator to oversee patient flow and placement decisions (e.g. Lepage et al. (2009), Gomez-Rosado et al. (2019)), but there was little information on how this role is implemented in practice.

Theme 2: Overflow placement decisions create challenges for the hospital's interdepartmental collaboration

A major challenge in caring for outliers was the limited knowledge and experience of nursing staff regarding specialty care. This corresponded with findings from Goulding et al. (2012, 2015), who identified knowledge gaps as a complicating factor in outlier care. Additionally, prior studies have linked such deficits to risks such as missed signs of deterioration and ineffective patient communication (Ede et al., 2019; Goulding et al., 2012). This study built upon these insights by identifying time pressure as a direct consequence of limited specialty knowledge. Nurses reported spending additional time searching for protocols, reviewing unfamiliar medication, or consulting other departments. While previous research by Cheung et al. (2020) and Cheng et al. (2022) highlighted time burdens on staff related

to outlier care, they attributed these burdens primarily to logistical inefficiencies, such as extra phone calls and travel time between departments, rather than to knowledge gaps as a cause of delays.

Research by (Serafini et al., 2015) has previously suggested that poorer outcomes for medical patients placed on surgical wards were linked to nursing staff's limited knowledge as well, especially lack of familiarity with emergency procedures specific to the patient's specialty. Findings from this research aligned with this perspective. Staff at the focal hospital highlighted the reliance on protocols within surgical specialties, whereas medical specialties tended to follow a more experience-based approach. This difference made it more difficult for surgical nurses to care for medical outliers, as they could not depend on structured protocols.

Unlike prior studies emphasizing inadequate ward environments due to missing equipment and medication (Ede et al., 2019), interviewees in this study did not identify the equipment as a primary concern. A possible explanation is that the focal hospital's structured flowchart-based decision-making process preemptively excluded patients requiring specialized equipment from being placed in an overflow bed. Future research could explore whether implementing such patient selection criteria in other hospitals mitigates this issue.

Similar to findings by Lepage et al. (2009), this study identified difficulty in reaching doctors responsible for outliers as a notable challenge for nursing staff. A further complication, not extensively covered in previous research, was the absence of preexisting professional relationships between staff from different departments. Only Cheung et al. (2020) noted that limited face-to-face interactions negatively impacted interdepartmental communication, supporting the findings of this study.

Additionally, this research found that patients on overflow beds required extra time from doctors on ward rounds, echoing findings by Creamer et al. (2010). The added time for visiting patients in other locations in the hospital was mentioned by two medical specialists involved in this study. However, given the small sample size of medical specialists interviewed, further research would be needed to determine the extent of this challenge.

Theme 3: Interdepartmental collaboration challenges impact patient safety

A major concern identified in this study was the risk of care delays for outlying patients, particularly due to late ward rounds and the nursing staff's unfamiliarity with specialty-specific procedures. This aligns with Ede et al. (2019), who also identified care delays as a risk factor in outlier care.

Extended hospital stays were identified as a consequence of delayed care. Lepage et al. (2009) found that prolonged hospitalization often resulted from delays in care provision to outlying patients, aligning with the findings reported in this research. Alameda and Suárez (2009) suggested that delays in care often stemmed from inefficient resource management for outlying patients. They provided an example where late ward rounds resulted in postponed diagnostic tests and medical or administrative decisions, sometimes extending a patient's hospitalization by an additional day. This precisely reflects the concerns raised by staff in this study, as seen in the statement by Nurse 2 in Subsection 8.1.3. As discussed in Chapter 2, the relationship between outlier placement and length of stay has been extensively investigated in quantitative research. However, other risks—such as delays in care and mistakes in treatment—have been less extensively explored.

Mistakes in care were also associated with outlier placement. Staff in this study reported that errors resulted from nurses' unfamiliarity with specialty-specific protocols, medications, and procedures. This aligns with concerns expressed by Ede et al. (2019). The recognition of clinical deterioration in outliers was another concern. Santamaria et al. (2014) found that outlying patients experienced more emergency calls and worse outcomes, attributing these issues to delayed recognition of deterioration. They suggested that this delay stemmed from a lack of nursing expertise in managing conditions outside their specialty. This concern was echoed by staff in this study, who emphasized that nurses' limited familiarity with outliers' medical conditions could lead to missed early warning signs.

Additionally, challenges in effectively informing outlying patients about their condition were another issue identified in both this research and prior studies. Lepage et al. (2009) reported that staff struggled to communicate with outlying patients due to the lack of continuity in care, a difficulty also mentioned by interviewees in this study.

The quantitative studies in Chapter 2 commonly covered three measures of care quality: LOS, mortality, and readmission rates. However, concerns about mortality and readmission rates were not prominently mentioned in interviews. Mortality was occasionally referenced, but interviewees dismissed a direct causal link, stating that early interventions typically prevented escalation to a critical condition.

Similarly, readmission rates were not discussed, pointing to a difference in the perception of quality risks by staff from those captured by quantitative indicators.

One key assumption in the literature, highlighted by Goulding et al. (2012), is that outliers may be perceived as less urgent cases, potentially influencing the quality of care they receive. This assumption did not emerge in the interviews conducted in this study. Given the hospital's existing strategies to avoid placing complex or unstable patients in overflow beds, outliers in the focal hospital may have lower overall acuity than those described in Goulding et al. (2012). Further research on patient acuity and staff perceptions of outliers across different hospital settings could provide more clarity on this issue.

9.1.2. Novel Contributions of This Research

In addition to confirming and expanding upon existing literature, this study contributes to the interdisciplinary fields of healthcare management, hospital operations, and clinical decision-making. It provided insights relevant to both management sciences—by detailing decision-making and stakeholder roles—and healthcare research—by exploring the impact of hospital organization and challenges on patient care quality. The findings bridge these disciplines by emphasizing the intersection between hospital capacity management, interdepartmental coordination, and patient safety.

This research introduced several novel insights that—to the author's knowledge—have not been extensively reported before:

- A schematic overview and detailed analysis of the outlier placement decision-making, including the roles and responsibilities of various stakeholders and tools—especially flowcharts—used. Particularly, this included the identification of the Patient Flow Coordinator (PFC) as the central decision-maker, which has not been extensively documented in prior research.
- A conceptual framework proposing how capacity constraints drive placement decisions, which in turn created interdepartmental challenges and impacted patient safety. This framework provided an understanding of how operational pressures relate to clinical challenges.
- Identification of organizational barriers in managing care for outliers, including differences between medical and surgical departments, consequences of nurses' limited knowledge and experience, and difficulties in interdepartmental collaboration. These findings expanded on previous research that highlighted
- Empirical evidence on the measures implemented to maintain safety for outlying patients. While some literature has suggested strategies such as assigning a dedicated doctor for outliers, this study examined the measures currently applied at the focal hospital and provided a comprehensive overview of those.

Beyond these contributions, this study highlighted a critical theme of shared responsibility in hospital capacity management. While most staff expressed a strong preference for avoiding overflow beds, their actions did not always align with this goal. For instance, departments often failed to proactively update discharge dates in the patient administration system, requiring the PFC to intervene. Similarly, while departments had the authority to move patients from single to multi-patient rooms when the indication for isolation had expired, this process was frequently delayed until prompted by the PFC. These findings suggest that efforts to optimize bed capacity remain only with the PFC, pointing to a need to improve the hospital-wide culture of shared responsibility in patient flow management.

This theme also helped explain the reluctance of specialty wards to admit outliers. Challenges in the provision of care—such as time pressure, limited familiarity with specialty-specific procedures, and nurses' feelings of incompetence—likely contributed to the resistance to admitting outlying patients. Staff members tended to assess these placements from their own perspective, rather than considering broader hospital-wide constraints. However, refusing an outlier may not eliminate the risk to patient safety but rather shift it elsewhere, either to another, potentially even less suitable specialty department or to an external hospital.

By promoting a better understanding of the systemic effects of placement decisions, this study contributed to improving hospital-wide coordination of overflow placements. Future research and policy interventions should focus on improving interdepartmental collaboration and fostering a culture where patient flow is viewed as a shared institutional responsibility rather than a localized departmental concern.

9.1.3. Societal and Managerial Implications

The practice of placing patients in overflow beds served as a short-term solution to accommodate surges in demand for care. While this ensured that all admitted patients received care, it also introduced compromises in patient-centered care, as hospital-wide efficiency was prioritized over individual patient needs. The Institute of Medicine defined patient-centered care as respectful of and responsive to individual patient preferences, needs, and values (Institute Of Medicine, 2001). However, the results of this study suggested that outlier placement inherently challenges this principle, as patients may experience reduced interaction with their primary specialty team, delays in treatment, and communication gaps.

This tension was also reflected in the Power-Interest Grid (Figure 6.2, Section 6.3), which illustrated that patients held the lowest level of power and interest in placement decisions. Unlike the PFC or medical specialists, the patients had no direct influence over where they were admitted. Their limited agency highlighted a situation where operational constraints dictated placement rather than patient preferences or clinical suitability. While hospital policies emphasized patient-centered care, overflow placement represented an instance where operational priorities took precedence over patient autonomy.

From a managerial perspective, these findings have implications for resource allocation, workforce flexibility, and interdepartmental coordination. The study suggested that current hospital resources, such as staff expertise, could be leveraged more dynamically to minimize risks for outliers. Potential strategies include enhancing interdepartmental collaboration and providing education for nurses on managing outliers. These and other strategies will be discussed in Subsection 9.4.2.

These insights contributed to a broader healthcare management discussion on how hospitals handle capacity constraints, patient flow, and outlier safety. While this research focused on a single hospital, the challenges identified—such as reluctance to admit outliers, fragmented responsibility for patient flow management, and interdepartmental barriers—are likely applicable to other healthcare institutions. Other hospitals can use these findings to evaluate their policies, particularly regarding the role of decision-makers such as the PFC, their patient flow management, and the impact of overflow placement on patient safety.

9.2. Limitations

This study has several methodological and interpretive limitations, which should be considered when evaluating the findings. While efforts were made to maximize data richness and ensure validity, certain constraints related to sampling, data collection, and interpretation may have influenced these results. These limitations are discussed below.

9.2.1. Methodological Limitations

The study employed purposive sampling, ensuring that interviewees had relevant experience with overflow patient placement and care. While this approach enhanced the data richness, it may have introduced selection bias, as stakeholders were identified through co-design, observations, and recommendations from other participants. Upon reflection, after finishing the interviews, some relevant stakeholders were still missing from the sample, such as the residents or outlying patients. Residents were not available for interviews, despite several attempts at contact. This was solved by asking the medical specialists about the resident's role, but to include their true perspectives, additional interviews with residents would be required. The unresponsiveness of the residents in itself may also be a form of selection bias: perhaps they faced too much time pressure or were otherwise not inclined to partake in this research. Similarly, including patient perspectives was recommended by prior research (Hassen et al., 2018) and interview participants. However, permission to interview patients necessitated additional ethical clearance and was not part of the scope of this research.

Data saturation was not reached among all stakeholder groups. While saturation was achieved for nurses, as the final interviews did not yield new insights, the same could not be confirmed for other professions. The study included 12 interviews, within the target range of 10-15 participants, as determined during the co-design phase. Additionally, a validation meeting confirmed that all targeted departments were represented, though some had greater participation than others. One notable gap in stakeholder representation, next to the residents and patients discussed before, was the absence of surgical medical specialists. To mitigate this limitation, the study incorporated nurses caring for

surgical outliers, as they provided valuable insights into care challenges for surgical outliers. However, future research should include direct input from surgical medical specialists. The absence of full data saturation suggests that certain perspectives, challenges, or solutions may have been under-reported. However, sufficient data was collected to gather meaningful conclusions.

Furthermore, sampling was based on occurrence rather than safety risk distribution. This approach was justified by the fact that safety risks associated with outliers were not formally documented by the hospital, and prior literature did not specify which departments would be most affected. Since overflow beds occurred infrequently during the study period, it was crucial to target staff members with firsthand experience to ensure the collection of meaningful data. However, this focus on occurrence rather than risk level may have influenced the sample composition. A more systematic inclusion of all departments where outliers could potentially be placed, even those with rare occurrences, may have yielded a more comprehensive picture of care disparities across departments.

The observational period also posed limitations. Observations were conducted on weekdays during standard working hours, meaning that the decision-making processes during weekend, evening, and night shifts were not directly observed. Interviewees frequently mentioned that the occurrence of outliers was more common during these shifts, suggesting that patient placement dynamics and challenges may differ outside of regular hours. While efforts were made to mitigate this limitation by informal interviews with evening and night PFCs, these accounts could not be verified through direct observation. Future studies could use observations during these shifts to investigate how resource availability and decision-making differ across shifts.

9.2.2. Limitations in Findings and Data Interpretation

The co-designed interview protocol originally included multiple questions on decision-support tools, aiming to explore the role of digital systems in outlier placement. However, during initial interviews, it became evident that few tools were actively used in decision-making, apart from the flowcharts and digital patient administration system. When asked about decision-support technology, many participants expressed uncertainty or difficulty answering the questions, suggesting that digital tools played a minimal role in guiding overflow placements. As a result, the study's original intent to examine technological influences on decision-making had to be de-prioritized, and a greater focus was placed on organizational processes. Though presented here as a limitation in the interview design, this could also be seen as a finding that suggests that decision-making on overflow placements remained highly manual and reliant on staff expertise.

Further, the infrequent occurrence of overflow beds during the study period limited the ability to observe real-time decision-making. The research took place between October and November 2024, months typically associated with high hospital demand. However, low patient inflow during this period meant that outlier placements were less frequent than anticipated. To compensate, additional observations were conducted in December and January, though these remained sporadic. The limited number of outlier cases observed may have led to under-reporting of certain challenges.

Additionally, the hypothetical nature of some interview responses may have influenced the findings. In cases where participants had limited recent experience with outliers, they tended to discuss hypothetical situations, rather than reporting first-hand experience. To verify whether the answers were hypothetical, clarifying questions such as *"Have you personally experienced this?"* were posed. In some cases, the hypothetical nature of the answer may have been missed by the researcher. Though it was useful to know what the interviewee indicated they would do in a situation involving outlying patients, it could also lead to the interviewee giving answers they perceived as desirable, instead of describing the reality or an experience. It was also possible that an interviewee could not report on any issues in the decision-making on outlier placements, because they did not have sufficient experience with it. This could lead to the under-reporting of potential challenges and solutions. When possible, the discussion of hypothetical situations was avoided to maintain results based on experience.

Another limitation concerned the differences in stakeholder perspectives. The majority of the challenges related to the decision-making were reported by the PFC, whereas other staff (e.g. nurses, department managers, and medical specialists) predominantly discussed challenges in outlier care rather than decision-making itself. This finding reflected the fact that the PFC held primary responsibility for patient placements, whereas other staff were primarily concerned with patient care post-placement. Consequently, nurses, department managers, and medical specialists were not involved in the decision-making, which impeded them from identifying challenges pertaining to it. As a result,

they were likely to answer based on the challenges they did experience, namely those in providing care for outliers after their placement. Eventually, these issues in care provision for outliers were more extensively discussed than the decision-making challenges. As a consequence of this limitation, challenges in placement decision-making may be under-reported. Additional interviews with other PFCs, ED secretaries, floor managers, and AMU secretaries could provide a more nuanced understanding of the placement process.

Also, the differences between medical and surgical departments were frequently mentioned but not fully explained by the interviewees. While the research identified protocol-driven versus experience-based approaches as a key distinction (Subsection 7.1.1), interviewees struggled to articulate why this distinction was perceived as so substantial. This limitation may stem from insufficient follow-up questions by the researcher or implicit assumptions held by staff that were not fully verbalized.

Finally, the bed capacity plan, which was expected to be an important strategy for avoiding outliers, was rarely mentioned by staff. This could indicate low awareness among frontline personnel, or it may suggest that the policy was so ingrained in hospital practice that staff did not think to mention it. More direct probing on this topic could have clarified whether the bed capacity plan actively influences daily decision-making or if it is primarily a high-level administrative tool.

Although these limitations influenced the research, it managed to provide valuable insights in terms of the current decision-making process, challenges in decision-making and outlying patient care, and consideration of patient safety.

9.3. Answering the Research Questions

This study set out to investigate the decision-making process for placing patients on overflow beds, the challenges associated with this process, and how patient safety was influenced. These research questions were explored through extensive descriptions of the daily hospital operations and decision-making, stakeholders, and challenges encountered in the management of overflow placements. Through qualitative analysis, three core themes emerged that form the basis for answering the research questions: (1) Overflow placement decision-making is a trade-off between operational efficiency and clinical suitability, (2) Overflow placement decisions create challenges for the hospital's interdepartmental collaboration, and (3) Interdepartmental collaboration challenges impact patient safety.

While these themes provide rich insights into hospital operations, it is important to note that only specific elements of the decision-making process were illuminated. As a result, the research questions—which focus on decision-making—may not have been fully answered. In particular, the broad nature of decision-making was not considered in its entirety, as the focus was primarily on stakeholders, responsibilities, and tools.

9.3.1. What is the daily decision-making process for assigning patients to overflow beds at the hospital of focus?

The decision-making process was found to be highly structured yet constrained by interdepartmental negotiations. The PFC played a central role in determining patient placements, balancing a trade-off between operational efficiency—ensuring all patients have a bed—and clinical suitability—assigning patients to the most appropriate specialty ward.

Essential steps in the decision-making included:

- **Assessing capacity:** The PFC consulted patient information, bed availability, and specialty compatibility (established in the flowcharts) to determine possible placements.
- **Following established guidelines:** Flowcharts dictated acceptable and unacceptable placements based on similarity between specialties and patient care requirements, such as equipment.
- **Negotiating placements:** The PFC coordinated with receiving wards, who sometimes resisted outlier admissions due to concerns about staff expertise and workload.
- **Reassessing and repatriating:** Outliers were prioritized for returning to their specialty ward when feasible. Discussions during the BAC could signal concerns for patients that required prioritization.

While this research captured key aspects of daily decision-making, it did not provide an account of all influencing factors. Notably, weekend, night, and holiday shifts—when outlier placements were reportedly more common—operated under different staffing structures, which could affect the decision-making process.

9.3.2. What challenges do stakeholders face during the decision-making process on overflow bed placements?

The hospital's departmental structure influenced the challenges faced by stakeholders in making overflow placement decisions. The most significant challenges identified in the research were:

- **Interdepartmental barriers:** Differences in approaches to care, especially between medical and surgical wards, and a lack of shared responsibility for patient flow made negotiating placements difficult.
- **Knowledge and experience gaps:** Nurses expressed time pressure and feeling insecure or incompetent in caring for outliers due to limited specialty-specific experience.
- **Operational inefficiencies:** Late ward rounds, fewer patient observations by doctors, and difficulties in contact between doctors and nurses contributed to delays.
- **Reluctance to admit outliers:** These challenges contributed to some departments resisting admitting overflow placements, reflecting again a lack of shared responsibility for hospital-wide capacity management.

These findings suggest that, while patient flow management aimed to balance efficiency and quality, stakeholder priorities and departmental separation complicated this process.

9.3.3. How is patient safety influenced by the decision-making process for overflow bed placements?

The study identified three primary risks associated with overflow placements:

1. **Delays in care:** Late ward rounds, fewer observations, and nurses' limited specialty knowledge could lead to delayed diagnostics and treatment.
2. **Increased length of stay:** Due to delayed care, outliers could remain hospitalized longer than necessary.
3. **Mistakes in care:** Nurses caring for outliers faced knowledge and experience gaps, which sometimes resulted in errors in treatment, medication administration, or protocol adherence.

These risks were consistent with prior literature and underscore a tension between operational efficiency and patient safety or patient-centered care. Consideration for patient's needs and preferences was challenged in overflow placement scenarios, where organizational efficiency took priority over individualized care. This was also reflected in the Power-Interest Grid (Section 6.3), where patients had low power and low interest in the placement decision-making process.

9.3.4. How are patient safety challenges addressed within the daily decision-making process?

Several strategies were identified to mitigate patient safety risks associated with overflow placements:

- **Flowcharts and exclusion criteria:** Decision-making was guided by structured flowcharts that helped avoid placing high-risk patients in alternative wards.
- **Prioritization for repatriation:** Outliers were prioritized for returning to their specialty department when space became available—though depending on demand, inflow from the ED or AMU was sometimes prioritized—ensuring that patients received care in the preferred ward whenever possible.

- **Peer support and nurse education:** Nurses caring for outliers frequently consulted colleagues in their department with relevant specialty knowledge or contacted colleagues from other specialty departments to address knowledge gaps. Some departments also implemented peer education strategies, such as recording procedures for future reference.

- **Signaling quality concerns in the Bed Availability Consultation:** Departments that struggled to provide adequate care for outliers could raise concerns about the quality of care during the BAC meetings. This facilitated adjustments to patient placement decisions and helped the PFC prioritize repatriation when necessary.

- **Doctors accommodating nurses with detailed treatment plans:** Medical specialists sometimes provided structured, step-by-step care plans for outliers, ensuring that nurses felt more confident in delivering treatment. This helped mitigate risks associated with knowledge gaps and unfamiliar processes.

While these measures were designed to address patient safety concerns, their implementation varied across departments. Some relied more heavily on informal practices, such as peer support, rather than structured institutional policies. Further standardization of these measures could enhance consistency and effectiveness in ensuring outlier safety.

This study provided an examination of the daily decision-making process for overflow bed placements, the challenges faced by stakeholders, and the implications for patient safety. The findings highlighted that placement decisions required balancing operational efficiency with clinical suitability, often constrained by hospital structure and interdepartmental coordination. Additionally, it identified measures in place to mitigate risks for outliers. Together, these insights offer a nuanced understanding of hospital capacity management.

9.4. Implications for the Future

This study has provided insight into the decision-making process and challenges surrounding the placement and care of outlying patients. Building on these findings, this section outlines recommendations for both future research and hospital practice.

9.4.1. Recommendations for Further Research

This study provided a foundation for understanding how overflow bed placement decisions were made, the challenges they created, and their impact on patient safety. Several areas could be further explored to build on these findings.

One significant avenue for future research involves testing the relationship between the identified themes—decision-making as a trade-off, interdepartmental challenges, and patient safety risks. These themes suggest a mechanism through which overflow bed placement affects hospital operations and care quality. Future research could assess this mechanism empirically and identify potential points of intervention to improve the process.

The role of the medical specialist in outlier placement is another area that requires further investigation. Currently, medical specialists are not formally involved in placement decisions, despite being ultimately responsible for patient care. The balance between clinical suitability and operational efficiency is reflected in the differing perspectives of the PFC, who prioritizes patient flow, and the medical specialist, who may advocate for patient-centered care. Future research could explore whether medical specialists should have a more formalized role in outlier placement decisions and how their involvement might influence patient outcomes.

Additionally, this study primarily focused on weekday decision-making, yet outliers were most frequently reported during night, weekend, and holiday shifts when hospital resources are more constrained. Similarly, Liu et al. (2014) found that 50% of the outliers in their study were admitted on the weekend. Due to fewer medical personnel being available for care and discharge planning during weekends, the number of outlying patients increased. Research into how decision-making responsibilities shift across different times of day—–including the role of night shift coordinators and on-call specialists—–could provide valuable insights into how hospital operations differ under capacity stress.

Understanding the patient experience remains a major gap in the literature. As recommended by Hassen et al. (2018) and several interviewees (see Section 6.3), future research should examine

whether patients are consistently informed about their overflow placement, whether they perceive differences in care quality, and whether outlying impacts their sense of safety and well-being.

This study highlighted that overflow beds were frequently used due to capacity limitations, particularly a shortage of single rooms. Future research could use hospital admission data to assess whether bed shortages, patient surges, or other operational constraints are the primary drivers of outlier placement. This could support targeted strategies to reduce overflow placement, particularly during weekends and night shifts, when repatriation delays may be more pronounced.

The findings suggest departments handle outliers differently, particularly in how responsibilities for rounding on outlying patients are assigned. However, this study did not have the scope to fully investigate whether some departmental approaches are more effective than others. Future research could identify best practices and explore whether standardizing responsibilities across departments could improve patient care and reduce inefficiencies.

Although this study provided qualitative evidence of risks associated with outlier placement, quantitative research is needed to determine which specialty-ward combinations present the highest risks. It was reported by interviewees that some combinations of the outlying patient's specialty and alternative ward were perceived as riskier than others, especially the cross-over between medical and surgical departments. However, this research did not aim to quantify which combinations of outlier specialty and their alternative department were riskier than others. Using quantitative research, it may be possible to determine which combinations of outlier specialties and alternative departments impact patient outcomes more drastically than others. This approach may be extended by considering the patient's diagnosis, which is more specific than their medical specialty, in combination with the alternative department to determine which diagnoses—falling within the same specialty—would be better suited for which specialty ward. An important aspect to include in this research would be defining how the main treating specialty of a patient is established, as this decision determines which department is deemed the preferred specialty department.

Additionally, while increased LOS has been well-documented in prior research, other risks—such as delays in care, increased emergency calls, and diagnostic or medication errors—have not been extensively studied. Research into how specific placement decisions influence these risks could provide stronger evidence for refining outlier placement policies.

This research could also include the severity of mistakes in care as a risk. Though regularly named, nurses and medical specialists stressed that these mistakes were minor and not dangerous for the patient. Further research could systemically categorize these errors to promote understanding of the severity of these mistakes and how they affect patient safety. Stylianou et al. (2017) also mentioned that further research into mistakes during diagnosis or medication prescription is necessary because it contributes to worse outcomes and longer LOS for outlying patients.

For other hospitals facing similar capacity constraints, it may be helpful to learn from the focal hospital's strategies. The focal hospital's ICM department and management have made extensive adjustments to the hospital's capacity management approach. Future research could investigate these measures and the potential causality between improved quality of care, fewer outliers, or other performance indicators. If the relationship between measures and improvements can be supported by scientific research, this may present a helpful learning case for other hospitals.

Finally, future research could explore the role of digital tools in optimizing outlier placements. Predictive analysis for bed management is an emerging field. For example, Cheng et al. (2022) tested the functioning of a bed calculator prediction tool that used medical records to predict the need for unoccupied staffed hospital beds. In some cases, they found that the calculator could more accurately predict the need for beds than the responsible staff. However, the improved prediction of the need for beds did not result in a decrease in patient ED boarding time. Taylor et al. (2018) examined the use of analytical methods to support operational decision-making in the ED. They suggest their model can be used to argue policy changes. However, little was said about how the model supports decision-making and which decisions it involves. These examples show that the literature about using data-driven tools is developing, but these tools have yet to be integrated and tested in the daily decision-making process. Exploring how data-driven models could support PFCs and other stakeholders in making more informed, safety-focused placement decisions could start bridging the gap between operational efficiency and patient-centered care.

In summary, future research should focus on validating the relationships between the identified themes, refining stakeholder roles, quantifying the identified risks, and leveraging technological in-

novations. Addressing these gaps could inform policy improvements and enhance patient safety in hospitals facing capacity constraints.

9.4.2. Recommendations for the Focal Hospital

While many of the identified challenges require further research, this study suggests several recommendations aimed at improving interdepartmental collaboration, shared responsibility, and outlier patient care.

1. **Strengthen Interdepartmental Collaboration Through Structured Relationship Building**
   One of the most persistent challenges in outlier management was interdepartmental collaboration and respective limited professional relationships across departments, which contributed to communication barriers, inefficiencies, and reluctance to admit outliers. Research suggests that intentional relationship-building with regular face-to-face interactions can improve interdepartmental cooperation (King et al., 2017). The hospital can consider introducing:

   - **Interdepartmental case discussions:** Regular meetings where recent outlier cases are reviewed collaboratively to foster mutual understanding and establish working relationships.
   - **Shadowing initiatives:** Short-term exchanges where medical staff from different specialties gain first-hand experience with another department's workflows.
   - **Dedicated interdepartmental liaison roles:** Assigning specific individuals for outlier care, responsible for maintaining communication and collaboration between departments. Currently, specialty department nurses may decline requests for assistance with outlying patients due to workload constraints, leading to inconsistent support. Assigning a dedicated nurse within each specialty department to provide guidance for outlier care could improve knowledge-sharing and streamline assistance. This nurse would serve as a point of contact for receiving departments, ensuring that critical expertise is available when needed.

2. **Foster Shared Responsibility for Outlier Management**
   The study found that departments often resisted admitting outliers, perceiving it as a problem imposed upon them rather than a shared hospital-level challenge. However, refusing outliers commonly resulted in shifting the problem elsewhere, rather than resolving it. The hospital could implement strategies to increase awareness of how resistance impacts patient flow and system-wide capacity:

   - **Education on patient flow dynamics:** Training sessions focused on specialty department secretaries and nurses with managerial responsibilities explaining how refusing outliers can lead to system-wide delays and its impact on patient care.
   - **Recognition for departments that facilitate overflow bed placements:** Acknowledging and rewarding departments that demonstrate flexibility in accepting outliers and take initiative to develop measures to maintain high-quality care (e.g. the example of peer education).

3. **Formalize the Role of the Bed Availability Consultation in Outlier Placement Decisions**
   The Bed Availability Consultation (BAC) serves as a crucial platform for discussing signaling quality concerns and discussing repatriation priorities. However, its role—both in outlier care and other responsibilities beyond that—remains informal and undocumented. To enhance the BAC's effectiveness, the hospital should consider:

   - **Formalize its structure:** Develop clear documentation on meeting objectives, mandate, and required participants to ensure consistency.
   - **Integrate data-driven decision-making tools:** Continue the integration of the hospital's digital dashboard to improve the real-time tracking of bed availability and stress the importance of providing accurate discharge dates among those present.
   - **Establish a standardized process for escalating quality concerns:** Ensure that departments know how and when to raise patient safety concerns. Ensure that they are systematically documented and can be addressed in future placement decision tools.

4. **Improve Knowledge Sharing Through Structured Peer Support**
   Nurses frequently expressed concerns about a lack of knowledge regarding specialty-specific care, which contributed to time pressure, uncertainty, and potential errors. While peer support was already an informal practice, it could be expanded through:
   - **A outlier point-of-contact program:** Assigning experienced nurses within each department as a point of contact for outlier-related questions from nurses caring for patients on overflow beds.
   - **A digital knowledge-sharing platform:** Developing a centralized database with treatment protocols and video demonstrations of specialized care or procedures designed for nurses unfamiliar with the patient's condition.
   - **Cross-departmental training sessions:** Workshops where departments share insights on managing common outlier scenarios. This could also contribute to Recommendation 1, as it would provide an opportunity for face-to-face professional interaction.
   - **Encourage intra- and interdepartmental knowledge-sharing for specialty care:** Nurses caring for outliers frequently rely on specialty ward nurses for guidance. However, knowledge gaps could often be addressed within the existing team if a nurse has prior experience with the patient's specialty. Encouraging staff exchange and internal knowledge-sharing sessions could improve care quality and reduce dependence on other departments.
5. **Strengthen Doctor-Nurse Collaboration for Outlier Care**
   Lack of familiarity between doctors and nurses could delay care. Nurses reported fear of mistakes and missing deterioration signs due to knowledge gaps. This research found nurses benefited when doctors provided detailed treatment plans with clear guidance and specialty-specific attention points. Encouraging more structured treatment plans for outliers could enhance collaboration. Critical attention points for specific diagnoses could also be integrated into the suggested knowledge-sharing database.

These recommendations focused on improving interdepartmental collaboration, fostering shared responsibility, and strengthening knowledge sharing. Implementing these strategies could help the hospital reduce resistance to outlier placements and improve patient safety.

9.5. Reflection on Researcher's Positionality

In qualitative research, the interviewer serves as a primary instrument for data collection, inherently influencing the data gathered (McGrath et al., 2018). As an external researcher in a hospital setting, the researcher's position impacted both data collection and interpretation in multiple ways. Limited formal training in interviewing may have led to unintentional prompting, shaping how participants framed their responses, and insufficient posing of follow-up questions, hindering the gaining of in-depth knowledge. While unfamiliarity with hospital processes encouraged interviewees to provide detailed explanations, it may have also resulted in oversimplifications of complex topics or responses tailored to perceived expectations. Additionally, significant time was spent on improving understanding of medical workflows, terminology, and institutional culture, and lack thereof introduced a potential risk of misinterpretation.

At the same time, the researcher's external position may have offered advantages. Without hierarchical ties to the hospital, they may have been perceived as a neutral party, fostering more openness in responses. However, this outsider status could also have led some participants to be more guarded in their critiques of hospital processes. During the analysis phase, the subjective nature of qualitative coding meant that the researcher's interpretations played a prominent role in assigning codes and identifying themes, potentially prioritizing certain themes over others.

To mitigate potential biases stemming from the researcher's positionality, several strategies were implemented. Cross-referencing documentation with interview findings helped validate the results, while discussions with hospital advisors ensured accurate interpretations of internal documents. The co-design of research questions with hospital advisors helped maintain relevance and alignment with the hospital's priorities. Additionally, a validation meeting was conducted to refine interpretations and confirm that identified themes accurately reflected hospital operations. These measures strengthened the credibility of the findings despite the potential limitations introduced by the researcher's positionality.

10

Conclusion

This chapter presents the key insights from the study, reflecting on how overflow bed placements are managed and their implications for hospital operations and patient safety. It revisits the research questions and the interplay between decision-making, interdepartmental challenges, and patient care outcomes. Additionally, it reiterates the study's contributions, limitations, and avenues for future research.

10.1. Addressing the Research Aim and Questions

This study explored the decision-making process for overflow bed placement and its impact on patient safety. Specifically, it aimed to understand how patient safety challenges were addressed within daily placement decisions, the difficulties encountered by stakeholders, and the risks posed to patients.

The findings demonstrated that outlier placement was driven by a trade-off between operational efficiency and clinical suitability. The hospital's departmental structure significantly influenced both the decision-making process and the interdepartmental collaboration. Moreover, the consequences of outlier placement—such as delayed care, mistakes in care, and increased length of stay—highlighted the risks associated with patient placement on overflow beds.

10.2. Key Findings

This study produced several key insights, including on the decision-making process, interdepartmental, challenges, and patient safety risks.

Firstly, overflow placement decision-making was established as a trade-off between operational efficiency and clinical suitability. The Patient Flow Coordinator (PFC) was found to have a central role, balancing efficiency and clinical suitability, while relying on tools such as flowcharts to guide decisions. However, placement decisions often faced resistance from receiving wards, stemming from a lack of shared responsibility for patient flow.

Secondly, the hospital's departmental structure hindered collaboration, with differences in medical and surgical care approaches contributing to difficulties in managing care for outliers. Additionally, nurses' knowledge gaps in other specialty care created time pressure, risks for patients, and reliance on specialty wards for information or assistance.

Thirdly, challenges related to the hospital's departmental structure contributed to risks for outlying patients, such as delays in care, mistakes in care, and increased length of stay. Measures such as signaling quality of care concerns, timely repatriation, and exclusion criteria in flow charts were implemented to mitigate these risks but did not eliminate them.

10.3. Contributions to Literature and Practice

This study contributed to the fields of healthcare management and patient safety by providing a detailed overview of overflow bed placement. While previous research has identified patient outcomes and risks associated with overflow placement, this study systematically mapped the decision-making process, stakeholder roles, and challenges faced within this decision-making.

Additionally, the findings highlight the importance of shared responsibility in patient placement, demonstrating that reluctance to admit outliers may stem from concerns about patient safety and workload. The study also stressed the need for interdepartmental collaboration to ensure optimal patient care.

10.4. Managerial and Policy Implications

The results have several implications for hospital management and policy. The recommendations focused on improving interdepartmental collaboration, enhancing shared responsibility, and formalizing the daily decision-making process.

Encouraging structured interactions between department staff may foster professional relationships and enhance collaboration and communication. Initiatives such as joint meetings and cross-departmental training could facilitate moments for face-to-face interaction, which is key for developing interdepartmental collaboration (King et al., 2017).

Resistance to outlier placement possibly stemmed from patient safety concerns and time constraints, rather than outright refusal. Addressing these concerns requires increased awareness about how refusal, and outlier placement decisions in general, affect hospital-wide patient flow. Education on how refusal can lead to adverse effects could help align staff perspectives.

The Bed Availability Consultation (BAC) served as a crucial coordination meeting for outlier repatriation but lacks formal recognition and documentation. Establishing its role, participant, and mandate would strengthen its function in managing capacity constraints and patient safety.

10.5. Future Research Directions

While this study provided a comprehensive overview of overflow bed placement, further research is needed to validate and expand upon its findings. The themes identified——decision-making as a trade-off between operational efficiency and clinical suitability, interdepartmental challenges in outlier placement, and the impact of these challenges on patient safety, see also Chapter 5——suggested a mechanism through which outlier placement affected hospital operations and patient care. Future research could focus on:

- Empirical validation of the relationship between these themes, testing whether the identified mechanism holds across different hospitals and healthcare systems.
- Assessing the impact of specific interventions within this framework, such as structured communication tools or interdepartmental training programs, to determine where improvements could be most effective.

Another interesting avenue for further research could be aimed at understanding patient perspectives on outlier placement, including their awareness of their placement and any perceived differences in care quality or safety.

10.6. Final Reflection

This research illuminated the complexities of hospital capacity management, demonstrating that overflow bed placement was not merely a logistical issue but a multi-faceted challenge involving clinical, operational, and relational factors. Addressing these challenges requires ensuring that both staff collaboration and patient-centered care remain at the forefront of hospital management strategies.

By examining the decision-making process, interdepartmental challenges, and patient safety concerns associated with outlier placement, this study contributed to a deeper understanding of hospital operations. While limitations existed, the findings provided a strong foundation for future improvements in patient flow, care coordination, and overall hospital efficiency.

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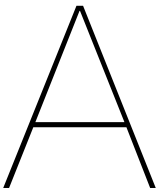

Articles Included in Literature Review

The articles included in the tables in this appendix were included in Chapter 2. Table A.1 lists each paper's (first) author, country of study, purpose, research design, population, and comprehensive main findings. Table A.2 lists the same articles, what their findings were in terms of the most commonly reported outcomes—LOS, Readmission, and Mortality—, and whether they were included through the direct literature search or by means of the bibliographies of other articles, snowballing. Though Table A.2 could be used to compare the outcomes of each of these studies, direct comparison of these measures should be avoided. The differences in research approaches and hospital practices lead to a high likelihood of incorrect conclusions from this comparison.

Table A.1: Overview of papers included in the theoretical background. Table based on suggestions by Younas and Ali (2021). (G)IM=(General) Internal Medicine. NHS = national health service

Author (year)	Country	Purpose	Research Design	Population	Findings
Alameda and Suárez (2009)	Spain	Influence of location on prognosis	Retrospective cohort	243 IM Patients	Outliers had longer LOS, no difference in mortality, readmission, or intra-hospital morbidity.
Asheim et al. (2022)	Norway	Study the consequences of crowded wards for patients with cardiovascular disease.	Retrospective cohort study	201801 Patients	High home ward occupancy increased the risk of being placed on an inappropriate ward for cardiovascular patients. A subgroup of patients also showed increased mortality within 60 days if they were admitted during a time when home ward occupancy was high.
Bai et al. (2017)	Canada	Compare inhospital mortality of GIM patients in GIM wards and off-service wards.	Retrospective cohort	3243 GIM Patients	Outliers had a significantly higher inhospital mortality.
Bogler et al. (2021)	Canada	Investigate the quality of care of bedspaced patients, specifically LOS, 30-day readmission, adverse events, and mortality.	22519 Admissions	Retrospective cohort study	Outliers had 2.1 days shorter LOS, 0.4% fewer adverse events, and 0.7% lower mortality
Cheng et al. (2022)	USA	Reduce variability and human error in predicting the number of beds needed.	Pre- and postintervention using model	-	The model can predict more effectively, but does not reduce ED boarding time.
Cheung et al. (2020)	Australia	Explore the phenomenon of nursing outlier patients.	Interviews	11 Nurses	Taking care of outliers disrupts the nurses usual process, suggesting that specialty-appropriate wards improve patient outcomes and reduce impacts on nurses' morale.
Creamer et al. (2010)	New Zealand	Identify the time spent in different activities during the ward round, especially the impact of outlying patients.	Prospective observational study	7 hours of ward rounds, 110 patient consultations	Outlying patients took longer time per patient, though bedside time was similar (5:40 vs. 2:57 min). Additional time mostly involves the medical team walking to the outlying patient.

Table A.1: Overview of papers included in the theoretical background. Table based on suggestions by Younas and Ali (2021). (G)IM=(General) Internal Medicine. NHS = national health service

Author (year)	Country	Purpose	Research Design	Population	Findings
Ede et al. (2019)	UK	Identify the barriers and facilitators of escalation of care (recognizing deterioration of a patient and communicating and acting on this) in the acute ward setting, especially those that are modifiable.	Qualitative service evaluation	55 hours of observation in NHS hospital	Failure of escalation is more likely to occur for complex patients, outliers, and patients with multiple care teams.
Gomez-Rosado et al. (2019)	Spain	Assess the frequency, complications, and costs of outlying patients.	Retrospective cohort	713 Patients	No significant differences in LOS, complications, or costs. Outlying male patients had more complications than women. Outliers presented with increased complications after 2.5 days.
Goulding et al. (2012)	UK	Explore NHS staff members perceptions and opinions on the factors that may contribute to patient safety issues for outliers.	Semi-structured interviews	29 NHS staff	According to NHS staff, placing patients on inappropriate wards is a safety concern. Five themes that contribute to safety issues were described.
Goulding et al. (2015)	UK	Explore patients' perspective of quality and safety during their stay on a clinically inappropriate ward.	Semi-structured interviews	19 Outliers	Patients prefer to be treated on the correct ward. Issues with communication, staff availability, nurses' knowledge, and available resources were identified.
Hassen et al. (2018)	UK	Evaluate the surgical ward environment to identify quality makers for safe care.	Semi-structured interviews	15 Patients and 36 staff	Among others, the study identified the presence of outliers as an error-prone process.
Hassen et al. (2019)	UK	To prioritize key factors that contribute to safety on the surgical ward.	Online questionnaire	Panel of experts in patient safety	International consensus was reached on various factors that influence the safety of patients in the postoperative environment. 100% of the participants agreed that the presence of outliers creates potential for errors.

Table A.1: Overview of papers included in the theoretical background. Table based on suggestions by Younas and Ali (2021). (G)IM=(General) Internal Medicine. NHS = national health service

Author (year)	Country	Purpose	Research Design	Population	Findings
Holmes and Stratford (2021)	UK	Evaluate the impact of the lack availability of neurological specialty care and subsequent placement of patients on clinically inappropriate wards on patient care.	Retrospective cohort	63 Patients	Though there are not statistically significant results, the lack of specialist input and admission of patients to inappropriate wards may have a negative impact on LOS, readmission rate, and complications.
Hommel et al. (2008)	Sweden	Investigate whether there are differences in LOS and complications between patients with hip fractures treated in an orthopedic department or another department.	Quasi-experimental, prospective	478 Patients with hip fractures	Outliers had an extra LOS of 3.7 days in hospital and 13.6 extra days of rehabilitation. Introduction of a clinical pathway reduced the number of complications.
Jacobson et al. (2016)	New Zealand	Determine the impact of a surgical assessment unit (SAU) on the number of general surgery outliers.	Pre- and postintervention using SAU	1462 Patient locations	Introduction of the SAU was associated with a reduced number of outliers.
Kohn et al. (2020)	USA	Assess the association of bedspacing with patient-centered outcomes among US patients on GIM services	Retrospective cohort study	18802 Patients	33% of patients were bedspaced. These patients had 5% longer LOS. there were no statistically significant differences in odds of mortality or discharge to home.
La Regina et al. (2019)	Italy	Assess quality and safety of care for outliers	Systematic review	17 Articles	No definite conclusion, but outliers may be a serious threat to safety/quality.
Lepage et al. (2009)	France	Improve the quality of care provided for inpatients outlying in inappropriate wards.	Prospective risk analysis	Hospital staff	The research identified various failure modes and suggested improvement measures and follow up indicators, including a responsible outlier doctor and coordinator nurses.
Liu et al. (2014)	Canada	Investigate whether bedspacing affects quality of patient care.	Matched-pair study	1639 admissions and 39 matched pairs	No differences in quality of care were found between the two groups in terms of LOS, adherence to quality indicators.

Table A.1: Overview of papers included in the theoretical background. Table based on suggestions by Younas and Ali (2021). (G)IM=(General) Internal Medicine. NHS = national health service

Author (year)	Country	Purpose	Research Design	Population	Findings
Lloyd et al. (2005)	UK	Compare and assess the quality of nursing care of acute trauma patients admitted to trauma and other wards	Multi-center questionnaire	220 Nurses	Trauma patients receive better nursing care from trauma nurses on trauma-wards. Advises hospitals to not place patients on other wards until nurses have appropriate training and can competently care for outlying patients on their ward.
Novati et al. (2017)	Italy	Test the efficacy of an innovative bed management model.	Pre-and postintervention using model	8 years of clinical charts	Various changes were observed, including a decrease in outlier days from 6.3% to 5.4%. Causal effect between implementation of model and changes in indicators cannot be presumed.
Pascual et al. (2014)	USA	Determine if ICU patients boarded in a geographically distinct specialist ICU experienced greater complications.	Retrospective study on prospectively maintained database	8626 Admissions	Some complications occur more often in ICU patients that are boarded geographically far away from their home unit. Boarding ICU patients elsewhere adds a proportion of risk for the patient.
Perimal-Lewis et al. (2012)	Australia	Examine the relation between the proportion of time a patient spent on their home ward and the outcomes of the hospital stay.	Retrospective cohort	23312 Patient journeys	Outlying patients had significantly shorter LOS (111 vs. 142h) and significantly greater risk of in-hospital mortality (+40%). Outlier readmissions were lower, as were rates of discharge summary completion.
Perimal-Lewis et al. (2016)	Australia	Examine patient journeys of people with dementia/delirium comparing risk factors for inlier and outlier status.	Retrospective, descriptive study	6367 Patient journeys	Health outcomes of outlying patients with dementia/delirium are compromised. ED LOS was prolonged, inpatient LOS was shortened, mortality within 48h of admission were increased, and their Charlson co-morbidity index was higher. Discharge summaries were completed less frequently and patients were more likely to be referred to another care facility.

Table A.1: Overview of papers included in the theoretical background. Table based on suggestions by Younas and Ali (2021). (G)IM=(General) Internal Medicine. NHS = national health service

Author (year)	Country	Purpose	Research Design	Population	Findings
Rae et al. (2007)	New Zealand	Describe the results of a continuous quality improvement project about delayed discharge.	20034 GIM patients	Retrospective cohort	Staff discharge behavior is an important hidden dimension of hospital care. The project changed senior staff behavior and showed decreased LOS (-2.6 days), no increase in readmissions, cost savings, and outliers disappeared.
Santamaria et al. (2014)	Australia	Determine the effect of spending time as an outlier on the frequency of emergency calls.	Observational cohort study	58158 admissions	The study found a strong relationship between the time spent as an outlier and the frequency of emergency calls (increase of 53%). In hospital mortality was increased for outliers (2.57% vs. 1.12%).
Serafini et al. (2015)	Italy	Investigate the outlying patient's mean LOS, survival, and early readmission compared to non-outlying patients on Medicine or Geriatrics departments.	Quantitative	3828 Patients	LOS did not show significant differences. The risk of death was twice as high for outliers. Readmission within 90 days was more frequent for outliers (26.1% vs. 14.2%.
Stowell et al. (2013)	France	Compare quality of care for outlying patients versus non outlying patients.	Prospective matched-pair cluster study	483 Patients	Outlying patients had a worse prognosis compared to non outlying patients. Outliers remained in the hospital longer (7 vs. 8 days) and were re-admitted more within 28 days.
Stylianou et al. (2017)	UK	Explore safety and quality of healthcare by identifying whether being a medical outlier is associated with worse patient outcomes.	Retrospective, cross-sectional observational study	71038 Patient spells	Outlying patients have increased length of stay of 2 days. There are no significant differences in the odds of in-hospital and 30-day mortality and readmission.

Table A.2: Overview of papers included in theoretical background. n.s.=not significant, n.a. = not applicable (for this research), GIM = general internal medicine, SAU = surgical assessment unit, CCI = Charlson co-morbidity index

Author (year)	LOS	Readmission	Mortality	Remarks	Snowballing?
Alameda and Suárez (2009)	+2.6 days	n.s.	n.s.	in-h morbidity n.s.	Snowballing
Asheim et al. (2022)	n.a.	n.a.	n.a.	crowding causes outlying	Snowballing
Bai et al. (2017)	n.a.	n.a.	3x higher	GIM ward	Snowballing
Bogler et al. (2021)	-2.1 days	same	-037%	IM, -0.4% adverse events	Snowballing
Cheng et al. (2022)	n.a.	n.a.	n.a.	bed calculator	Snowballing
Cheung et al. (2020)	n.a.	n.a.	n.a.	nurse's experience	Snowballing
Creamer et al. (2010)	n.a.	n.a.	n.a.	rounding time	Snowballing
Ede et al. (2019)	n.a.	n.a.	n.a.	early warning scores	Snowballing
Gomez-Rosado et al. (2019)	n.s.	n.a.	n.a.	n.s. costs, n.s. compl.	
Goulding et al. (2012)	n.a.	n.a.	n.a.	qualitative	
Goulding et al. (2015)	n.a.	n.a.	n.a.		
Hassen et al. (2018)	n.a.	n.a.	n.a.	qualitative	
Hassen et al. (2019)	n.a.	n.a.	n.a.	panel consensus	Snowballing
Holmes and Stratford (2021)	n.s.	n.s.	n.s.	quality concern, n.s.	
Hommel et al. (2008)	+3.7 days	n.a.	n.s.		Snowballing
Jacobson et al. (2016)	n.a.	n.a.	n.a.	SAU reduces OP	
Kohn et al. (2020)	+5%	n.a.	same	disch. home same	Snowballing
La Regina et al. (2019)				Review	
Lepage et al. (2009)	n.a.	n.a.	n.a.	Failure modes	
Liu et al. (2014)	n.s.	n.s.	n.a.	small sample	Snowballing
Lloyd et al. (2005)	n.a.	n.a.	n.a.	nursing quality	Snowballing
Novati et al. (2017)	n.a.	n.a.	n.a.	-0.9% outlier days	Snowballing
Pascual et al. (2014)	to do				
Perimal-Lewis et al. (2012)	-30h	lower	+40%	+EDstay -disch.sum	
Perimal-Lewis et al. (2016)	-5.6 days	n.s.	higher (48h)	CCI higher	
Rae et al. (2007)	n.a.	n.a.	n.a.	discharge differently	Snowballing
Santamaria et al. (2014)	n.a.	n.a.	+1.45%	+emergency calls	Snowballing
Serafini et al. (2015)	no difference	+11.9%	2x higher		
Stowell et al. (2013)	+1 day	12d. faster	n.a.	lower st. care	
Stylianou et al. (2017)	2x higher	no dif	no dif		

B

COREQ checklist

The Consolidated Criteria for reporting qualitative studies (COREQ) is a checklist providing a list of elements that need to be included in reports on qualitative studies (Tong et al., 2007). This table contains all these criteria, directly reproduced from Tong et al. (2007) and the way these criteria were addressed in this research. These elements are also incorporated throughout the thesis but are shown here for a comprehensive overview.

Table B.1: The COREQ checklist as developed by Tong et al. (2007), applied to this research.

Criterion	Incorporation in this thesis
1. Interviewer	Sophie Mans, the researcher, conducted the interviews.
2. Credentials	The researcher had a BSc in Life Science & Technology from Delft University of Technology.
3. Occupation	Full-time student in the master's program Management of Technology at Delft University of Technology.
4. Gender	Female.
5. Experience and training	The researcher had no previous experience in qualitative research. Their training consisted of courses focused on research that were part of the master's program.
6. Relationship established	There was no pre-established relationship between participants and the researcher.
7. Participant knowledge of the interviewer	Participants were made aware of the researcher's goals through an extensive informed consent letter and introduction before the interview. The main goal of the researcher was to gather information about the decision-making process on outlier placement and to publish these findings in a master's thesis for graduation.
8. Interviewer characteristics	No bias, assumptions, or interests were reported.
9. Methodological orientation and theory	Thematic analysis was applied to analyze the interview data. The inductive approach allowed the themes to emerge from the data.
10. Sampling	Purposive sampling approach was used to reach participants with the most valuable experience in the decision-making process.
11. Method of approach	Via e-mail, see Appendix D.
12. Sample size	12 participants were interviewed.

Continued on next page

Table B.1: The COREQ checklist as developed by Tong et al. (2007), applied to this research. (Continued)

Criterion	Incorporation in this thesis
13. Non-participation	No participants dropped out. Three residents were directly contacted but did not respond to the invitation.
14. Setting of data collection	Interviews were conducted in the focal hospital. Usually, they took place in the department of the interviewee, in a private room. On occasion, per the interviewee's request, the researcher reserved a flex working space for conducting the interviews.
15. Presence of non-participants	Only the researcher and participant were present in the room during the interviews.
16. Description of sample	Description of professions and departments in provided in Subsection 3.3.1.
17. Interview guide	Interview questions and prompts were provided in Appendix C. Interviews were pilot-tested, but no significant changes were applied. All interviews were used.
18. Repeat interviews	No repeat interviews were carried out.
19. Audio/visual recording	Only audio recording, on two devices.
20. Field notes	No extensive field notes were necessary, as audio recordings provided maximum retention of the conversation.
21. Duration	The interviews lasted between 15 and 45 minutes, averaging around 28 minutes.
22. Data saturation	Data saturation was not reached for each stakeholder group. This was covered in Chapter 9.
23. Transcripts returned	Transcripts were not returned to participants. In hindsight, this may have been useful for verifying their accuracy.
24. Number of data coders	Only the (single) researcher coded the interviews. As explained in Chapter 3, more coders within the context of a master's thesis were not feasible.
25. Description of the coding tree	Coding trees were provided in the chapters when relevant. Codes used to answer research questions were provided in the appendix.
26. Derivation of themes	Themes were derived from the data. The open coding approach allowed for the emergence of themes from the data.
27. Software	The software used was listed in Section 3.8.
28. Participant checking	The PFC that was interviewed was invited to provide feedback. The co-design approach included a validation meeting for the co-designers of the research to provide feedback.
29. Quotations presented	The researcher aimed to provide ample quotations to support the findings in the results chapters. An identifier consisting of profession and number was added to each quote.
30. Data and findings consistent	The researcher aimed to provide consistency between data and findings. Think description was applied to allow the reader to determine whether they deem the data and findings consistent.
31. Clarity of major themes	The researcher aimed to present major themes with clarity and precision. The extent to which this objective was achieved can be assessed by the reader.

Continued on next page

Table B.1: The COREQ checklist as developed by Tong et al. (2007), applied to this research. (Continued)

Criterion	Incorporation in this thesis
32. Clarity of minor themes	The researcher aimed to present minor themes with clarity and precision. The extent to which this objective was achieved can be assessed by the reader.

C

Interview Protocol

This appendix lists the protocol that has been used to interview the subjects. It is provided in both English (Section C.1) and Dutch (Section C.2). Note that all interviews were conducted in Dutch, so the Dutch protocol was used.

C.1. Interview Protocol in English

Begin with an introduction of myself and the research. Explain that the goal is to better understand the decision-making process around bed capacity and overflow patients. Emphasize that the interviewee's experiences will be valuable. Ask if the interviewee has any questions about the consent form. Provide two copies of the form to sign. Start the recording after the consent form has been signed. Ask for a brief introduction of the interviewee. Verify the name and current role of the interviewee.

1. **Can you describe the process in your hospital for admitting a patient and determining the appropriate department?**
   (a) What is your role and what are your responsibilities in that process?
   (b) Which stakeholders are involved in patient admissions?
   (c) Where are these decisions made? (e.g., which meetings)
   (d) Who makes these decisions?
   (e) Are there formal guidelines, policies, or protocols regarding decisions about overflow beds?
2. **Can you explain how this decision-making process changes when a specific department is full, but there are new patients requiring care from that specialty?**
   (a) What factors are considered when deciding to admit a patient to an overflow bed? (e.g., does the patient's opinion matter?)
   (b) Are other stakeholders involved in decisions to place patients in overflow beds?
   (c) What agreements exist about decision-making regarding overflow beds?
   (d) How would you define what an overflow bed is?
   (e) What do you think causes overflow beds to occur?
3. **What is your opinion on the decision-making process for placing patients in an overflow bed?**
   (a) What do you think works well in this process?
   (b) Do you think your role and responsibilities align with the actual process? (e.g., conflicts, being overruled by a different role)
   (c) What do you think are areas for improvement in the decision-making process?
   (d) How would you address these areas for improvement?

(e) Do the existing agreements work well? Does everyone adhere to them? In what situations do they or don't they?

4. **What tools are available to support your decisions about overflow beds?**
   (a) What data is available to make decisions about overflow beds?
   (b) What technology is available to support decisions about overflow beds or bed capacity? (e.g., EHR, dashboards)
   (c) Can you name one or more tools that are available for decision-making? (e.g., flowcharts, bed policies, bed plans, mutual agreements)
   (d) Are there differences between the tools available for the regular process compared to the process involving overflow beds?
5. **Can you elaborate on your experiences with tools that support your decision-making?**
   (a) How do you perceive the role of tools/technology in the decision-making process?
   (b) Are the data, technology, and tools helpful and sufficient?
   (c) Do you see any possibilities for improving these tools? Which ones?
   (d) What technological challenges have you encountered?
6. **How is the quality of care for the patient factored into the decision to admit them to an overflow bed?**
   (a) How do you define quality of care? (from the patient level to the department level)
   (b) When can a patient be placed in an overflow bed? When not? (What are the criteria that must be met before placing a patient in an overflow bed?)
   (c) What are the risks for a patient placed in an overflow bed?
   (d) How are risks or quality of care factored into the decision-making process?
   (e) What measures are taken to mitigate these risks?
   (f) Are these measures dependent on the situation? (e.g., high demand/scarcity vs. less pressure)

Thank the interviewee for their time. Are there any questions or comments about what we have discussed today? Is there anything you would like to add? Do you have suggestions for other staff members I could invite for an interview?

C.2. Interview Protocol in het Nederlands

Begin met een introductie van mezelf en het onderzoek. Leg uit dat het doel is om het besluitvormingsproces rondom bedcapaciteit en gastpatiënten beter te begrijpen. We hopen dat de ervaringen van de geïnterviewde zullen helpen. Vraag of de geïnterviewde vragen heeft over de toestemmingsbrief. Zorg voor twee exemplaren van de brief om te ondertekenen. Start de opname na het ondertekenen van de toestemmingsbrief. Vraag om een korte introductie van de geïnterviewde. Controleer de naam en huidige functie van de geïnterviewde.

1. **Kunt u het proces beschrijven dat in uw ziekenhuis plaatsvindt om een patiënt op te nemen en de juiste afdeling te bepalen?**
   (a) Wat is uw rol en wat zijn uw verantwoordelijkheden in dat proces?
   (b) Welke belanghebbenden zijn betrokken bij de opname van patiënten?
   (c) Waar worden deze beslissingen genomen? (welk overleg)
   (d) Door wie worden deze beslissingen genomen?
   (e) Zijn er formele richtlijnen, beleid, of protocollen betreft besluitvorming over buitenbedden?
2. **Kunt u uitleggen wat er in die besluitvorming verandert wanneer er een specifieke afdeling vol ligt en er wel aanbod van nieuwe patiënten van dat specialisme is?**

(a) Welke factoren worden er meegewogen wanneer besloten wordt een patiënt op een buitenbed op te nemen? (bijv. ook mening patiënt?)

(b) Zijn er andere belanghebbenden betrokken bij de opname van patiënten op buitenbedden?

(c) Welke afspraken zijn er onderling gemaakt over het maken van beslissingen over buitenbedden?

(d) Hoe zou u uitleggen wat een buitenbed is?

(e) Wat denkt u dat de oorzaak is van buitenbedden?

3. **Wat is uw mening over de besluitvorming over het plaatsen van patiënten op een buitenbed?**

(a) Wat vindt u dat goed gaat in dit proces?

(b) Vindt u dat uw rol en verantwoordelijkheden kloppen met het daadwerkelijke proces? (spanningen, overrulen door functie x)

(c) Wat denkt u dat verbeterpunten zijn in het besluitvormingsproces?

(d) Hoe zou u die verbeterpunten aanpakken?

(e) Werken de afspraken goed? Houdt iedereen zich eraan? En in welke situaties wel of niet?

4. **Welke hulpmiddelen zijn beschikbaar om uw beslissingen over buitenbedden te ondersteunen?**

(a) Welke data zijn beschikbaar om beslissingen over buitenbedden te nemen?

(b) Welke technologie is beschikbaar om beslissingen over buitenbedden of beddencapaciteit te nemen? (bijv. EPD, dashboards)

(c) Kunt u één of meerdere hulpmiddelen benoemen die beschikbaar zijn om beslissingen te nemen? (bijv. stroomdiagrammen, beddenbeleid, beddenplan, afspraken onderling)

(d) Zijn er verschillen tussen de hulpmiddelen die u heeft voor het reguliere proces ten opzichte van het proces rondom buitenbedden?

5. **Kunt u uw ervaringen met hulpmiddelen die uw besluitvorming ondersteunen toelichten?**

(a) Hoe ervaart u de rol van hulpmiddelen/technologie in het besluitvormingsproces?

(b) Zijn de data, technologie en bijbehorende hulpmiddelen nuttig en toereikend?

(c) Ziet u nog mogelijkheden om deze hulpmiddelen te verbeteren? Welke?

(d) Met welke technologische uitdagingen bent u geconfronteerd?

6. **Hoe wordt de kwaliteit van zorg voor de patiënt meegewogen in de besluitvorming over het opnemen van een patiënt op een buitenbed?**

(a) Hoe definieert u kwaliteit van zorg? (schaal van patiënt- tot afdelingsniveau)

(b) Wanneer kan een patiënt op een buitenbed worden geplaatst? Wanneer niet? (Wat zijn de criteria waaraan voldaan moet worden voordat een patiënt op een buitenbed wordt geplaatst?)

(c) Wat zijn de risico's voor een patiënt die op een buitenbed wordt geplaatst?

(d) Hoe worden risico's of de kwaliteit van zorg meegewogen in de besluitvorming?

(e) Wat wordt er gedaan om deze risico's te beperken?

(f) Zijn de maatregelen afhankelijk van de situatie? (drukte/schaarste of rustig)

Bedank de geïnterviewde voor hun tijd. Zijn er nog vragen of opmerkingen over wat we vandaag hebben besproken? Is er nog iets dat u wil toevoegen? Zijn er suggesties voor andere personeelsleden die ik zou kunnen uitnodigen voor een interview?

D

Interview Invitation E-mail

Beste [naam],
Hierbij wil ik u graag uitnodigen om deel te nemen aan een onderzoek van het [ziekenhuis] in samenwerking met de Technische Universiteit Delft (TUD). Het onderzoek wordt uitgevoerd door Sophie Mans, masterstudent aan de Faculteit Techniek, Bestuur en Management van de TUD. De begeleiding wordt gedaan door de afdeling [twee afdelingen van het ziekenhuis]. Het onderzoek richt zich op het besluitvormingsproces over op welke afdeling een patiënt wordt opgenomen. Daarbij wordt met name gefocust op de zogenaamde 'gastpatiënt'. Dit zijn patiënten die zijn opgenomen op een afdeling die medisch gezien niet aansluit bij hun belangrijkste diagnose.

Waarom dit onderzoek?
Eerder onderzoek toont aan dat opname op een afdeling die niet aansluit bij de belangrijkste diagnose van een patiënt risico's kan opleveren. Door middel van interviews kunnen we een beter begrip krijgen van hoe er beslissingen worden gemaakt over het plaatsen van deze patiënten. Hierbij zijn we vooral geïnteresseerd in wie er betrokken worden bij de beslissingen, welke informatie er gebruikt wordt en hoe de kwaliteit van de zorg wordt meegewogen. Uiteindelijk is het doel om deze inzichten te gebruiken bij de verbetering van de kwaliteit van zorg.

Wie zoeken we?
Werknemers van het [ziekenhuis] die betrokken zijn bij de besluitvorming over op welke afdeling patiënten worden opgenomen. Dat kan vanuit verschillende rollen, bijvoorbeeld: verpleegkundigen, baliemedewerkers, artsen, afdelingsmanagers, zolang de werknemer te maken heeft met bovenstaande kwestie.

Wat verwachten we van u als deelnemer?
De deelname aan het onderzoek bestaat uit een interview van ongeveer een uur. Dit zal bij voorkeur plaatsvinden in november of december 2024.

Wat gebeurt er met uw gegevens?
Uw gegevens worden gebruikt voor wetenschappelijk onderzoek. Ze worden veilig opgeslagen en zo veel mogelijk gepseudonimiseerd. Als u besluit mee te doen aan het onderzoek krijgt u een uitgebreide toelichting over hoe er met uw gegevens wordt omgegaan.

Krijg ik de resultaten te horen?
De resultaten van dit onderzoek worden door de TU Delft gepubliceerd in de vorm van een masterscriptie. U krijgt een (digitale) kopie van deze publicatie.
Ik hoor graag of u mee wil werken aan dit onderzoek. Dat kan u aangeven d.m.v. een antwoord op dit bericht, waarna er contact met u wordt opgenomen over het plannen van een afspraak. Als u vragen heeft over het onderzoek, kunt u contact opnemen met mij, Sophie Mans, te bereiken op [telefoonnummer] of [e-mailadres].
Hartelijk dank,
Sophie Mans

E

Profession Groups

This appendix shows which stakeholders were part of each group in Table E.1. These groups were used to create the Sankey diagrams in ATLAS.ti that show the relationships between codes and professions.

PFC	Medical Specialist	Nurse	Managers	Department Secretary
PFC	Medical Specialist 1	Nurse 1	Department Manager	Department Secretary
	Medical Specialist 2	Nurse 2	Medical Specialist 1	
		Nurse 3	Medical Specialist 2	
		Nurse 4	Care Unit Manager	
		Nurse 5		
		Nurse 6		

Table E.1: Overview of groups of professions to create Sankey diagrams in ATLAS.ti.

As can be seen in Table E.1, the medical specialists were both part of the medical specialist group and the manager group. The reasoning behind this was the fact that both medical specialists who were interviewed had significant managerial tasks.

Reflection: Use of Artificial Intelligence

In writing this thesis, I used artificial intelligence (AI), specifically ChatGPT, to support various stages of the writing process. My use of AI was primarily focused on structuring sections, refining language, and generating alternative phrasings for clarity. Additionally, I have sought assistance in summarizing findings, rewording complex explanations, and ensuring logical coherence across sections.

Examples of prompts included:

- ”Can you rephrase this sentence to make it more suitable for a scientific thesis? Ensure the language remains formal and do not change the meaning.”
- ”Can you write a short introduction for the ’Implications for the Future’ section of my discussion? It should introduce both research recommendations and practical recommendations for the hospital.”
- ”Please improve the clarity of this paragraph without changing any of the references or the information they accompany. Make sure to preserve a scientific tone.”
- ”This sentence explains why some stakeholders were not included in the research, but it sounds too informal. Can you rephrase it in a more academic and neutral tone?”

Each of these prompts was accompanied by a draft version of the intended text, which was my original work.

While AI provided helpful suggestions, I critically evaluated all outputs to ensure accuracy, coherence, and alignment with my research. In order to do so, I avoided directly copying and pasting any text generated by ChatGPT but instead evaluated line-by-line whether the content was accurate. When scientific sources were covered in my source text (which was added to the prompt), I ensured to carefully validate the rephrasing suggestions against academic sources and adapted the AI-generated text where needed to maintain an accurate reflection of these sources. Furthermore, I ensured that no false references or statements were introduced and that all insights were correctly phrased.

I would argue that my approach maintained academic integrity by treating AI as a supportive tool rather than a content generator and ensured that my original analysis and critical thinking, which were not supported by any form of AI, remained central to the thesis. In short, my aim of using AI was to refine my academic writing.