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A GROUNDED THEORY OF PATIENT FLOW MANAGEMENT
WITHIN THE EMERGENCY DEPARTMENT

A Dissertation Presented

by

ELLEN BENJAMIN

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

September 2023

Elaine Marieb College of Nursing

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by

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DEDICATION

For my children.

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Thank you to my advisor and dissertation committee who have been unfailingly supportive throughout this journey. Their generosity is reflective of my entire experience at the Elaine Marieb College of Nursing, which has been filled with great kindness, flexibility, and encouragement. Thank you to all the UMass Amherst faculty who have cultivated an academic culture that made me feel valued, respected, and inspired.

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Thank you especially to my husband, who supports my every ambition without hesitation. This dissertation is as much a reflection of his hard work and dedication as my own. Lastly, I want to acknowledge my parents and sisters who have always instilled in me a love of learning and who have made it possible for me to be where I am today.

ABSTRACT

A GROUNDED THEORY OF PATIENT FLOW MANAGEMENT WITHIN THE EMERGENCY DEPARTMENT

SEPTEMBER 2023

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Background: Emergency department (ED) crowding is an urgent threat to patient safety and negatively impacts healthcare staff and institutions. Patient flow researchers have employed a range of methods to address this crisis, including an increase in the use of operations research and operations management strategies. However, identified patient flow solutions are inadequate. Research describing the complexities of patient flow processes and investigating the work and contributions of ED nurses is needed.

Purposes: The purposes of this study were to explore how ED nurses perform patient flow management and to develop a constructivist grounded theory of patient flow management within the ED.

Methods: A conceptual foundation for patient flow management was first established using evolutionary concept analysis and expanded concept analysis approaches. This study then employed constructivist grounded theory and situational analysis methodologies to examine the work of ED nurses. Data was collected through 29 focus groups and interviews with 27 participants and 64 hours of participant observations

across four EDs. Data analysis relied on coding, constant comparative analysis, and memo-writing to identify emergent themes and develop a substantive theory.

Findings: Concept analyses defined patient flow management as the application of ED experience, holistic perspectives, dynamic data, and complex considerations of multiple priorities by ED nurses to promote patient safety within their scope of responsibility. The study offers three main contributions: a theoretical model of the work of ED patient flow management, a theoretical framework to describe holistic considerations of factors that impact departmental capacity and nurse engagement in patient flow management, and a grounded theory of patient flow management capacity and engagement that describes how ED nurses adapt patient flow management strategies according to patient burden.

Conclusion: This study offers a new conceptual and theoretical foundation to understand the work of patient flow management. This novel perspective centralizes the work of ED nurses as active agents in patient flow processes and describes their strategies and contributions to meet patient care needs. Several practical considerations are offered to engage and support nurses in their roles as patient flow managers, improve patient flow processes, and further investigate ED nurse patient flow management.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS..... v
ABSTRACT..... vi
LIST OF TABLES..... xiii
LIST OF FIGURES xiv
LIST OF ABBREVIATIONS..... xv

CHAPTER 1: PATIENT FLOW AND EMERGENCY MEDICAL CARE..... 1

 Introduction..... 1
 A Note About Terminology..... 1
 A Brief History of Patient Flow and Emergency Care 2
 An Overview of ED Patient Flow Research 5

 Causes of ED Crowding..... 5
 Consequences of ED Crowding 7
 Patient Flow Solutions 7
 Patient Flow Approaches 8
 The Role of Nurses in Patient Flow 11

 Conclusion 12

CHAPTER 2: THE CONCEPTUAL BASIS OF PATIENT FLOW MANAGEMENT.. 14

 Introduction..... 14
 Conceptual Models of ED Patient Flow 14
 An Analysis of the Concept of Patient Flow Management 18

 Abstract 18
 Introduction..... 19
 Background 20
 Research Questions 20
 Methods..... 21

 Data Sources 21
 Data Analysis 23

 Results..... 23

 Defining Attributes 23

 Holistic Perspectives 25
 Dynamic Data 25
 Complex Considerations..... 26
 Concerned with Timeliness 27
 Concerned with Efficiency 28

Concerned with High-Quality Care	28
Summary of Defining Attributes	29
Antecedents.....	29
Consequences.....	31
Surrogate Terms and Related Concepts	31
Interdisciplinary/Sociocultural Context and References	32
Exemplar	33
Implications and Discussion	35
Conclusion	36
“Nurses Are Every Bit of Flow:” Emergency Department Nurses’ Conceptualization of Patient Flow Management	37
Abstract	37
Introduction.....	38
Background.....	38
Aim	40
Method	40
Study Design.....	40
Recruitment.....	40
Data Collection and Analysis.....	41
Ethical Considerations	41
Findings.....	42
Holistic Perspectives	43
Dynamic Data	44
Complex Considerations of Multiple Priorities	45
Concerned with Timeliness.....	45
Concerned with Efficiency	46
Concerned with High-Quality Care	47
New Defining Attributes.....	49
A Nurse-Driven Process	49
ED Experience	49
Antecedents.....	50
Consequences.....	51
Summary of Expanded Analysis.....	52
Discussion and Implications	52
Implications for Nurses.....	53
Implications for Patient Flow Researchers	54
Implications for Hospital Management	55

Limitations	55
Conclusion	56
CHAPTER 3: STUDY METHODS	57
Introduction.....	57
Research Aims	58
Study Definitions	58
Theoretical Perspective.....	58
Methodology.....	59
Study Design.....	63
Participant Eligibility	63
Participant Recruitment	63
Retention	65
Data Collection	66
Participant Sample	68
Data Analysis	71
Protection of Human Subjects.....	73
Risks to Human Subjects and Protections Against Risks	73
Benefits to Human Subjects.....	75
Trustworthiness.....	75
Credibility	76
Dependability	76
Confirmability.....	77
Transferability.....	77
Study Timeline.....	78
Summary.....	79
CHAPTER 4: ARTICULATING THE WORK OF PATIENT FLOW MANAGEMENT	80
Clarifying the Goals of Patient Flow Management	80
Ethical Care.....	81
Efficient Care	81
Timely Care	82
Comprehensive Care	82
Identifying the Five Tasks of Patient Flow Management.....	83
Information Gathering	86
Continuous Triage.....	92

Resource Management	94
Throughput Management	97
Care Oversight	99
A Theoretical Model of the Work of Patient Flow Management	101
Discussion	102
Section Summary	110
CHAPTER 5: FACTORS THAT SHAPE DEPARTMENTAL CAPACITY AND NURSE ENGAGEMENT IN PATIENT FLOW MANAGEMENT	111
Departmental Patient Flow Management Capacity	112
Resources	112
Communication Norms	113
Staff Roles and Norms	114
Interdepartmental Factors	117
Technology	118
Physical ED Layout	120
Department Culture	121
Staff Teamwork and Camaraderie	121
Respect Between ED Providers and Nurses	122
Capacity for Change	122
Relationship Between Staff and Administration	123
Patient Flow Culture	123
Summary of ED Patient Flow Management Capacity	125
Factors Shaping Nurse Patient Flow Management Engagement	126
Attitude	126
Personality	127
Situational Awareness	128
Time Management	129
Clinical Judgment	129
Experience	130
Summary of Nurse Patient Flow Management Engagement	130
Discussion	131
Section Summary	138
CHAPTER 6: ADAPTING PATIENT FLOW MANAGEMENT STRATEGIES ACCORDING TO PATIENT BURDEN: A GROUNDED THEORY	140
Describing Patient Flow Management Through Temporal Orientations	140
Retrospective Patient Flow Management	141

Reactive Patient Flow Management	145
Proactive Patient Flow Management	146
Summary of Temporal Orientations	149
Describing Creative Patient Flow Management	150
Information Gathering	151
Continuous Triage.....	153
Resource Management.....	153
Throughput Management.....	155
Care Oversight	156
Summary of Creative Patient Flow Management.....	159
Describing Changes in Nurse Patient Flow Management Urgency	159
A Grounded Theory of Patient Flow Management Capacity and Engagement	161
Theory Tenets	162
Discussion.....	164
Section Summary.....	168
CHAPTER 7: DISCUSSION, IMPLICATIONS, AND CONCLUSION	169
Limitations	169
Discussion.....	169
Implications	174
Engage Nurses in Patient Flow Management	174
Support Nurses in Patient Flow Management.....	175
Improve Patient Flow Management.....	176
Investigate Patient Flow Management.....	180
Conclusion	183
APPENDIX A: SAMPLE RECRUITMENT MATERIALS.....	185
APPENDIX B: FOCUS GROUP AND INTERVIEW INFORMED CONSENT	187
APPENDIX C: EXAMPLE FOCUS GROUP TOPIC GUIDE.....	193
APPENDIX D: THINK-ALoud SCENARIO INTERVIEWS	194
APPENDIX E: PARTICIPANT OBSERVATION INFORMATION SHEET	198
APPENDIX F: PARTICIPANT OBSERVATION SCRIPT.....	200
APPENDIX G: PARTICIPANT OBSERVATION SCHEDULE.....	201
APPENDIX H: UNIVERSITY OF MASSACHUSETTS IRB EXEMPTION LETTER	
.....	202
APPENDIX I: HEALTH SYSTEM IRB EXEMPTION LETTER.....	203
APPENDIX J: NIH CERTIFICATE OF CONFIDENTIALITY	204
BIBLIOGRAPHY.....	205

LIST OF TABLES

Table	Page
2.1: Concept attributes and supporting literature evidence.....	24
2.2: Participant demographics.....	42
3.1: Participant demographics.....	69
3.2: ED characteristics.....	70
4.1: Summary of ED nurse patient flow management strategies.....	84
6.1: Overview of the work of patient flow management by task and temporality.....	150

LIST OF FIGURES

Figure	Page
2.1: Analysis of patient flow in the emergency room.....	15
2.2: A conceptual model of emergency department crowding.....	16
2.3: Modeling patient flows through the healthcare system.....	17
2.4: PRISMA diagram.....	22
3.1: Study design.....	63
3.2: Study timeline.....	78
4.1: A theoretical model of the work of patient flow management.....	101
5.1: Factors shaping department patient flow management capacity.....	111
5.2: Factors shaping nurse patient flow management engagement.....	126
6.1: A grounded theory of patient flow management engagement and capacity.....	162

LIST OF ABBREVIATIONS

Participants

Participant quotes and observations appear throughout the manuscript and reflect multiple data collection strategies.

FG (focus group participant)

Int (interviewee)

NM (nurse manager)

PCT (patient care technician)

RN (registered nurse)

TA (think-aloud participant)

CHAPTER 1

PATIENT FLOW AND EMERGENCY MEDICAL CARE

Introduction

Emergency department (ED) crowding has been described as the greatest threat to emergency medical care globally (Javidan et al., 2020), and the challenges of patient flow are only growing (Rutherford et al., 2020). Patient flow has significant consequences on patients, hospital staff, and the healthcare system (Javidan et al., 2020; Rutherford et al., 2020). Although a large body of research has grown over the past few decades to address ED overcrowding, significant gaps in knowledge persist (De Freitas et al., 2018). Qualitative research describing the work of nurses in managing patient flow is necessary to understand and improve patient flow processes.

A Note About Terminology

Research about patient flow has been largely framed around the concept of “ED crowding.” Therefore, when discussing the historical context and existing body of patient flow research, the term “ED crowding” is used in addition to “patient flow.” However, the term “ED crowding” has been heavily criticized because it is poorly defined and it misrepresents the true nature of the problem. Asplin (2006) called for a paradigm shift in which he urged researchers to abandon their emphasis on ED crowding and instead turn to evaluating patient flow. Researchers have repeatedly critiqued inconsistencies in how ED crowding is defined and measured (Hoot & Aronsky, 2008; Morley et al., 2018; Pines & Griffey, 2015). Yet, a focus on ED crowding persists, erroneously representing patient flow challenges as a problem of the emergency department rather than a system-wide issue (Rutherford et al., 2020).

A Brief History of Patient Flow and Emergency Care

Although the system of emergency medical care that exists in the United States (US) today may feel like a fixture of society, its relatively recent emergence is credited to the 1966 National Academy of Science's report "*Accidental Death and Disability: The Neglected Disease of Modern Society*" (Institute of Medicine [IOM], 2007). This report described serious deficiencies in contemporary emergency and trauma care, including a lack of research in shock and trauma, archaic and ill-equipped departments, and ED overcrowding (National Academy of Sciences, 1966). By 1966, there was already concern about the rising utilization of EDs and recognition that they were frequently providing non-emergent healthcare (National Academy of Sciences, 1966).

Concern for ED overcrowding grew in the 1990s as hospitals faced increasing demand for emergency care that was outpacing a growing population, an increase in acuity and complexity of patients, and a significant decline in the number of hospitals nationwide (IOM, 2007). High rates of uninsured Americans and laws such as the 1986 Emergency Medical Treatment and Labor Act (EMTALA) have also contributed to the EDs growing role in providing primary and "safety net" care (IOM, 2007). A 1991 study of hospitals across the US found that three-fourths of hospitals reported recent increases in ED visits, and 10% of EDs described overcrowding as occurring "virtually every day" (Andrulis et al., 1991). By 2001, 91% of EDs reported overcrowding as a growing problem (Derlet et al., 2001).

It was also during this time that ED crowding was increasingly linked with poor quality of care, including prolonged inpatient boarding, ambulance diversions, significant patient care delays, risks to patient safety, and patients leaving without being seen (LWBS; Andrulis et al., 1991; Institute for Healthcare Improvement [IHI], 2003;

Kyriacou et al., 1999). ED crowding came to be understood as a systemic problem arising from hospital-wide challenges, notably the lack of inpatient hospital beds (General Accounting Office, 2003; IHI, 2003).

In 2004, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) responded to growing alarm by publishing guidelines requiring accredited hospitals to address ED overcrowding, boarding of inpatients, and ambulance diversion (IOM, 2007; Morrissey, 2004). JCAHO's 2004 guidelines were repealed after pushback from hospitals, and new requirements offering greater leniency were established in 2005 (IOM, 2007; Morrissey, 2004). Other organizations, such as the American College of Emergency Physicians, added to the mounting pressure on hospitals to measure, analyze, and reduce ED crowding (American College of Emergency Physicians, 2006). Despite these efforts, ED overcrowding continued to grow, and by 2007, the IOM had declared it a nationwide epidemic (IOM, 2007).

The IOM's 2007 landmark report titled "*Hospital-Based Emergency Care at the Breaking Point*" described a crisis of overwhelmed EDs failing to meet patient demands. In addition to providing "safety net care" to underinsured populations, the IOM recognized that EDs are integral to public health surveillance and disaster preparedness, serve as the heart of healthcare in rural communities, and act as the pressure valve for overcrowded hospitals (IOM, 2007). The IOM highlighted rising rates of inpatient boarding and ambulance diversion as reflective of an overburdened system (IOM, 2007). *Boarding* occurs when there are no inpatient hospital beds available and patients are forced to wait in the ED for hours, or days, before transfer to the hospital unit. Internationally, this phenomenon is known as "access block" (Javidan et al., 2020).

Ambulance diversion is the practice of re-directing incoming ambulances to other hospitals because the intended ED lacks the capacity to safely accept additional patients (IOM, 2007). The IOM's report revealed an emergency medical system that was fragmented, stressed, inefficient, and lacking adequate resources to ensure safe and high-quality patient care (IOM, 2007).

Among their 2007 recommendations, the IOM urged healthcare providers to adopt operations management and industrial engineering efficiency strategies to improve patient flow (IOM, 2007). This advice was promptly echoed by other influential publications (Eitel et al., 2010; Hoot & Aronsky, 2008). At the time, authors described the belief that the healthcare industry was lagging behind other industries, such as aerospace or manufacturing, and had failed to adopt the critical operational techniques that had successfully transformed these other sectors (Gabow et al., 2005; Hoot & Aronsky, 2008; IOM, 2007).

Researchers responded to this call, resulting in a dramatic increase in publications applying operations research (OR) and operations management (OM) techniques to ED patient flow (Saghafian et al., 2015). The body of ED patient flow research is now substantial. Recent literature reviews examining articles published after 2000 have identified over 100 original research articles (Morley et al., 2018) and 13 systematic reviews (De Freitas et al., 2018) on the topic.

Most recently, publications by the IHI and the International Federation for Emergency Medicine (IFEM) have added their own insights into ED patient flow challenges (Javidan et al., 2020; Rutherford et al., 2020). The IHI's 2020 White Paper is described as the culmination of 2 decades of patient flow research (Rutherford et al.,

2020) and the IFEM's White Paper emerged from an international task force of patient flow experts. Important themes described in these papers are (1) that patient flow challenges require urgent attention to minimize negative impacts on patient care, hospital staff, and healthcare costs, (2) that improving patient flow requires a systemic hospital-wide approach, (3) that a variety of existing patient flow strategies should be employed, and (4) solving patient flow challenges is complex and additional research is needed (Javidan et al., 2020; Rutherford et al., 2020).

An Overview of ED Patient Flow Research

An overview of ED patient flow research offers a foundation for the contributions of this study. ED patient flow research has been classified into studies that identify the causes, consequences, and solutions of ED crowding (Hoot & Aronsky, 2008; Morley et al., 2018). This section will also discuss the leading approaches that contribute to patient flow literature.

Causes of ED Crowding

Healthcare institutions fail to meet current patient demands despite an oversupply of hospital beds in the US (Rutherford et al., 2020). ED crowding is a complex problem arising from systemic and institutional factors. System-wide issues include a lack of access to primary care and diagnostic services, a high volume of non-urgent patient visits, and growing numbers of complex, elderly patients (Hoot & Aronsky, 2008; Morley et al., 2018). Within a healthcare institution, ED crowding arises from mismatches between demand and staff capacity and inefficient hospital processes that delay patient care and dispositions (Morley et al., 2018; Rutherford et al., 2020). The most commonly reported cause of ED crowding is access block, or the inability to transfer ED patients to an

available inpatient hospital bed (General Accounting Office, 2003; Hoot & Aronsky, 2008; Javidan et al., 2020; Morley et al., 2018).

When compared with research addressing the consequences and solutions of ED crowding, relatively little work has been done to understand the causes of ED crowding (Morley et al., 2018). In the first attempt to comprehensively categorize ED patient flow research according to causes, consequences, and solutions, Hoot and Aronsky (2008) identified 33 articles discussing causes. Ten years later, in a search of literature published between 2000 and 2008, Morley et al. (2018) only found 14, demonstrating a declining focus on studying underlying causes. Scholars also express concern that many proposed ED patient flow solutions are misaligned with the primary contributing factors (Morley et al., 2018), suggesting that current patient flow interventions are unfit to solve the root causes of ED crowding.

In addition to limited research about the causes of ED crowding, patient flow processes are poorly described (De Freitas et al., 2018; Leviner, 2019). Patient flow is complex, and yet, the majority of studies present patient flow as a linear, unidimensional process (Nugus et al., 2011). The role of staff in shaping and determining flow processes is often overlooked (Nugus et al., 2014; Saghafian et al., 2015). This knowledge gap may arise from a lack of qualitative research exploring patient flow processes (De Freitas et al., 2018, 2020; Morley et al., 2018; Nugus et al., 2014). As will be discussed below, the predominant patient flow research approaches are poorly suited for describing the complexities of patient flow. Scholars have called for the use of qualitative approaches to increase our fundamental understanding of patient flow (De Freitas et al., 2018, 2020; Nugus et al., 2014).

Consequences of ED Crowding

Literature describing the consequences of ED crowding is well-established (Morley et al., 2018). ED crowding has negative impacts on patients, staff, and the healthcare system (Javidan et al., 2020; Morley et al., 2018; Rutherford et al., 2020).

ED crowding causes delays in patient care, reduced patient satisfaction, greater lengths of stay (LOS), inappropriate patient placement, and risks to patient safety including medical errors, poor health outcomes, and increased mortality (Javidan et al., 2020; Morley et al., 2018). Patients also face greater risk of discharge with high-risk clinical features and higher rates of readmission (Rasouli et al., 2019). ED crowding harms staff through increased stress, higher rates of violence, and accelerated burnout (Morley et al., 2018; Rutherford et al., 2020). ED staff experience increased workload during periods of overcrowding (Rasouli et al., 2019). Finally, ED crowding impedes hospital-wide efficiency and raises healthcare costs (Javidan et al., 2020; Rutherford et al., 2020).

Patient Flow Solutions

Patient flow research has proposed numerous interventions to address ED overcrowding. Recent efforts to summarize these interventions include an umbrella review by De Freitas et al. (2018), a comprehensive literature review by Morley et al. (2018), the White Paper by Rutherford et al. (2020), and the White Paper by Javidan et al. (2020).

Broadly, interventions can be categorized as (a) changes in workflow processes, (b) changes in resources, and (c) changes in staff roles. Examples of *workflow process* changes include moving patient registration from triage to the bedside, streaming patient

care according to chief complaint or likely disposition, implementing fast tracks for the care of low-acuity patients, changing triage practices, and creating distinct care areas such as short stay units or rapid assessment zones (De Freitas et al., 2018; Javidan et al., 2020; Morley et al., 2018; Rutherford et al., 2020). Changes in *resources* include increasing staff, rescheduling staff according to demand, restructuring the ED spaces and beds, adjusting service hours, implementing technology such as electronic tracking boards or point of care diagnostic capabilities, and introducing new staffing roles such as scribes or dedicated ED radiology staff (De Freitas et al., 2018; Javidan et al., 2020; Morley et al., 2018). Finally, changes in *staff roles* include the incorporation of physicians at triage, empowering triage nurses to place protocol orders, and introducing specialized nursing roles (De Freitas et al., 2018; Morley et al., 2018).

Despite the vast number of proposed solutions, the quality of their supporting evidence is predominately weak or moderate due to a heavy reliance on retrospective, before-after studies (De Freitas et al., 2018; Javidan et al., 2020; Morley et al., 2018). These weak study designs compromise generalizability (De Freitas et al., 2018; Javidan et al., 2020). Many studies also implement multiple interventions at once, confounding outcomes and further impeding successful implementation in other EDs (De Freitas et al., 2018). Most significantly, studies largely offer an intervention but fail to understand *how* or *why* they work (De Freitas et al., 2018). Therefore, many interventional studies do not substantially add to the body of patient flow knowledge.

Patient Flow Approaches

Approaches to improve patient flow predominately emerge from industrial engineering and operations research (OR), operations management (OM), and quality

improvement initiatives (Rutherford et al., 2020; Saghafian et al., 2015). These disciplines shape the analytical methodologies and the perspectives of patient flow researchers.

Operations research (OR) is a discipline that began in England during World War II (Rajgopal, 2001). OR provides a method of systematic analysis for decision-making and problem-solving, drawing from mathematic, economic, and engineering principles (Rajgopal, 2001). OR techniques include qualitative, statistical, and spatial modeling, statistical analysis, mathematical programming and optimization, simulation, and Game Theory (Brailsford et al., 2009; Rajgopal, 2001; Saghafian et al., 2015). Broadly, the application of OR is a process of identifying a problem, formulating a model, solving the model, analyzing results, and implementing solutions (Rajgopal, 2001). Models serve as simplified abstractions of reality, requiring operation researchers to weigh the inclusion of rich detail against the practicalities of model analysis (Rajgopal, 2001). Achieving the right balance of accuracy and feasibility is a challenging task that requires researcher expertise (Rajgopal, 2001). When done well, OR can help researchers better understand large volumes of data, identify satisfactory solutions, and develop heuristics (Rajgopal, 2001).

While the distinction between operations research and operations management (OM) is contested, OM is attributed to the field of business (Rajgopal, 2001). OM techniques arose from the industrial revolution and the work of Federick Taylor (Bhasin, 2020; McLaughlin & Hays, 2008). OM is defined as the design, operation, and improvement of systems and processes (McLaughlin & Hays, 2008). The discipline focuses on supply chain management and logistics, including approaches such as quality

function deployment, root cause analysis, failure mode and effects analysis, and simulation (IOM, 2007; McLaughlin & Hays, 2008).

Despite their significant contributions to patient flow research (Rutherford et al., 2020), several criticisms of OR/OM approaches have been raised. Multiple scholars have noted poor collaboration between OR/OM researchers and hospital staff that reduces the successful implementation of research findings (Mahdavi et al., 2013; Mohiuddin et al., 2017; Saghafian et al., 2015). Several studies have also critiqued the transparency, methodological rigor, and quality of data in OR/OM research (Mohiuddin et al., 2017; Ortíz-Barrios & Alfaro-Saíz, 2020; Saghafian et al., 2015; Wiler et al., 2011). Nurses and physicians tend to be skeptical that mathematical modeling and simulations offer accurate representations of the realities of working in the ED (Saghafian et al., 2015). Current OR/OM research is criticized for insufficiently considering patient heterogeneity, system complexity, and behavioral aspects of care delivery (Mohiuddin et al., 2017; Ortíz-Barrios & Alfaro-Saíz, 2020; Saghafian et al., 2015). Indeed, OR/OM approaches largely fail to incorporate the role of human agency in shaping patient flow processes (Nugus et al., 2014). Therefore, several authors have emphasized the need for research to represent ED patient flow processes more accurately (Bergs et al., 2016; Mohiuddin et al., 2017; Ortíz-Barrios & Alfaro-Saíz, 2020; Saghafian et al., 2015).

Responding to this call, within the broad field of OR/OM approaches, some researchers have begun to grapple with the complexity of patient flow processes. The use of systems thinking and complexity theory has recently risen, embracing approaches such as complex adaptive systems (CAS) and agent-based simulation (Rusoja et al., 2018). These methods offer greater consideration of dynamic processes, unpredictability, and

interactions between agents than traditional simulation and modeling strategies (Rusoja et al., 2018). The popularity of Lean and Six Sigma methodologies has also grown recently within OM research (Morley et al., 2018), embracing more holistic approaches to identifying process improvement solutions (Tlapa et al., 2020). Nevertheless, the use of systems thinking and complexity theory, including agent-based simulation, has remained predominately theoretical and its practical applications are undemonstrated (Mohiuddin et al., 2017; Rusoja et al., 2018). The use of Lean and Six Sigma methodologies to improve healthcare process is similarly criticized as immature, lacking generalizability, lacking rigor (Moraros et al., 2016; Tlapa et al., 2020), and as fundamentally poorly suited to address emergency healthcare delivery processes (Gifford et al., 2022). Innovative research approaches are needed to shift the research paradigm and improve current understanding of patient flow (Bergs et al., 2016).

The Role of Nurses in Patient Flow

The voice of nurses is largely absent from patient flow literature. Nursing research and engagement is scant even within Lean studies, where nurses have been identified as key leaders and implementers (Magalhães et al., 2016; Tlapa et al., 2020). The first systematic review and appraisal of the role and contributions of nurses to ED patient flow was performed by Sharma et al. in 2020. Authors concluded that nurses have unique expertise and an intimate knowledge of patient flow processes, but there is little understanding of how patient flow management is performed (Sharma et al., 2020).

The implementation of various specialized nursing roles has grown internationally in response to patient flow challenges (Cameron & Shaw, 2020; Sharma et al., 2020). These roles include bed coordinators, ED case managers, nurse navigators, flow

coordinators, and expanded clinical roles (Sharma et al., 2020). The use of nurses in specialized patient flow management roles is effective at reducing LOS, triage time, ED crowding, and LWBS rates (Berg et al., 2020; De Freitas et al., 2018; Sharma et al., 2020). Interestingly, physicians placed in similar flow management roles do not achieve equal benefits (Berg et al., 2020). Although the use of these specialized nursing roles is an effective patient flow intervention, they are poorly understood (Sharma et al., 2020; Wise et al., 2021).

A lack of awareness of how nurses perform patient flow management is reflective of a larger culture that de-emphasizes the organizing work of nurses (Allen, 2015b). The term “organizing work” was coined by sociologist Davina Allen to describe the ways in which nurses organize and coordinate patient care, accumulate information and hold a global view of patient needs, drive patient care trajectories, perform bed management, and manage care transfers. This organizing work has been largely invisible to the profession and has received little scholarly attention or research (Allen, 2015b). Instead, the nursing profession has predominantly defined its work around the concept of caring (Smith, 2019; Turkel et al., 2018), minimizing the many “indirect” care tasks that nurses perform (Allen, 2015c).

Conclusion

This chapter has provided a brief history of patient flow and emergency care, an overview of ED patient flow literature, and an introduction to the role of nurses in patient flow management. Several critical knowledge gaps were revealed, including a lack of qualitative research describing the complexities of patient flow processes and little understanding of the work of ED nurses performing patient flow management. ED

crowding is a nationwide crisis with severe consequences on the health of our patients, our healthcare staff, and our institutions. New approaches and solutions are needed.

CHAPTER 2

THE CONCEPTUAL BASIS OF PATIENT FLOW MANAGEMENT

Introduction

The body of literature describing patient flow within the ED context is substantial. Research focused on patient flow management is more limited and poorly defined. As the core concept of this research, this chapter will first describe the conceptual basis of patient flow management through an examination of existing patient flow conceptual models, a concept analysis, and an expanded concept analysis.

Conceptual Models of ED Patient Flow

Several authors have offered models to understand ED patient flow. Three are presented below that describe (1) patient flow within the ED, (2) patient flow within the acute care system, and (3) patient flow within the macro healthcare system.

(1) Fineberg and Stewart (1977) developed an early conceptual model of patient movement through the ED in which they conceived five different “patient stations:” triage, initial evaluation, x-ray/laboratory/consultation, re-evaluation, and disposition. This simple model provided the basis for timing and counting of patient care at each station to support early analysis of ED operations and quality control (Fineberg & Stewart, 1977). Fineberg and Stewart (1977) also provided a modification of their most basic model to reveal that patients may travel through these stations differently in varied patient care pathways.

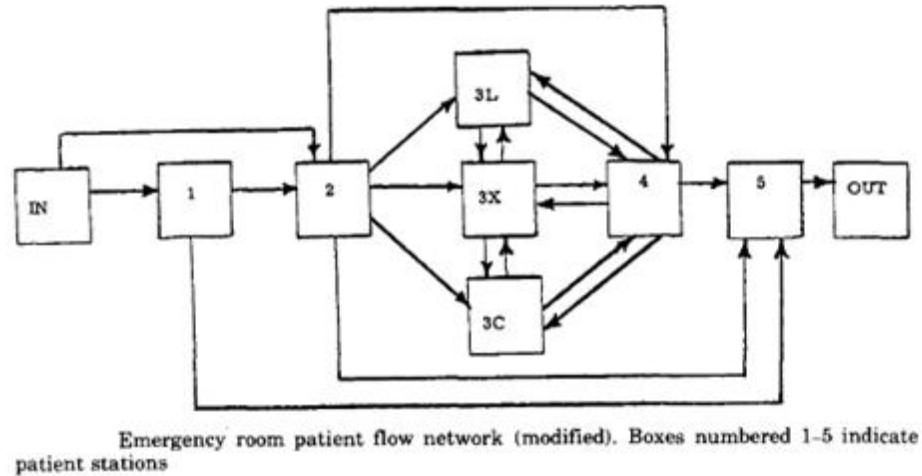


Figure 2.1: Analysis of patient flow in the emergency room. Fineberg, D. A., & Stewart, M. M. (1977). Analysis of patient flow in the emergency room. *Mt. Sinai Journal of Medicine*, 44(4), 551–559.

(2) Asplin et al. (2003) created the conceptual model of ED patient flow that has become dominant throughout patient flow literature. Their paper further simplified the stages of ED care and placed the ED within the context of the acute care system. Their model proposed three interconnected components of ED patient flow including input, throughput, and output. The input component identifies sources of demand for ED care, including emergency care, unscheduled urgent care, and safety net care for patients with care accessibility barriers. The throughput component provides a framework for the ED patient care journey, including patient arrival, triage and room placement, diagnostic evaluation, and ED treatment. Throughput also contains the boarding of ED patients. Finally, the output component addresses the disposition of ED patients, including patients who leave without being seen, patients who are discharged to the ambulatory care system or are transferred to other healthcare facilities, and patients who are admitted to the hospital. Feedback loops demonstrate that lack of access to follow-up

care and lack of inpatient hospital bed capacity cause patients to return or remain in the ED (Asplin et al., 2003). This “input/throughput/output” model has been broadly used as a framework for understanding ED crowding causes, consequences, and solutions.

The input-throughput-output conceptual model of ED crowding.

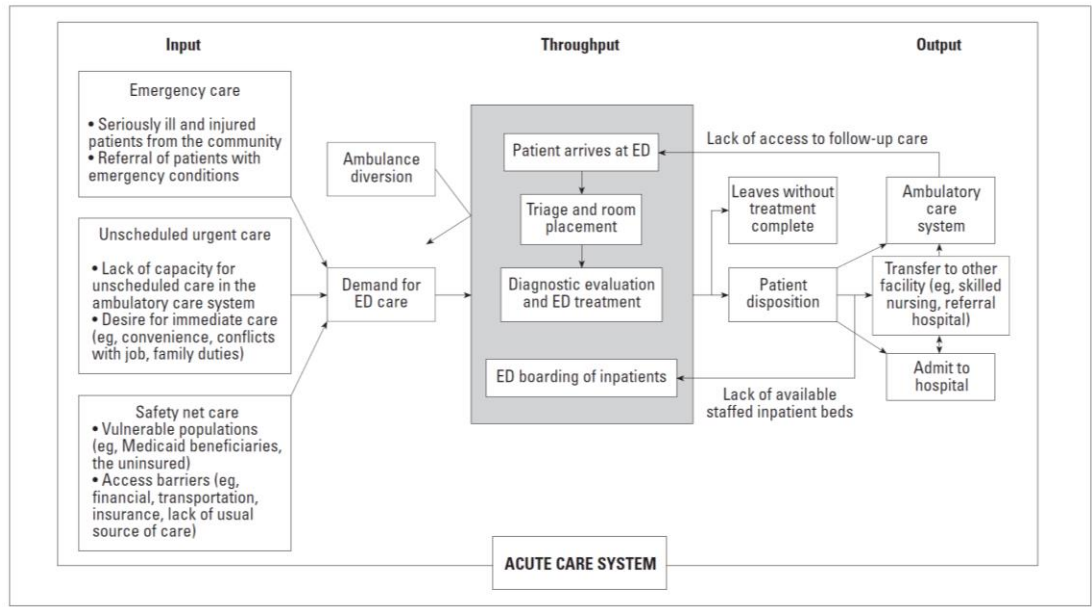


Figure 2.2: A conceptual model of emergency department crowding. Asplin, B. R., Magid, D. J., Rhodes, K. V., Solberg, L. I., Lurie, N., & Camargo, C. A., Jr. (2003). *Annals of Emergency Medicine*, 42(2), 173–180. <https://doi.org/10.1067/mem.2003.302>

(3) In 2006, Randolph Hall published the self-described first book focusing on the topic of reducing patient delays. In this prominent text, Hall presented a model of Health Care as a System (Hall, 2006). In this model, the emergency department is the smallest level of a larger “system of systems” that encompasses the department, the healthcare center, the regional health system, and finally the macro health system. Hall (2006) describes the macro health system as six states that determine a person’s level of engagement in the healthcare system throughout their lifespan: periods of wellness, preventative visits, illness, treatment visits, recuperation, and post-care visits. Therefore,

a person enters the macro health system at the time of their birth and leaves upon their death (Hall, 2006). This model emphasizes a more systematic and holistic understanding of patient flow than the previous two models.

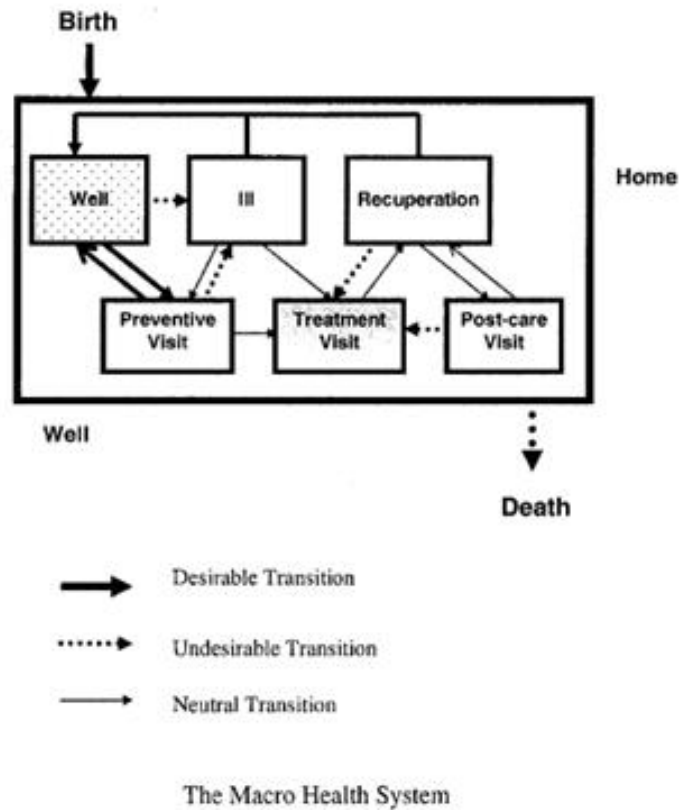


Figure 2.3: Modeling patient flows through the healthcare system. Hall, R. W., Belson, D., Murali, P., & Dessouky, M. In R. W. Hall (Ed.) *Patient flow: Reducing delay in healthcare delivery*. Springer; 2006:1–44.

These three models each add understanding to the concept of patient flow. One could imagine these three models superimposed on top of one another. The model proposed by Fineberg and Stewart (1977) is the smallest in scope, but highlights the multi-step processes and variability of ED patient care. Fineberg and Stewart’s (1977) model adds detail to Asplin’s (2003) model by clarifying the “diagnostic evaluation and ED treatment” element within the throughput component of the ED. Asplin’s (2003)

model situates patient flow within the acute care system, explaining broader causes of ED overcrowding that encompass both input and output factors. Asplin's (2003) model focuses on the treatment of patients requiring ED care, but Hall (2006) situates ED patient flow in the wider context of a patient's lifelong health. Hall's (2006) model illuminates macro solutions to addressing ED patient flow that include improving access to preventative care and reducing periods of illness and recuperation. Together, these three models of patient flow illustrate the movement of patients through the emergency department, the acute care system, the regional health system, and macro health system. Notably, they all present patient flow as linear movement through multiple stages of care. These three models lay the groundwork for this dissertation because they demonstrate the historical context and dominant conceptualizations of ED patient flow. Next, a concept analysis was performed to bring clarity to the meaning of "patient flow management."

An Analysis of the Concept of Patient Flow Management

This is the accepted version of the following article: Benjamin, E., & Jacelon, C. (2021). An analysis of the concept of patient flow management. *Nursing Forum*, 1–8. <https://doi.org/10.1111/nuf.12681>, which has been published in final form at <https://onlinelibrary.wiley.com/doi/10.1111/nuf.12681>

Abstract

Aim: To analyze the concept of patient flow management.

Background: Patient flow has a significant impact on the provision of patient care. The term "patient flow" is widely used, but the related concept of "patient flow management" has been poorly defined. The ability to differentiate and clarify the term patient flow management has implications on strategies to improve patient flow.

Design: Rodgers evolutionary method of concept analysis.

Data Source: Literature published between 2000 and 2021 in the PubMed, CINAHL, and Business Source databases.

Review Methods: Inductive analysis of the literature was performed to identify the usage and features of the concept.

Results: Patient flow management is defined as the application of holistic perspectives, dynamic data, and complex considerations of multiple priorities to enable timely, efficient, and high-quality patient care. Patient flow management requires the identification of a patient, care processes, a flow manager, and frontline staff. It has profound consequences on patient, staff, and hospital system outcomes.

Conclusions: Literature should more carefully delineate between “patient flow” and “patient flow management.” Effective patient flow management increases the speed and quality of patient care, improves employee satisfaction, and reduces healthcare costs. Strategies to improve patient flow management should focus on understanding the role and interventions of flow management nurses.

Keywords: administration, concept analysis, management, role development

Introduction

Emergency department (ED) crowding fundamentally threatens the delivery of safe patient care worldwide (Javidan et al., 2021). ED crowding is associated with delays in treatment, unnecessary patient suffering, adverse medical outcomes, increased healthcare costs, and reduced efficiency (Hall et al., 2006; Javidan et al., 2021). This crowding is a symptom of ineffective management of patient flow throughout the hospital system (Hall et al., 2006). The issue is confounded by inconsistent use of terminology

and by a poor understanding of how flow is managed. To address these problems, we performed a concept analysis of patient flow management.

Background

In 2021, the International Federation of Emergency Medicine (IFEM) constructed a task force to study ED crowding (Javidan et al., 2021). They criticized the term “ED crowding” because it frames crowding as an ED, rather than a hospital-wide, issue (Javidan et al., 2021). The phrase “patient flow” has been suggested in place of “ED crowding” to help researchers address this severe public health problem (Asplin, 2006)

Our concept analysis adds to this discussion by differentiating the concepts “patient flow” and patient flow management. “Patient flow” is defined as “the progressive movement of patients through care processes” (De Freitas et al., 2018, p. 4). This term was first used in operations research in the 1960s (Fetter & Thompson, 1965; Fetter & Thompson, 1969). The related, but distinct, concept patient flow management was first described as *facilitation* of the movement of patients within a hospital system (McDonald, 1990). Definitions of patient flow management are scarce, creating a lack of clarity on its use and meaning (Alhaider et al., 2020; Sharma et al., 2020). The research on interventions to improve ED “patient flow” is vast (De Freitas et al., 2018), however, only a small segment of this research focuses on patient flow management. The first step in developing effective strategies for patient flow management is comprehensively describing the concept.

Research Questions

Two research questions are addressed:

1. What are the defining attributes of the concept patient flow management when used in the context of an inpatient hospital setting?
2. What are the contextual features of patient flow management, including its antecedents, consequences, surrogate terms, references, and related concepts?

Methods

Concept analysis is a tool for synthesizing understanding of the attributes and boundaries of a concept (Knafl & Deatrck, 2000). This paper will use the evolutionary method developed by Rodgers, which emphasizes the context and dynamic nature of concepts, and relies on inductive analysis of a concept's usage in existing literature (Rodgers, 2000). The primary activities of this method include identifying the concept, defining the setting and sample for data collection, identifying the attributes of the concept, and recognizing its contextual features, including the antecedents, consequences, surrogate terms, related concepts, and references. Researchers then describe an exemplar and consider the implications of the concept analysis, including future nursing theory and knowledge development (Rodgers, 2000).

Data Sources

Data sources included literature published between 2000 and 2021 in PubMed, CINAHL, and Business Source databases. These parameters were established to include holistic nursing, medical, and business perspectives. Patient flow management is a concept applied in several patient care settings, such as urgent care centers, ICUs, or surgical wards. To capture the issue of ED crowding within an inpatient hospital setting, the keywords "flow management" and "emergency" were used along with the following criteria:

- Inclusion criteria: Literature written in English in the selected databases that discussed patient flow management in the ED and the wider inpatient hospital context.
- Exclusion criteria: Literature limited to specialty units or outpatient settings, and literature where the full text was not available.

The search methodology is summarized in the PRISMA flow diagram (Moher et al., 2009) in Figure 2.4. The initial search identified 113 articles, of which 25 were included as data. Because the term “flow management” is used by other disciplines, such as traffic control and water management, for clarity we use the phrase patient flow management.

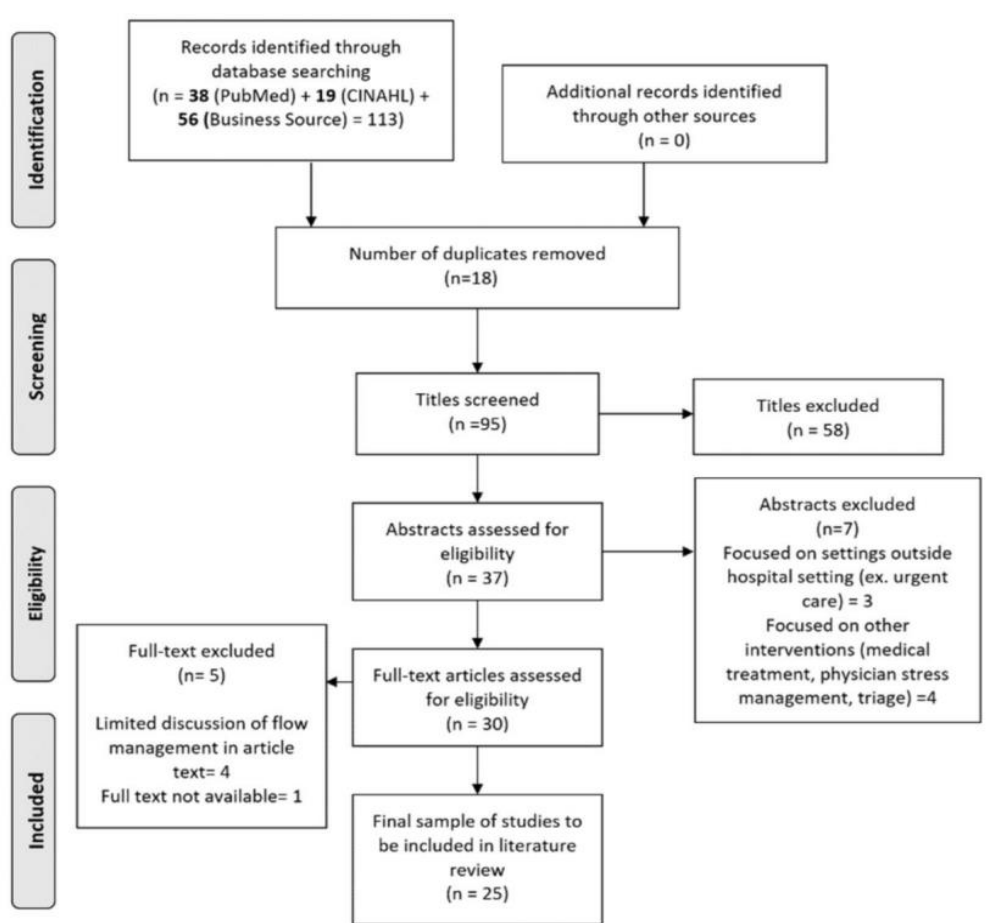


Figure 2.4: PRISMA diagram.

Data Analysis

Inductive analysis was conducted after reading the full text of the 25 articles. As Rodgers (2000) instructed, due to the infrequency of actual, provided definitions, consideration was made for any statements that described the usage or features of the concept. Primary attention was given to identifying major themes across the literature.

Results

Defining Attributes

Across the 25 articles reviewed, one explicit definition was found, stating “Flow management is constructed by multiple professionals through a series of intertwined activities and interactions that enable patient throughput” (Boiko et al., 2020, p. 1). While this description reflects the complexity of patient flow management, the heart of the statement, “enable patient throughput,” merely substitutes one synonymous expression for another (Rodgers, 2000). Other authors alluded to six defining attributes of patient flow management, which are decision-making that is (1) holistic, (2) dynamic, (3) complex, (4) concerned with timeliness, (5) concerned with efficiency, and (6) concerned with high-quality care. These attributes (see Table 2.1) are used to offer a new, richer definition of patient flow management that more clearly identifies the boundaries of the concept (Rodgers, 2000).

Table 2.1: Concept attributes and supporting literature evidence.

Attribute	Supporting Quotation
Holistic Perspectives	<p>“To ensure continuous care delivery, solving flow problems must not be limited to one unit, but should be extended to other departments—a prerequisite for solving flow problems in the entire hospital” (Winasti et al., 2018, p. 718)</p> <p>“Maximizing patient flow must consider the entire system of care” (Alhaider et al., 2020, p. 684)</p>
Dynamic Data	<p>“To model patient flows and random patient arrivals (such as occurs in emergency departments), however, different methods are needed to incorporate the element of randomness” (González et al., 2019, p. 289)</p> <p>“Nurses’ perspectives suggest that inaccurate bed census data, delays in information seeking and processing leads to flow challenges” (Sharma et al., 2020, p. 16)</p>
Complex Considerations	<p>“Hospitals around the world continue to struggle to manage patient flow effectively given the complexities of the normal admission, discharge, and transfer process— many processes must be completed in synchrony” (Lovett et al., 2016, p. 255)</p> <p>“The movement of a patient depends on a complex sequence of processes that encompass communications, movements of equipment between departments, and coordination between staff and external organizations for delivering patient care” (Alhaider et al., 2020, p. 683)</p>
Concerned with Timeliness	<p>“Patient flow means providing patient care in the most clinically appropriate, timely and cost-effective way possible” (Jensen, 2004, p. 27)</p> <p>“We want to emphasize that studying inpatient flow dynamics at hourly resolution and capturing time-of-day performance are important, especially when one evaluates policies that impact the interface between the ED and wards, where hours of waiting matter” (Shi et al., 2016, p. 4)</p>
Concerned with Efficiency	<p>“In hospitals, several patient flows compete for access to shared resources” (Winasti et al., 2018, p. 718)</p> <p>“The main function of this [logistics management] team is efficient placement of a patient” (Healy-Rodriguez et al., 2014, p. 139)</p>
Concerned with High-Quality Care	<p>“Streamlining patient flow can provide a better use of available hospital resources by reducing waste (e.g., idling bed), and thereby treat more patients without sacrificing quality of care” (Alhaider et al., 2020, p. 683)</p> <p>“Decreasing wait times and crowding in the ED increases quality of care and improves patient health outcomes” (Patey et al., 2019, p. 655)</p>

Holistic Perspectives

Patient flow management requires a holistic, system-wide perspective. Just as ED crowding is recognized as a problem arising from the entire health system (Crilly et al., 2015), management of patient flow must include all aspects of a patient care journey (Alhaider et al., 2020; Patey et al., 2019; Winasti et al., 2018). Flow managers consider system-wide staffing, capacity, and resources in order to avoid resource mismatching and inefficiencies (Alhaider et al., 2020; Lovett et al., 2016).

The implementation of patient flow management interventions requires multi-disciplinary support and collaboration between employees across a hospital (Alhaider et al., 2020; Alishahi Tabriz et al., 2019; Lovett et al., 2016). Organizational culture and teamwork have a significant impact on success (Boiko et al., 2020; Lovett et al., 2016). These holistic strategies can improve patient flow metrics such as ED and inpatient length of stay (Healy-Rodriguez et al., 2014; Lovett et al., 2016).

Dynamic Data

Patient flow management is based on dynamic data of variable quality. Variability in the rate of patient arrivals, including ED arrivals, admissions, and scheduling of elective surgeries, is the most prominent factor impacting patient flow (Winasti et al., 2018). Rates of daily patient admissions, discharges, and transfers are challenging to predict (González et al., 2019). Flow managers must accommodate rapid, fluctuating changes in patient volumes (Kriegel et al., 2016). Dynamic decision-making might involve opening extra nursing units, adjusting the operating room schedule, discharging patients (Winasti et al., 2018), or transferring patients to different units in response to the variable patient census (González et al., 2019).

Flow managers contend with inaccurate patient flow data, including incorrect bed availability and patient census numbers (Healy-Rodriguez et al., 2014; Sharma et al., 2020). Real-time data processing is essential for patient flow management to ensure that their information is accurate and up-to-date (Boiko et al., 2020; Jessop, 2014; Lovett et al., 2016; McLeod et al., 2010).

Complex Considerations

Patient flow management is a complex process (Alhaider et al., 2020; Lovett et al., 2016; Nugus et al., 2011; Sharma et al., 2020). This complexity is created by a multitude of actors, simultaneous processes, and considerations. The complexity requires flow managers to have specific training and a wide range of flow management strategies (Campbell & Sinclair, 2004; Chan et al., 2020; Healy-Rodriguez et al., 2014; Sharma et al., 2020).

First, complexity arises from the need for coordination between many professionals (Alhaider et al., 2020; Gilardi et al., 2014) across multiple settings (González et al., 2019). These include medical providers, nurses, bed managers, case managers, environmental managers, patient transporters, transfer coordinators, and pre-hospital providers (Sharma et al., 2020).

Second, complexity results from the need for management of multiple simultaneous processes for patients at different stages of care (Gilardi et al., 2014). Flow managers must consider admission, transfer, and discharge processes (Lovett et al., 2016). Several flow processes occurring at the same time, such as the separation of adult and pediatric patients in the ED, adds further complexity (Kim et al., 2014).

Third, complexity is created by the need to consider several, often conflicting, priorities and stakeholders (Kriegel et al., 2015). Flow managers must contend with barriers to patient flow stemming from power imbalances between providers, including disagreements about the necessity of consults or admission to specialist teams (Boiko et al., 2020). The workload and stress levels of nurses and providers must also be considered (Nugus et al., 2011; Song et al., 2015). The decision to assign a patient to a particular bed might be influenced by the acuity of patients in a nurse's assignment, the skill set of that nurse, or the time since his/her last patient arrival (Nugus et al., 2011). Staffing, administrative, and resource considerations must be balanced with considerations of patient acuity, severity, and complexity (Nugus et al., 2011).

Finally, external pressures such as national benchmarks, financial concerns, and target wait times affect the patient flow management process (Boiko et al., 2020; Patey et al., 2019). Flow managers are held responsible for increasing the speed of patient flow and maximizing efficiency (Boiko et al., 2020).

Concerned with Timeliness

Successful patient flow management is timely (Boiko et al., 2020; Jensen, 2004; Shi et al., 2016). Rapid patient treatment and measurement and enforcement of time-based targets are critically important. Patient flow management that minimizes ED wait times is crucial for timely life-saving interventions for the most critical patients and increases the number of patients providers can treat (Hogan et al., 2012). Inpatient admission wait times also affect patient outcomes and are a focus of patient flow managers (Shi et al., 2016).

Flow managers face the pressures of meeting external benchmarks for wait times (Boiko et al., 2020). Hospital administrators track and measure the rate of patient flow (Alhaider et al., 2020). Patient flow management effectiveness is described in terms of delays and blockages (Alhaider et al., 2020; Crilly et al., 2015; Lovett et al., 2016; Winasti et al., 2018). When delays are encountered, flow managers rely on rapid communication, problem-solving, and negotiating with providers to increase the rate (Boiko et al., 2020).

Concerned with Efficiency

Patient flow management occurs within the context of restricted resources. Decision-making is limited by number of beds, physical space, staffing, and equipment (Nugus et al., 2011; Winasti et al., 2018). Therefore, patient flow management is a process of matching supply and demand (Lovett et al., 2016; Winasti et al., 2018), including rationing, prioritization, and concern with efficiency (Healy-Rodriguez et al., 2014; Pires et al., 2019; Song et al., 2015).

Concerned with High-Quality Care

The final goal of patient flow management is high-quality patient care (Jensen, 2004; Kriegel et al., 2016; Nugus et al., 2011). This was defined by care that is clinically appropriate, safe, and that improves the patient experience (Lovett et al., 2016) and satisfaction (Jensen, 2004; Patey et al., 2019). Patient flow management, most notably its impact on wait times, significantly shapes patients' perceptions of care regardless of the clinical care quality (Hogan et al., 2012). Patient flow management requires consideration of patient clinical needs (Alhaider et al., 2020), severity (González et al., 2019; Healy-

Rodriguez et al., 2014), nursing workload, and staff skill level (Nugus et al., 2011) to maximize patient safety.

Summary of Defining Attributes

Using the six essential attributes, a new definition of patient flow management is proposed: Patient flow management is the application of holistic perspectives, dynamic data, and complex considerations of multiple priorities to enable timely, efficient, and high-quality patient care. Reflecting on the nominal definition (Rodgers, 2000) to “enable patient throughput,” (Boiko et al., 2020) this new definition clarifies both *how* and *why* patient flow management endeavors to improve patient flow.

Antecedents

After identifying the essential attributes of a concept, the temporal context is examined (Rodgers, 2000). Antecedents are conditions that must be present *before* the manifestation of a concept. In the context of an acute care hospital system, there are four antecedents to patient flow management: a patient, care processes, the flow manager, and frontline staff.

While usage of the concept patient flow management is applied most often in the context of multiple patient pathways (Boiko et al., 2020; Jensen, 2004), patient flow management decisions have also been described in terms of individual patients (Kriegel et al., 2015) or “patient-by-patient” (Jensen, 2004). Therefore, the first antecedent is simply the identification of a patient.

The second antecedent is a set of care processes. Patients are moved through these care processes, which are defined by the scope of the care setting. Some authors were found to focus only on the ED (Campbell & Sinclair, 2004; Chan et al., 2020; Hogan et

al., 2012), while others also describe the inpatient setting (Alhaider et al., 2020; Alishahi Tabriz et al., 2019). Care processes include ambulance transport (Househ & Yunus, 2014; McLeod et al., 2010) arrival to the ED (Chan et al., 2020; Nugus et al., 2011), triage, allocation to an ED bed, ED treatment, diagnosis, hospital admission (Nugus et al., 2011), inpatient bed assignment, transport from the ED to the inpatient unit (Alhaider et al., 2020), inpatient therapy (Kriegel et al., 2015), external transfer, and discharge (Alhaider et al., 2020).

Third, patient flow management requires a flow manager. Actors in this role include nurse managers, medical directors, directors of clinical operations, hospital executives (Alishahi Tabriz et al., 2019), transfer operators, admission coordinators, case management supervisors, internal/external transport coordinators (Alhaider et al., 2020), flow coordinators, bed managers, nurse navigators, clinical site supervisors, and discharge nurse navigators (Sharma et al., 2020). Patient flow management teams might also incorporate ED leadership, or leadership from environmental services and patient transport departments (Lovett et al., 2016). Providers also play an integral role by managing patient trajectories with diagnosis, admission, and discharge decisions (Campbell & Sinclair, 2004; Nugus et al., 2011; Song et al., 2015). These roles perform patient flow critical-thinking and strategizing that differentiates them from frontline staff.

The final antecedent is frontline staff who treat, perform diagnostic tests, and facilitate the physical movement of patients. These staff members include nurses, transporters, and environmental workers (Alhaider et al., 2020), ambulance workers (Gilardi et al., 2014), phlebotomists (Boiko et al., 2020), x-ray and laboratory staff, specialty consults, and registration clerks (Song et al., 2015). Flow managers must

coordinate with the frontline staff who complete the tasks necessary to advance patients through their care processes.

Consequences

The second element of the temporal context is a concept's consequences (Rodgers, 2000). Patient flow management has broad consequences on patient, staff, and system outcomes.

Consequences on patient outcomes include both the speed and quality of care. Frequently cited metrics include ED and inpatient length of stay (Alishahi Tabriz et al., 2019; Healy-Rodriguez et al., 2014; Jensen, 2004; Patey et al., 2019) and wait times, including the time to initial provider evaluation (Kim et al., 2014; Kriegel et al., 2015; Kriegel et al., 2016). Patient flow management also influences left without being seen (LWBS) rates (Alishahi Tabriz et al., 2019; Jensen, 2004; Patey et al., 2019), patient satisfaction, and patient safety (Jensen, 2004; Lovett et al., 2016). Small changes in ED wait times impact patient outcomes (Chan et al., 2020), and prolonged waits for transfers to the ICU are associated with higher patient mortality (González et al., 2019; Pires et al., 2019).

Consequences of patient flow management also include staff and system outcomes, including staff stress levels, employee satisfaction (Jensen, 2004; Lovett et al., 2016), healthcare costs (Alhaider et al., 2020; Kriegel et al., 2015; Winasti et al., 2018), and utilization of medical resources (Kriegel et al., 2015). As Lovett et al. (2016) succinctly explain, “A performance improvement initiative focused on improving patient flow [has] the potential to impact every aspect of the operation” (p. 247).

Surrogate Terms and Related Concepts

Surrogate terms are words or phrases that are used interchangeably with a concept, while related concepts are connected ideas that have distinct attributes and definitions (Rodgers, 2000). Surrogate phrases identified include “flow coordination” and “improving patient flow.” While not explicitly defined, “flow coordination” denotes the desire to manage patient flow and was used when describing a team similar to a patient flow management team (Alishahi Tabriz et al., 2019). The phrase “improving patient flow” was defined as the optimization of resources along the patient journey (Lovett et al., 2016), and has been used interchangeably with patient flow management (Winasti et al., 2018). Several authors were found to use the phrase “patient flow” instead of patient flow management (Jensen, 2004; Kriegel et al., 2015; Nugus et al., 2011). This usage incorrectly equates the *movement* of patients with the *action* of directing this movement. “Patient flow” is a related concept but should not be used as a surrogate term.

Other related concepts include “ED throughput,” defined as the quantity of patients treated per hour (Campbell & Sinclair, 2004), and “ED crowding,” when patient arrivals exceed discharges and transfers out of the department (Nugus et al., 2011). “Patient logistics” and “patient flow logistics” also describe the movement of patients but do not encompass the management and critical thinking of patient flow management (Kriegel et al., 2015; Kriegel et al., 2016).

Interdisciplinary/Sociocultural Context and References

The contextual basis of a concept is the conditions in which it is used and how it is used by different people (Rodgers, 2000). References are defined as real-life situations in which the concept is applied (Rodgers, 2000). Patient flow management is an interdisciplinary concept. We found that it was discussed in business, medicine, and

nursing journals. Among the articles included in this analysis, 13 discussed the impacts of a specific patient flow intervention. Other studies utilized qualitative data to identify patient flow management barriers and strategies (Alhaider et al., 2020; Boiko et al., 2020; Campbell & Sinclair, 2004; Nugus et al., 2011; Winasti et al., 2018). Two studies retrospectively evaluated the impact of flow decisions on patient outcomes (Pires et al., 2019) or metrics such as ED wait times (Kim et al., 2014).

To summarize, the concept of patient flow management was applied when examining the impact of a specific intervention on patient flow, when identifying barriers or strategies to improve patient flow, or when studying the impact of flow decisions on patient care. Patient flow management is a concept that is described by several disciplines and used across hospital departments.

Exemplar

Exemplars can help clarify and define a concept (Rodgers, 2000). It may be appropriate to review additional literature to identify an exemplar when concepts are in early stages of development (Rodgers, 2000). Patient flow management is exemplified by bed coordinators, who determine patient bed assignments (Alhaider et al., 2020; Boiko et al., 2020; Jensen, 2004; Lovett et al., 2016; Sharma et al., 2020). One element of this decision is whether to assign a patient to a single- or multiple-occupancy room (Bloomer et al., 2016).

The act of determining room occupancy meets the four antecedents of patient flow management. Bed coordinators act as *patient flow managers* who perform the critical thinking of this decision (Bloomer et al., 2016). They depend on *frontline staff* who provide the cleaning, transport, and paperwork required to move patients to new

rooms (Bloomer et al., 2016). The need to determine room occupancy arises from the progression of *patients* through *care processes*, including the admission of ED patients to an inpatient floor and the provision of inpatient therapy that advances patients toward discharge.

Determining whether a patient is assigned to a single room requires careful consideration of the individual patient's needs when balanced with competing patient needs and overall hospital capacity (*holistic perspectives*) (Bloomer et al., 2016). Bed coordinators weigh many factors including patient behavior, whether the patient has a communicable disease, patient insurance, the specialty equipment inside each room, and family preferences (*complex considerations*; Bloomer et al., 2016). These considerations are in constant flux due to unpredictable ED admissions and changing patient needs (*dynamic data*). For example, patients may suddenly require a private room when they become dangerous, disruptive, infectious, or when they near death (Bloomer et al., 2016). In these situations, rapid room adjustments are needed for patient and staff safety, or to accommodate family visitation before a patient passes away (*concerned with timeliness*; Bloomer et al., 2016). In fact, bed coordinators reported that the safety concerns of infection control and violent behavior were the most compelling reasons to place patients in single-occupancy rooms (*concerned with high-quality care*; Bloomer et al., 2016). While facing these fluctuating needs and weighing the interests of multiple patients waiting for an available single-occupancy room, bed coordinators endeavor to achieve the optimal bed assignment to prevent wasting resources needed to make room change adjustments (*concerned with efficiency*; Bloomer et al., 2016).

Room occupancy decisions have consequences on patients, staff, and the hospital system. Patients in single-occupancy rooms perceive greater privacy and dignity but may also suffer from loneliness and increased anxiety (Bloomer et al., 2016). Nurses report that having a private room shapes the care they can provide, providers want their patients' room assignments closer to their offices, and environmental workers' workload is increased by frequent bed assignment changes (Bloomer et al., 2016). The ability of bed coordinators to match patients efficiently to the right room impacts hospital capacity, and the placement of a patient with private insurance in a single-occupancy room increases hospital revenue (Bloomer et al., 2016). Thus, although establishing room occupancy is just one consideration in a plethora of bed coordinator decisions, it highlights the features of patient flow management.

Implications and Discussion

One of the most important outcomes of a concept analysis is the identification of future areas for research (Rodgers, 2000). One critical topic for inquiry is the role of patient flow management nurses. Nurses conduct patient flow management in roles including flow nurses, navigator nurses, site managers, bed management nurses, and discharge planners (Sharma et al., 2020). While their impact is significant, nursing contributions to patient flow were only recently systemically reviewed (Sharma et al., 2020). Additional research is needed to capture their potential (Sharma et al., 2020).

Patient flow management strategies is another area for exploration. We found little delineation between the terms "patient flow management" and "improving patient flow." This suggests that there is poor distinction between hospital-wide, administrative interventions such as building extra beds or hiring more staff (Winasti et al., 2018), and

the day-to-day strategizing of patient flow management nurses and teams. Inpatient flow management research has focused on interventions that require additional resources, with little focus on how to optimize existing capacity (Winasti et al., 2018). Research on the critical-thinking and problem-solving of patient flow management nurses could be an opportunity to identify more cost-effective and feasible strategies (Sharma et al., 2020). Future inquiry could focus on examining patient flow management as a nursing intervention, as opposed to executive decision-making.

Finally, concepts analyzed through the evolutionary method are not viewed as static or definitive (Rodgers, 2000). Instead, concept analyses aim to provide the clarity necessary for future research and concept development (Rodgers, 2000). There are many other considerations that were not found in this inductive analysis of literature, but that warrant further investigation to clarify our understanding of patient flow management.

Conclusion

Through the process of concept analysis, we have clarified the concept of patient flow management by identifying the defining attributes, including decision-making that is holistic, dynamic, complex, concerned with timeliness, concerned with efficiency, and concerned with high-quality care. Patient flow management requires the identification of a patient, care processes, a flow manager, and frontline staff. Patient flow management has extensive consequences on patient, system, and staff outcomes. It is a concept that is shaped by the work of multiple disciplines and is applied across the hospital system. As the exemplar illustrated, knowledge and application of patient flow management principles can significantly impact the provision of care. Future research should continue

to expand the understanding of patient flow management with a focus on the role and strategies of flow management nurses.

“Nurses Are Every Bit of Flow:” Emergency Department Nurses’ Conceptualization of Patient Flow Management

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Abstract

Aim: To validate and refine Benjamin and Jacelon's 2021 definition of patient flow management using the experience and knowledge of practicing emergency department nurses.

Background: Patient flow requires complex, real-time decision-making to match patients to limited resources and facilitate their movement through care processes. A literature-based concept analysis of patient flow management was first performed in 2021, but the voice of nurses is largely absent from existing patient flow research.

Design: This study employed an expanded concept analysis methodology, as articulated by Kathleen Cowles.

Data source: Focus groups of nine emergency nurses were conducted.

Results: Emergency nurses' conceptualization of patient flow management differs from the definition as it has emerged through patient flow literature. Patient flow management is a nurse-driven process that relies on nursing knowledge and the work of all emergency nurses, including bedside nurses. Emergency nurses perceive the ultimate goal of patient flow management to be the collective safety of patients, and they work to promote patient safety within their own scope of responsibility.

Conclusion: Understanding patient flow management as a nurse-driven process emphasizes the importance of nurse training and capacity to effective patient flow. Future research should explore the role of emergency nurses as active directors, rather than passive components, of patient flow. More work is needed to investigate this complex nursing task.

Keywords: concept analysis, emergency department, emergency nurses, organizing work, patient flow

Introduction

In 2019, there were 47 emergency department (ED) visits per 100 United States civilians, and health-care burdens were exacerbated by the coronavirus disease 2019 (COVID-19) pandemic (Cairns et al., 2022; Rutherford et al., 2020). Hospitals facing overcrowding, poor staffing, and rising expenses turn to patient flow solutions to reduce costs and improve patient care (Rutherford et al., 2020). Despite efforts to develop effective patient flow strategies, research focused on patient flow management is limited (Benjamin & Jacelon, 2021; Sharma et al., 2020). Benjamin and Jacelon first clarified the meaning of patient flow management in 2021, but no study has explored how ED nurses understand this concept.

Background

Concern about ED overutilization has been expressed since the birth of the modern emergency health system (IOM 2007; National Academy of Sciences, 1966). In the 1990s, growing demand for emergency care, increases in patient acuity, complexity, and declining numbers of hospitals exacerbated alarm over overburdened EDs (IOM, 2007). By 2007, the IOM had declared ED overcrowding a nationwide epidemic,

describing the emergency medical care system as overwhelmed, fragmented, and unable to meet patient demand (IOM, 2007). To address these significant challenges, health-care researchers implemented patient flow strategies (Rutherford et al., 2020). Despite decades of research, patient flow solutions remain insufficient (De Freitas et al., 2018; Javidan et al., 2020). Patient flow research is criticized for its inadequate exploration of the complexity of patient flow processes, the role of staff in shaping flow processes, and the nature of patient flow management decisions (Alhaider et al., 2020; Benjamin & Jacelon, 2021; De Freitas et al., 2018; Nugus et al., 2014; Nugus et al., 2011; Saghafian et al., 2015; Sharma et al., 2020).

Effective patient flow management requires complex, real-time decision-making (Alhaider et al., 2020; Rutherford et al., 2020), but the work of nurses performing patient flow management is poorly understood (Benjamin & Jacelon, 2021; Sharma et al., 2020). A 2020 systematic review of literature found that nurses mitigate patient flow barriers and increase ED efficiency in specialized roles like nurse navigators, ambulance offload nurses, journey coordinators, and bed managers (Sharma et al., 2020). Harnessing the potential of nurses to improve patient flow management is a cost-effective, yet under-explored opportunity (Benjamin & Jacelon, 2021; Sharma et al., 2020).

Investigations of patient flow management may have been impeded by a lack of concept clarity and inconsistent usage (Benjamin & Jacelon, 2021). Benjamin and Jacelon first defined patient flow management as, “the application of holistic perspectives, dynamic data, and complex considerations of multiple priorities to enable timely, efficient, and high-quality patient care” (Benjamin & Jacelon, 2021, p. 5). Patient flow management requires the identification of a patient, a set of care processes, a flow

manager, and frontline staff, and it has consequences on patients, staff, and hospital system outcomes (Benjamin & Jacelon, 2021). Benjamin and Jacelon's concept analysis relied on existing literature, where the voice of nurses is largely absent. No known study has explored ED nurses' conceptual understanding of patient flow management.

Aim

The purpose of this study is to validate and refine Benjamin & Jacelon's conceptual understanding of patient flow management using the lived experiences and practice knowledge of current ED nurses.

Method

Study Design

This study is an expanded concept analysis, a methodology articulated by Cowles (1996, 2000). The aims of an expanded concept analysis are (1) to use empirical data to identify a concept's defining attributes, antecedents, consequences, and contextual basis, and (2) to use these findings to validate and/or refine an existing concept analysis that relied on literature as its data source (Cowles, 1996, 2000). This methodology emerges from the “evolutionary view” of concept analyses, which argues that concepts are dynamic, pragmatic, and are shaped by their usage in sociocultural and disciplinary contexts (Rodgers, 1989). Concepts must be continuously refined and validated in real nursing situations to be relevant to nursing practice (Cowles, 1996; Rodgers, 1989; Rodgers et al., 2018). Like Cowles (1996), this study relied on focus groups of practicing nurses.

Recruitment

Purposive and snowball sampling through email and social media platforms were used to recruit participants who were English-speaking, over the age of 18, and who worked as ED registered nurses in a patient flow management-related role at the time of data collection. Roles included, but were not limited to, charge nurses, triage nurses, pod leads, team leaders, flow coordinators, ED navigators, and nurse managers. Participants unable to access the Zoom platform were excluded.

Data Collection and Analysis

An online Qualtrics survey was used to confirm participant eligibility, collect demographic information, and assess scheduling availability. Focus groups were held remotely over Zoom at a time of the participants' convenience. Discussions were guided by semistructured interview guides designed to explore the six categories of a concept analysis framework: defining attributes, antecedents, consequences, related concepts, surrogate terms, and references (Cowles, 1996, 2000). Meetings were audio/ video-recorded and transcribed to generate study data. An expanded concept analysis relies on (1) coding of transcript data, (2) thematic analysis of data using the six conceptual analysis categories, and (3) comparative analysis between focus group findings and the original concept analysis (Cowles, 1996, 2000). Study authors coded independently and used memo-writing to prompt reflexivity and investigate coding decisions. Member checking was facilitated by sending the findings to each participant via email. Thirty-three percent (3/9) of participants responded, all confirming that findings accurately captured focus group discussions.

Ethical Considerations

This study was reviewed by The University of Massachusetts Amherst Institutional Review Board (Protocol #3115). Informed consent was obtained online for all participants. To reduce any power gradient, participants were separated into nurse management and nonmanagement groups. A National Institutes of Health Certificate of Confidentiality was obtained to further protect participant privacy.

Findings

Nine participants, including four nurse managers, attended a total of four 1-h focus groups. Nonmanagement nurses held multiple roles, including charge, triage, pod leads, and flow manager roles. The study sample reflects nurses from EDs of varying sizes, community, and clinical settings (see Table 2.2). Emerging themes are organized according to the findings of Benjamin and Jacelon's (2021) concept analysis to highlight comparisons between literature-based and focus group results.

Table 2.2: Participant demographics

Demographic	No. of Participants
Age	
25–34 years	1
35–44 years	4
45–54 years	3
55 years or greater	1
Years of Experience as ED RN	
7–9 years	3
10–12 years	3
>12 years	3
Highest Level of Education	
Bachelor's degree	4
Master's degree	5
Geographic Region	
Northeastern US	5
Southern US	4
Community	
Rural	3
Suburban	2
Urban	4

# Treatment Spaces	
10–30	3
31–50	2
51–100	1
Greater than 100	3
Annual Patient Visit Volume	
20,000–50,000	5
50,000–100,000	3
Greater than 100,000	1
Current Roles Held	
Charge	4
Triage	4
Pod lead/team lead	3
Flow manager	3
Nurse manager	4

Note. ED = emergency department; RN = registered nurse.

Holistic Perspectives

Patient flow management requires decision-making that is holistic and system-wide (Benjamin & Jacelon, 2021). ED nurses consider holistic perspectives through awareness of (1) access to inpatient beds, (2) oversight of ED care, and (3) patient care trajectories and needs. First, although ED nurses lack control over the inpatient hospital system, they maintain awareness of inpatient bed availability and patient boarding.

I think the biggest variable that impedes our flow is the inpatient world, and how many admissions are upstairs. (RN5)

Nurses also maintain an oversight of ED care, described as having a “3,000 feet view” (RN4) of the waiting room, ambulance arrivals, departmental acuity, and outstanding patient needs. This situational analysis allows flow managers to intervene and mitigate patient flow obstacles.

And you have your flow nurse, who is triaging ambulances. And they should know that if you have five [ESI] 2's out in the waiting room, and an ambulance comes in and they're a 2, and they can go out—they should be able to triage that 2 out to get one of the other 2's in. (RN6)

Finally, in a perspective not found in Benjamin and Jacelon's (2021) concept analysis, participants stated that bedside nurses also manage patient flow within their own assignments and maintain holistic oversight of their patients' care trajectories and needs.

The bedside nurse has 4 patients, and that's their little pocket to manage.
(RN4)

Dynamic Data

Patient flow management relies on real-time verification of dynamic data, including fluctuating patient volumes and bed availability (Benjamin & Jacelon, 2021). Participants emphasized (1) knowledge of current patients, (2) transparency of current resources, and (3) thinking a shift ahead.

Accurately prioritizing and placing patients requires knowledge of their acuity and resource needs. This knowledge is gathered through initial nursing assessments and early diagnostic tests.

So, but the reality is, if you don't do—if you don't at least look at them and evaluate them at least a little bit before you go to a room, how do you know you're putting them in the right room? (RN2)

Transparency of available beds and equipment strengthens patient flow management. In the ED, communication and direct visualization are used to determine bed availability, while coordination with outside staff is needed to understand inpatient resources.

And what it really depends on—is...somebody who's got their finger on the pulse—either your bed management team or your house supervisor, and in my role as the house supervisor, like, that was all I did was constantly circle like a shark... looking for those empty beds. (RN2)

Finally, ED nurses must also “think a shift ahead” to accommodate variable future resources.

That we, as nursing, are responsible for—to be aware of, you know, 5 h down the road...D pod's closing at whatever hour now because we don't have the staffing. And so now we can't bring patients in. (RN5)

Complex Considerations of Multiple Priorities

Patient flow management depends on complex considerations of multiple actors, flow processes, and conflicting priorities (Benjamin & Jacelon, 2021). ED nurses cited (1) variable staffing personalities and (2) misaligned provider incentives.

Patient flow management is impacted by varying levels of staff motivation, speed of work, and work processes. For example, a flow manager's desire to assign a patient to a bed may conflict with a nurses' reluctance to take a new patient.

If you had a, you know, kind of a lackadaisical team, it's kind of like, "All right, let's just chill, let's just get through this, we've got 12 hours, we're going to see what we see in 12 hours." And then we have people who are like, "Okay. Our goal is to clear the waiting room. Let's clear the waiting room." (RN2)

At times, provider incentives may be misaligned with flow manager priorities. Providers may be motivated by metrics and/or financial reimbursement, sometimes leading to premature admission decisions, high admission rates, or reluctance to evaluate new patients.

But our physicians get paid by the patients that they dispo [disposition], and so, if they see the patient, they want to start it from start-to-finish, they don't want that patient going to the back and being seen by another provider, because then they're not going to be paid. (NM3)

Concerned with Timeliness

Patient flow management should promote timely patient treatment (Benjamin & Jacelon, 2021). Participants emphasized the importance of (1) expediting initial provider evaluations and (2) pushing dispositions to move patients out of the ED.

Expediting initial provider evaluations is a critical task of patient flow management. Several participants equated patient assessment with patient safety. Provider evaluation is needed to initiate patient care orders, begin treatment, further investigate the acuity of the patient, and to “find out what's going on with them” (RN2).

I would always say my goal is to get the person who's sitting in the waiting room waiting to see a doctor, that we don't know how sick they are yet, to get them to a room just as quickly as we can so we can find out what's going on with them... that was my whole goal in throughput. (RN2)

Pushing patient dispositions is a second important task. Nurses expedite dispositions by anticipating care orders, accomplishing patient care tasks, assessing and reassessing patients, recognizing delays, and communicating with providers. Although disposition decisions are an important milestone, ED nurses are most concerned with their timeliness because of their desire to physically move patients out of the ED. As one nurse commented, “A discharge dispo would be great if we could do that—but the dispo is not my focus.” (NM3)

So if we don't have good throughput, we get a back-up in the waiting room... if you don't get people out, people can't come in. There's only so many spots. (RN6)

Concerned with Efficiency

Patient flow management is a process of matching supply and demand within a context of scarcity (Benjamin & Jacelon, 2021). All participants described insufficient resources, especially following COVID-19. To promote efficient decision-making, ED nurses emphasize the importance of matching patients to (1) the right treatment space and (2) the right nurse.

Good patient flow management requires placing patients in correct treatment spaces. Treatment spaces include informal patient care areas such as fast tracks, rapid

examination areas, and waiting room recliners. Inside the department, treatment spaces include ED rooms and hallway stretchers with variable medical equipment. To match patients to the right space, flow managers consider other patients' competing needs, moving stable patients out of ED rooms to prioritize sicker patients.

Because that, you know how that bed is, it's way far away from the nurses' station, and it's kind of tucked in the corner. Make sure they're appropriate for that room before we commit. (RN2)

Well, you don't want to put a toe pain in a bed with a cardiac monitor, when you've got, you know an Afib RVR [rapid ventricular response] sitting in the lobby, (laughs) because it's not safe. (RN4)

Second, flow managers match patients to an appropriate nurse by considering a nurses' experience, skill set, and current patient assignment load, including acuity, number of patients, and time since last patient arrival.

So, I guess it's getting the patients to the best nurse to take care of them. (RN6)

What acuity level do the other, does that nurse have? Does that nurse have, you know, a 2 [ESI], maybe a 1, maybe, or maybe even a couple of 3's? But how—are they completely worked up, and we're waiting on results? Or did they just come in through EMS? I do my best not to slam double EMS's on anybody. (RN1)

Concerned with High-Quality Care

Patient flow management is concerned with patient safety and satisfaction (Benjamin & Jacelon, 2021). This is the most important defining attribute to ED nurses, who perceive patient safety as the ultimate goal of patient flow management. This attribute was supported by two themes: (1) prioritizing the most acute patients and (2) minimizing the danger of the waiting room.

First, ED nurses promote safety across the department by prioritizing the most acute patients in patient flow management decisions.

I think I just prioritize bringing the sickest patient back to the resources.
(RN4)

So, the goal was to try to get—make sure that the sick people weren't sitting in chairs in the waiting room and try to push through the department the best we can. (RN2)

The perceived danger of the waiting room is at the heart of patient flow management decisions. ED nurses understand the waiting room as the riskiest part of the department due to a lack of “eyes on” patients and the threat that patients might be sicker than suspected.

And bad things happen in ER [emergency room] waiting rooms. Every, the—every hospital I've worked at has had somebody die in the waiting room... the waiting room is the most dangerous place in the ER. The waiting room is the most dangerous place in the hospital. (RN2)

Three key differences were noted between ED nurses' understanding of high-quality care and the theme as it emerged through existing literature. Literature describes patient flow management's impact on patients' experience, satisfaction, perception of care, and its ability to provide clinically appropriate and safe care (Benjamin & Jacelon, 2021). In contrast, ED nurses predominately focused on patient safety.

Second, ED nurses believe timeliness and efficiency are important because of their impact on patient safety. Therefore, “concerned with timeliness” and “concerned with efficiency” are understood as subthemes of patient safety.

Third, ED nurses consider the safety of patients collectively, rather than independently. ED nurses promote patient safety within their own scope of responsibility. Bedside nurses focus on patient safety within their own assignment, pod leads promote safety within their pod, charge or flow nurses are concerned with department-wide safety, and transfer/bed management nurses consider patients throughout the entire hospital.

Yeah, it's almost, you know I think I would say like, it's almost like at the staff-nurse level, like, it's the n-size of patients you impact at the time that you're working, right? So, like as a staff-nurse, my n-size is really these, preferably 3 or 4 patients, and how quickly can I get them to their next destination? Whereas, a charge nurse, my n-size was the entire department. And then, as a department manager, my n-size is really all of the ED patients, and this is where I'm focusing. (NM4)

I think the world shrinks down, right? So flow is responsible for the entire ER, pod leads are responsible for their pod, the nurse is responsible for their assignment. (RN6)

New Defining Attributes

Two defining attributes of patient flow management emerged that did not appear in the 2021 literature-based concept analysis: (1) a nurse-driven process and (2) the importance of ED experience.

A Nurse-Driven Process

ED nurses perceive patient flow management as a nurse-driven process. As one participant succinctly stated, “Nurses are every bit of the flow” (RN 2). Although other ED staff impact patient flow, the responsibility of patient flow management ultimately falls on nurses.

And so, yes, it's absolutely nurse-driven. 100%. Even in the back it's nurse-driven. (RN1)

'Cause I mean let's face it, you know, the doctors think they're in charge but really it's the nurses. (RN2)

ED Experience

Participants argue that effective patient flow management relies on ED experience, including (1) clinical judgment, (2) clinical experience, and (3) knowledge of staff.

Good clinical judgment allows ED nurses to perform accurate triage assessments, rapidly understand patient acuity, identify clinical deterioration, anticipate patient care trajectories, and expedite needed interventions.

I think, certainly a number of years under your belt in an ER with patient care can help you understand, “Okay, this patient's sicker than this patient. So this patient needs more of my time and resources,” or you know, “I can anticipate what this patient needs based on their diagnosis, so I can help move things along. (RN4)

Clinical experience is also important to develop the time-management, prioritization, and delegation skills needed to maintain patient safety amid numerous, complex tasks.

But I think prioritization is the hard thing that the newer nurses have, and like trying to—cause it's a lot all at once—and having to prioritize what you're going to do first, right, can be very overwhelming if you're new to it. (RN6)

Finally, flow managers must have an intimate knowledge of ED staff to understand staff strengths and weaknesses, skill sets and competency levels, and varying scopes of practice.

I have to know my staff, and the longer I'm a charge nurse—you get to know the personalities of your staff, and you get to know what they're good at, and what they're not good at, and what they lack, and they don't lack. (RN1)

Antecedents

Patient flow management requires a patient, a set of care processes, a flow manager, and frontline staff (Benjamin & Jacelon, 2021). Participants validated these four antecedents, with one important clarification: the role of the bedside nurse. Whereas Benjamin and Jacelon (2021) described bedside nurses as frontline staff, ED nurses classify bedside nurses as flow managers who expedite patient care, identify and resolve

delays, coordinate with other staff to push dispositions, and facilitate patient movement out of the ED.

Participants also identified an additional antecedent: care capacity. Care capacity includes both (1) bed capacity and (2) nursing capacity. Bed capacity requires available ED treatment spaces and sufficient inpatient beds to prevent excessive ED boarding and patient flow stagnation.

Patient flow management means to me is, is trying to keep the patients moving, even though for us, you know, we're bottlenecked... We're a 39-bed ER and yet, today we have 47 patients, and 35 of them are admissions. So it's, how do you keep the flow going? (NM3)

Nursing capacity includes both adequate staffing levels and appropriate workloads that allow nurses to bring patients in from the waiting room and promptly complete patient care tasks. Adding nursing capacity, such as a float or flow manager nurse, expedites patient care task completion, increases ED oversight, and enables mitigation of patient flow obstacles.

So the biggest thing for us is resources to do the things that the—is not necessarily a nursing function, but the nurse has to get done. (NM3)

Consequences

Patient flow management has consequences on patients, staff, and the hospital system (Benjamin & Jacelon, 2021). Participants validated these consequences, describing impacts on patient safety, patient satisfaction, staff and nursing workloads, provider revenues, and hospital ratings.

You make them feel special like, “Oh, I'm gonna bring you to our fast treatment area.” Even though it's just recliners, you kind of, you know, zhuzh it up a little bit, so that they make their experience kind of seem like it's not, “Oh, I'm dumping you in this corner because there's a sicker patient right behind you.” (RN4)

A lot of what we do is based on that incentive, that Press Ganey numbers. They expect our numbers to be high, and that's part of it is customer satisfaction, you know, hospitals are business. (RN1)

Summary of Expanded Analysis

This expanded analysis clarified the attributes of patient flow management using the experiences of ED nurses. Key refinements include:

1. ED patient flow management is a nurse-driven process that relies on nursing experience and judgment.
2. Bedside nurses act as flow managers by expediting patient care, identifying and resolving delays, coordinating with other staff to push dispositions, and facilitating the movement of patients out of the ED.
3. Care capacity, including appropriate nurse staffing and workloads, is an antecedent to effective patient flow management.
4. Timeliness and efficiency are important because of their impact on patient safety, rather than emphasized as independent goals.
5. ED nurses identify the ultimate goal of patient flow management as the collective safety of patients. Nurses work to promote patient safety within their own scope of responsibility.

Based on these clarifications, a new understanding of patient flow management is offered: ED patient flow management is the application of ED experience, holistic perspectives, dynamic data, and complex considerations of multiple priorities by ED nurses to promote patient safety within their scope of responsibility.

Discussion and Implications

Patient flow management is a nonlinear, dynamic process of responding to current patient needs and available resources. Within their scope of responsibility, nurses make patient flow management decisions focused on maintaining safety across multiple patients. Nurses prioritize the sickest patients and work to move patients out of the waiting room, which is the most dangerous area of the department. Guided by the overarching goal of patient safety, ED nurses also promote timely clinical care and the efficient matching of patients to resources. Effective patient flow management relies on clinical judgment, clinical experience, and knowledge of ED staff. This new conceptual understanding of patient flow management reveals important implications for nurses, patient flow researchers, and hospital administrators.

Implications for Nurses

This study provides insight into a poorly understood facet of ED nursing work, points to opportunities to improve nursing care, and demonstrates the importance of expanded concept analyses.

The articulation of patient flow management as holistic, complex, and dynamic decision-making highlights the multifaceted nature of ED nursing work. The work that nurses do to organize and coordinate patient care, accumulate information and hold a global view of patient needs, and drive patient care trajectories has received little scholarly attention and research (Allen, 2015b). This “organizing work” has been de-emphasized by the nursing profession, which has focused on direct patient care (Allen, 2015b, 2015c). Research and education must better address the complex reality of nursing work. Nursing models and theory focused on linear care trajectories of individuals, rather than the dynamic needs of collective patients, or that fail to consider

the reality of working in a context of restricted resources, are poorly suited to meet the needs of ED nurses. More research is needed to understand how ED nurses perform patient flow management.

Effective patient flow management depends on the training and skills of nurses (Sharma et al., 2020). ED charge nurses receive minimal training on patient flow management (Wolf et al., 2022), and focus group participants confirm that other specialized roles also receive scant training. Strengthening the preparation of ED nurses as flow managers may have powerful implications for staff satisfaction and patient safety.

Concept analyses have been criticized for their failure to prompt additional concept development and connect to real nursing practice (Rodgers et al., 2018). This study demonstrates the benefits of validating concepts with practicing nurses. Nursing researchers should consider performing expanded concept analyses to refine literature-based analyses.

Implications for Patient Flow Researchers

This study reveals important discrepancies between current patient flow research and the knowledge of practicing ED nurses. ED nurses perceive patient flow management as fundamentally a nurse-driven process, in contrast to most research that presents patient flow as a linear, unidimensional process and fails to account for the role of staff in determining flow processes (Nugus et al., 2014; Nugus et al., 2011; Saghafian et al., 2015). Nurses in *all* roles perform patient flow management. Although specialized ED nurses are known to increase patient flow efficiency (Sharma et al., 2020), the influence of bedside nurses is poorly understood. Future research should explore the role of all ED nurses as active directors, rather than passive components, of patient flow.

Understanding nurses as flow managers underscores the importance of nurse training and capacity. Strengthening the training of ED nurses as flow managers is potentially a cost-effective and practical approach to improve patient flow (Sharma et al., 2020). Effective patient flow management also requires sufficient nurse staffing levels and appropriate workloads that allow for the safe advancement of patient care. Research should further explore the benefits of investing in ED nursing staff to improve patient flow.

Implications for Hospital Management

Benjamin and Jacelon found that the concept of patient flow management poorly delineates between executive hospital-wide decisions to improve patient flow and the day-to-day strategizing by staff (Benjamin & Jacelon, 2021). This study clarifies this confusing overlap by proposing that patient flow management is conceptualized according to a person's scope of responsibility. Whereas hospital executives strive to achieve timely, efficient, and high-quality patient care throughout the entire institution, nurses promote care within their own department, section, or assignment. Although effective patient flow management requires a systemic approach (Rutherford et al., 2020), interprofessional “siloeing” between administration and staff has impeded patient flow improvement (Kreindler et al., 2022). The ability to articulate patient flow management as a uniting concept relevant to hospital administrators, managers, and all nurses has powerful implications for breaking down silos, engaging and empowering hospital staff, and harnessing nursing knowledge and expertise.

Limitations

This study faced recruitment challenges. All study participants worked in the northeastern or southern United States. No participants had fewer than 7 years of ED nursing experience and 56% held a Master's degree. Although data saturation was achieved, future research may reach broader geographic and educational representation. Based on previous understandings of patient flow management, this study recruited ED nurses in "patient flow management-related roles." These roles have now been clarified to include all nurses, and findings should be validated with ED bedside nurses.

Conclusion

This expanded concept analysis has refined Benjamin and Jacelon's (2021) understanding of patient flow management using the experience and knowledge of practicing ED nurses. Within the context of the ED, patient flow management is defined as the application of ED experience, holistic perspectives, dynamic data, and complex considerations of multiple priorities by ED nurses to promote patient safety within their scope of responsibility. Patient flow management includes a patient, a set of care processes, care capacity, a flow manager, and frontline staff. Findings from this study highlight the importance of nursing knowledge and the work of bedside ED nurses to successful patient flow management.

CHAPTER 3

STUDY METHODS

Introduction

Hospitals facing overcrowding, poor staffing, and rising healthcare expenses are turning to patient flow solutions to reduce costs and improve patient care (Rutherford et al., 2020). Healthcare challenges have only become more significant in the context of the COVID-19 pandemic (Rutherford et al., 2020). Despite decades of research to improve patient flow, current patient flow solutions are inadequate (De Freitas et al., 2018; Javidan et al., 2020).

Qualitative research on patient flow is insufficient, and the current literature does not adequately describe the complexities of patient flow (De Freitas et al., 2018, 2020; Morley et al., 2018; Nugus et al., 2014). The body of patient flow research has not sufficiently explored patient flow processes or the work of nurses (De Freitas et al., 2018; Sharma et al., 2020; Wise et al., 2021). These knowledge gaps reflect larger failures to describe the complexities of emergency department work and the organizing labor of nurses (Allen, 2015b; Wears, 2012). Efforts to understand the decision-making processes and strategies of nurses performing patient flow management are needed (Benjamin & Jacelon, 2021).

The purpose of this study was to develop a substantive theory of ED patient flow management using constructivist grounded theory and situational analysis methodologies. Drawing from a symbolic interactionism perspective, this study aimed to bring new insights into the strategies and decision-making processes of nurses in order to articulate their work and contributions, to strengthen their training and preparation, and to identify patient flow management improvement solutions.

Research Aims

This proposed study addressed the following specific aims:

1. Explore how ED nurses perform patient flow management.
2. Develop a constructivist grounded theory of patient flow management in the ED.

Study Definitions

1. Patient Flow Management. This study defined patient flow management within the ED context as “The application of ED experience, holistic perspectives, dynamic data, and complex considerations of multiple priorities by ED nurses to promote patient safety within their scope of responsibility” (Benjamin & Wolf, 2022, p. 7).

2. Emergency Department (ED). This study defined emergency departments as hospital-based or freestanding departments that provide immediate medical care to patients. This definition does not include ambulatory medical facilities, such as urgent care centers or walk-in clinics, designed to provide medical care for minor illnesses and injuries.

3. ED Nurses. ED nurses included registered nurses who have at least 90 days of experience working in an emergency department.

Theoretical Perspective

Symbolic interactionism is a methodological position that arose from the work of many scholars including George Hebert Mead, John Dewey, and W. I. Thomas, but is widely credited to Hebert Blumer who synthesized and clarified this perspective (Blumer, 1969). Symbolic interactionism relies on three fundamental assumptions:

“[1] human beings act toward things on the basis of the meanings that the things have for them... [2] the meaning of such things is derived from, or arises out of, the

social interaction that one has with one's fellows... [3] these meanings are handled in, and modified through, an interpretative process used by the person in dealing with the things he encounters" (Blumer, 1969, p. 2).

Symbolic interactionism shaped the work of Glaser and Strauss and has continued to influence modern grounded theorists including Kathy Charmaz and Adele Clarke (Charmaz, 2006). Grounded theory and symbolic interactionism are well-aligned because they both encourage the researcher to inductively ground their data collection and analysis in empirical evidence with a focus on examining social interactions. Symbolic interactionism supports constructivist grounded theory because meaning is understood to be shaped by personal interpretations and individual perspectives (Blumer, 1969).

Blumer (1969) argues that an institution, such as a hospital or health system, does not function automatically based on operating procedures, system requirements, or institutional policies. Rather, institutions function because of the individual actions and social processes of the people who comprise that institution. This methodological position supports the primary assumption of this study, that understanding ED patient flow requires understanding the thoughts, decisions, and interactions of the nurses who perform patient flow management.

Methodology

This study employed constructivist grounded theory and situational analysis methodologies. Grounded theory was developed by Barney G. Glaser and Anselm L. Strauss during their collaborative research in 1965-1967, and was first presented in the landmark publication *The Discovery of Grounded Theory* (Charmaz, 2006; Glaser & Anselm, 1967). Grounded theory arose in response to growing skepticism towards qualitative methodologies as scientists in the mid-20th century embraced positivism,

quantitative approaches, and the scientific method (Bryant & Charmaz, 2019; Charmaz, 2006). Glaser and Strauss presented grounded theory as a “legitimate” qualitative approach, offering systematic research methods and an emphasis on empirical evidence (Charmaz, 2006; Glaser & Anselm, 1967). Grounded theory was built on core principles that include (1) inductive data analysis that occurs simultaneously with data collection, (2) theory development that emerges through constant comparative analysis, (3) the use of theoretical sampling to investigate coding categories until saturation is reached, (4) the use of multiple data sources, and (5) the postponement of a literature review until after substantive theory development (Charmaz, 2006; Glaser & Anselm, 1967).

The invention of grounded theory marked a transition away from the traditional colonialist ethnography that dominated qualitative research between 1900–1950s (Bryant & Charmaz, 2019; Clarke et al., 2015). Grounded theory has continued to evolve and adapt as qualitative researchers have embraced constructivism, postpositivism, and critical approaches (Bryant & Charmaz, 2019; Clarke et al., 2015). The publication of *Strategies in Qualitative Research* in 1990 marked a split between Strauss and Glaser, who each came to define their own distinct methodology (Streubert & Carpenter, 2011), and a growing number of scholars have offered new approaches to counter the positivism of classical grounded theory (Bryant & Charmaz, 2019; Clarke et al., 2015). In the early 21st century, Kathy Charmaz and Adele Clarke each published their own grounded theory methodologies (Charmaz, 2006; Clarke, 2005).

Kathy Charmaz introduced constructivist grounded theory in 2000 as a contemporary revision of classical grounded theory (Charmaz, 2009). Constructivist grounded theory arose from a relativist epistemology, arguing that knowledge is created

through shared experiences between participants, researchers, and other sources of data (Charmaz, 2006, 2009). Charmaz believes that knowledge is socially constructed, that theories are interpretations of the researcher, and that ideas are situated within their contexts of space, time, and positions. Therefore, constructivist grounded theory emphasizes researcher reflexivity. Constructivist grounded theory aligns with pragmatism and symbolic interactionism, but also embraces other theoretical perspectives such as feminism (Charmaz, 2009). Charmaz's (2006) recommended research approaches include a strong emphasis on gerund line-by-line coding to prompt in-depth analysis of social processes.

Adele Clarke proposed the methodology known as Situational Analysis (Clarke, 2005). Drawing heavily from Anselm Strauss's late work in which he developed a social worlds/arenas/negotiations framework, Actor-Network Theory, and Foucault's discourse analysis, Clarke envisioned a new approach that she calls a "theory/methods package" (Clarke, 2005, p. xxiii). Clarke's methodology centers the situation as the primary unit of analysis, pushing researchers to consider not just social processes, but also the roles of discourse, texts, nonhuman elements, and power (Clarke, 2005). She proposes the use of maps as analytical tools to supplement coding and memo-writing, including (1) situational maps, (2) social worlds/arenas/discourse analysis maps, and (3) positional maps, described below. Like Charmaz, Clarke critiques positivism and instead advocates relativism, reflexivity, situatedness, ambiguity and complexity, and feminist perspectives (Clarke, 2005). Aiming to identify actors that are not present, that are silenced, or that are traditionally invisible, Clarke also encourages researchers to consider the role of "implicated actors" (Clarke et al., 2015).

Constructivist grounded theory and situational analysis were appropriate methodologies to employ in this study for several reasons. First, as an emergency department nurse with many years of experience performing patient flow management, it would be challenging for me to pursue this topic in a completely objective manner. Constructivist grounded theory allowed me to acknowledge and draw from my own expertise in this field. Second, constructivist grounded theory is well-suited to describe the social interactions and behaviors of nurses. As described above, understanding how staff shape patient flow processes is a critical knowledge gap in patient flow literature. Constructivist grounded theory's emphasis on line-by-line grounded coding pushes researchers to uncover and capture these actions. Situational analysis was employed to examine the role of non-human elements, power, and discourse in shaping patient flow. This is important because available ED resources, power dynamics between patients and providers, and the language used to describe patient flow all may have significant consequences on patient flow management. Finally, this work aimed to highlight the invisible work of nurses. Constructivist grounded theory and situational analysis' embrace of feminist perspectives are well-aligned with this goal. The integration of both Charmaz and Clarke's methodologies can deepen data analysis and strengthen a substantive theory of patient flow management.

Study Design

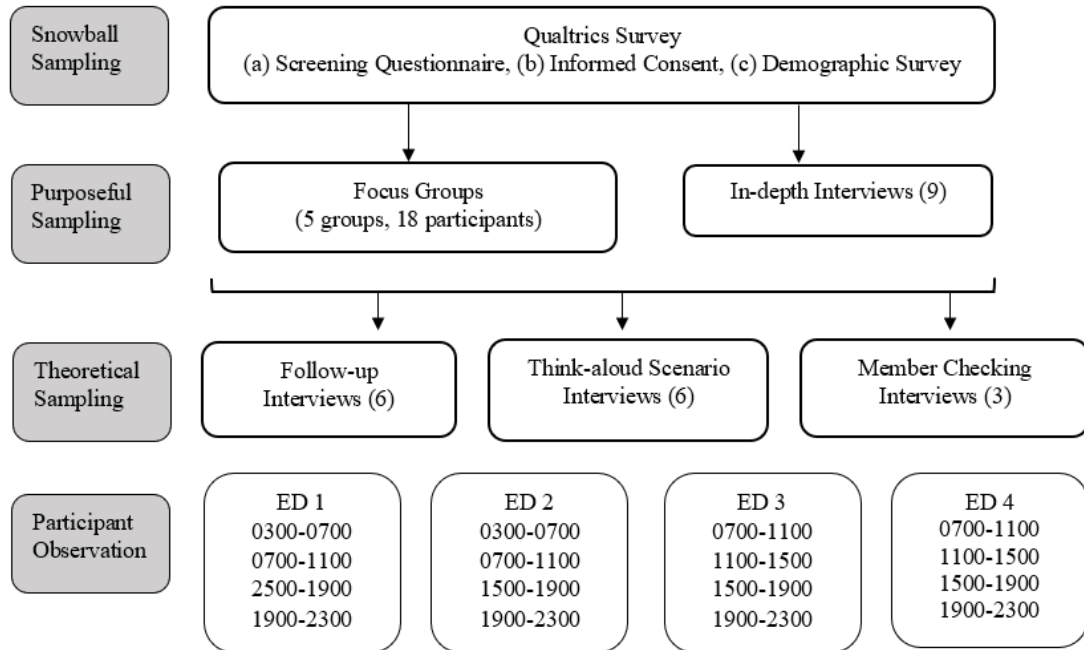


Figure 3.1: Study design.

Figure 3.1 illustrates the study design including sampling and data collection strategies.

Participant Eligibility

The following criteria were used to determine study eligibility:

Participants were included if they (1) spoke English, (2) were over the age of 18, and (3) had at least 90 days of experience working as an emergency department registered nurse (RN).

Participants who did not consent to being recorded and those who did not have access to an online video conferencing platform were excluded.

Participant Recruitment

Participants were recruited through email and social media platforms including Facebook and Twitter. See Appendix A for sample recruitment materials. Initial

recruitment relied on snowball sampling and the sharing of social media posts to nursing, research, and emergency department groups that permitted research recruitment.

Interested participants clicked a link to a Qualtrics survey where (1) a screening questionnaire confirmed their study eligibility (age over 18, English-speaking, and experience as an ED registered nurse), (2) they completed an informed consent and confidentiality agreement (Appendix B) and, if willing, (3) they proceeded to a demographic survey. The demographic survey asked participants about their role, work experience, geographic location, and clinical setting. Finally, participants were asked to enter their email address to be contacted for focus group or interview scheduling.

Shortly after the Qualtrics surveys were distributed, it was discovered that there was a high rate of ineligible respondents, including duplicate respondents with identical IP addresses. Additional IRB approval was obtained to include a CAPTCHA screening survey feature and an open-ended screening question to reduce additional ineligible respondents.

Initial demographic data was used to purposefully select focus group participants. Focus groups were designed based on participant availability and the goal of providing a mix of participant experience, geographic, and clinical backgrounds. Nurses in management or administrative roles were segregated from other participants to avoid coercion.

Recruitment for additional in-depth interviews, think-aloud scenarios, and follow-up interviews relied on theoretical sampling to clarify and develop initial coding categories (Charmaz, 2006). According to grounded theory methodology, participants were theoretically sampled until saturation was reached (Charmaz, 2006). Saturation is

defined as the point at which no additional properties of the identified categories emerge (Charmaz, 2006). Additionally, in order to provide data triangulation, preliminary focus group and in-depth interview findings were confirmed with new participants purposefully recruited to increase geographic representation.

Focus group and interview participants were compensated at a rate of \$35/hour for participation in focus groups, in-depth interviews, follow-up interviews, think-aloud scenario interviews, and member checking interviews. The time required to complete the Qualtrics survey was not compensated. Eligible participants were required to be registered nurses, and therefore study compensation was designed to reflect the estimated salary of a registered nurse. Participants were required to complete at least one-half of the anticipated focus group/interview time to be eligible for compensation. Compensation was distributed via email in the form of an Amazon gift card. Per University of Massachusetts guidelines, no study participants were compensated more than \$100. Funding was provided by the Beta Zeta at-Large Chapter of the Sigma International Honor Society of Nursing.

Retention

The nurses' continued interest in participating in in-depth and follow-up interviews relied on additional financial compensation and the rapport established between the researcher and the participant. Nurses who indicated that they were willing to be contacted for interviews were contacted via the email addresses they provided in Qualtrics. If participants failed to respond to an email, two additional emails were sent. If the participant did not respond after those three emails, they were considered withdrawn from the study and were not contacted further.

Data Collection

Grounded theorists include a variety of data sources to generate rich data. As Glaser famously stated, “all is data” (Glaser, 2002). Grounded theorists adapt and refine their data collection methods as they learn and ask new questions (Charmaz, 2006). Charmaz (2006) encourages researchers to bring ingenuity to their data collection, seeking methods most helpful for answering their research questions, and allowing data analysis to shape evolving research methods. Therefore, data collection methods were adapted over the course of the study, relying on the following data sources:

1. **Focus groups.** Focus groups were conducted to prompt idea generation, collective thinking, and rich data using multiple participants. Focus group participants were purposefully selected from the Qualtrics survey respondents, based on their role, work experience, geographic location, and clinical setting. Focus group conversations were framed by a few, broad, open-ended questions and additional probing questions (Charmaz, 2006). See Appendix C for an example focus group topic guide. Focus groups lasted approximately 1 hour and were held remotely via an online video conferencing platform. Conversations were audio/video-recorded and transcribed. Focus groups aimed to consist of a maximum of five participants; sizing depended on participant availability and recruitment success.
2. **Interviews.** In-depth interviews were held to provide rich detail and to clarify and develop initial coding categories. Participants for in-depth interviews were selected from the Qualtrics survey respondents. Interview questions were broad, open-ended, and emerged from previous data analysis. These interviews lasted

approximately 1 hour, were conducted remotely through an online video conferencing platform, and were audio/video recorded and transcribed.

3. ***Think-Aloud Scenario Interviews.*** The think-aloud method is a research strategy for understanding participants' cognitive processes, including reasoning and decision-making (Fonteyn & Fisher, 1995). Think-aloud methods have been applied to nursing research and can be used in clinical settings, simulation, vignettes, or descriptive scenarios (Fonteyn & Fisher, 1995). Participants were provided with three clinical scenarios designed based on previous data analysis. Clinical scenarios described EDs with low patient burden, high patient burden, and extremely high patient burdens. Participants were asked to verbalize their considerations, priorities, and decision-making processes. This approach aimed to confirm previous emergent themes by helping participants articulate how they perform patient flow management in a concrete, life-like simulation. Interviews lasted approximately 30 minutes, were held remotely over an online video conferencing platform, and were audio/video recorded and transcribed. See Appendix D for think-aloud scenarios and questions.
4. ***Follow-up Interviews.*** Subsequent follow-up interviews were conducted with willing participants to answer outstanding questions and provide clarification. Follow-up interviews lasted approximately 1 hour, were held remotely over an online video conferencing platform, and were audio/video recorded and transcribed. Recruitment for follow-up interviews was based on theoretical sampling until saturation was reached.

5. ***Member-Checking Interviews.*** Member checking is inherent to the process of grounded theory, which engages in repeated data collection and clarification of previous findings (Charmaz, 2009). Formal member checking interviews were also held towards the end of data collection and theory development to increase the credibility of study findings. Member checking participants were purposefully selected to represent a diversity of ED sizes and geographic locations. Member checking interviews lasted approximately 1 hour, were conducted remotely through an online video conferencing platform, and were audio/video recorded and transcribed.
6. ***Participant Observation.*** Participant observation was performed at four EDs of varying sizes and community settings. Observations were conducted in 4-hour blocks at variable times throughout a 24-hour shift. Field notes were generated based on observation of nursing behavior and interactions with nurses to clarify their decision-making processes. No formal interviews were conducted with working ED nurses and no patient data was collected. ED management and staff were provided with an information sheet that described the study and included contact information for questions and concerns (Appendix E). This information sheet was distributed by ED management and shared with interested participants during observations. Initial participant interactions were guided by a participant observation script (Appendix F).

Participant Sample

This study aimed to recruit up to 30 participants. Based on this goal, it was anticipated that 150 survey respondents would be needed. Grounded theory does not

require a large sample size, instead focusing on prolonged engagement and rich data collection (Charmaz, 2006). Scholars estimate that grounded theory studies require between 20-30 interviews (Moser & Korstjens, 2018).

A total of 71 Qualtrics survey responses were collected. Twenty-seven nurses participated in focus groups and interviews. Participant demographics are summarized in Table 3.1. Participants were asked to describe the characteristics of the emergency department(s) in which they had worked. Characteristics of participants' collective ED experiences are described in Table 3.2. (Example interpretation: 11 (31%) of participants reported experience working in an ED with 10–30 beds/treatment spaces.)

Table 3.1: Participant demographics.

Age	n	%
18–24 years	1	4%
25–34 years	10	37%
35–44 years	6	22%
45–54 years	5	19%
55 years or greater	5	19%
Years as RN		
1–3 years	4	15%
4–6 years	7	26%
7–9 years	7	26%
10–12 years	0	0%
Greater than 12 years	9	33%
Highest Level of Education		
Associate degree	4	15%
Bachelor's degree	16	59%
Master's degree	5	19%
Doctorate degree	2	7%
Currently Employed as ED RN		
Yes	21	78%
No	6	22%
Total No. Participants	27	

Table 3.2: ED characteristics.

	n	%
Number of ED Beds/Treatment Spaces		
Less than 10	1	3%
10 to 30	11	31%
31 to 50	11	31%
51 to 100	8	22%
Greater than 100	5	14%
Annual Patient Visit Volume		
Less than 20,000	4	11%
20,000–50,000	12	32%
50,000–100,000	12	32%
Greater than 100,000	9	24%
ED Community Setting		
Rural	10	25%
Suburban	12	30%
Urban	18	45%
Geographic Region		
Northeastern United States	20	65%
Southern United States	6	19%
Midwest United States	1	3%
Western United States	3	10%
Work outside the United States	1	3%

Eighteen participants were included in five focus groups. Due to challenges with participant attendance, one focus group contained only two participants. Initial in-depth interviews were conducted with six participants. After initial recruitment and data collection, three additional in-depth interview participants with experience working in the midwestern and western United States were purposefully recruited to provide geographic triangulation, for a total of nine in-depth interviews.

Follow-up interviews were conducted with six participants according to theoretical sampling. Six participants were purposefully recruited for think-aloud scenario interviews: three with significant charge nurse/flow coordinator experience in

EDs with greater than 100 beds, two with charge nurse experience in a EDs with less than 50 beds, and one participant with no charge nurse/flow coordinator experience.

Finally, formal member checking was performed with three participants with experience working in EDs of diverse sizes and geographic location. In total, 29 focus groups and interviews were completed with 27 participants.

Sixty-four hours of participant observations were conducted across four EDs of variable size and community setting. Observations were conducted across nursing shifts ranging from 3:00 am to 11:00 pm; see Appendix G for observation schedule. Focus group/interview participants and observed participants comprised two entirely distinct samples with no overlapping nurses.

Data Analysis

Data analysis was informed by constructivist grounded theory and situational analysis methodologies. Grounded theory data analysis is inductive and relies on strategies including coding, constant comparative analysis, and memo-writing. Mapping and diagramming techniques proposed by Adele Clark were used to understand the broader situational context of patient flow management.

Coding. Coding was conducted using NVivo 12 software. As Charmaz (2006) described, two phases of coding were completed. Line-by-line *in vivo* and gerund coding was used for initial coding. As data analysis progressed, incident-by-incident coding was also employed to code larger segments of data. The goal of initial coding is to stay close to the data and remain open to all possible theoretical directions (Charmaz, 2006).

Focused coding is the second stage that is used develop emergent coding categories.

Focused coding identifies the most salient or most frequent initial codes and synthesizes larger segments of data (Charmaz, 2006).

Coding analysis was also informed by the instruction of Johnny Saldana in a qualitative research coding workshop. Saldana argues that coding is the process of identifying the most evocative, essential, and salient information, and then working to group codes according to “what looks alike” and “what sounds alike” (J. Saldana, personal communication, April 4, 2021).

Constant Comparative Analysis. Coding categories and themes were identified using constant comparative analysis (Charmaz, 2006). Constant comparative analysis was first defined by Glaser and Strauss as a systematic approach to coding and analysis that informs subsequent theoretical sampling (Glaser & Anselm, 1967). Researchers begin by comparing data to identify similarities and differences. As data analysis continues, researchers compare new incidents to emerging categories to further develop and clarify categories and concepts (Charmaz, 2006; Glaser & Anselm, 1967).

Memo-Writing. Memo-writing was used for data analysis, to explore and clarify coding strategies, and to prompt reflexivity. Memo-writing is a vital tool for engaging with data and informing data analysis (Charmaz, 2006). Clarke also advocates for the use of memo-writing for data analysis and mapping (Clarke et al., 2015). Memo-writing in this study employed free-writing strategies and prompts proposed by Johnny Saldana (J. Saldana, personal communication, April 5, 2021).

Mapping/Diagramming. Data analysis incorporated the mapping strategies described by Adele Clarke, including situational maps, social worlds/discourse/arenas maps, and positional maps. These are described by Clarke (2005) as the following:

1. Situational maps are used to explore the roles of human, nonhuman, discursive, historical, symbolic, cultural, and/or political factors within the situation of inquiry. By mapping these elements, researchers deepen their understanding of the complexities of a situation and begin to explore the relationships between important actors.
2. Social worlds/discourse/arenas maps raise analysis to a meso-level, prompting researchers to group collective human, nonhuman, and discursive factors and consider their relative size and power.
3. Positional maps explore the major positions taken, and not taken, through analysis of controversy, concerns, and debates within the situation of inquiry.

Clarke (2005) presents these diagrams as supplementary tools for grounded theorists. Therefore, their use augmented Charmaz's constructivist grounded theory approach. These maps and strategies were used to prompt deeper analysis of the ED context, including the identification of key nonhuman elements and consideration of the role of discourse in shaping patient flow management.

Protection of Human Subjects

This study was reviewed by the University of Massachusetts Amherst and the participating health system IRBs and deemed exempt. See Appendices H and I for exemption letters.

Risks to Human Subjects and Protections Against Risks

(1) Physical Risks: It was not anticipated that participants would experience physical risks during this study. Mild discomfort that may have arisen during a focus group or interview was mediated by allowing participants to step away when needed.

(2) Psychological Risks: It was not anticipated that participants would experience psychological harm from this study. However, feelings of stress and anxiety may have arisen during discussions of emergency department crowding and patient flow. At the beginning of focus groups and interviews, participants were directed to the American Nursing Association's resources for combating stress (<https://www.nursingworld.org/practice-policy/work-environment/health-safety/combating-stress/>).

Participants were given the option of turning their camera off to minimize discomfort related to participating with their camera turned on.

(3) Economic Risks: It was not anticipated that participants would incur economic harm. Focus groups and interviews were offered at a variety of different times and days to allow nurses to participate at a time that was convenient for them and that did not interfere with their work schedule. Focus groups and interviews were also offered via an online video conferencing platform to eliminate the cost of travel.

(4) Social, Cultural, and Political Risks: Nurse managers were segregated from other focus group participants so that staff nurses could talk freely about their place of employment without fearing job repercussions. In addition, a Certificate of Confidentiality from the National Institutes of Health (NIH) was obtained to protect employees against retribution from their employer (Appendix J).

(5) Breach of Confidentiality Risk:

- a. Participants were asked to sign a confidentiality form before the focus groups and were reminded not to repeat any information discussed outside of the focus group.

- b. Participant email addresses and demographic information were saved under the UMass Amherst Microsoft OneDrive which is approved for confidential data storage. This data was stored separately from the study transcripts.
- c. Transcriptions were de-identified prior to data analysis. Audio/video recordings were deleted after verification of transcription accuracy, within 90 days.
- d. Virtual meetings were held through UMass Zoom Video Conferencing and were private, requiring admittance to enter.
- e. A Certificate of Confidentiality was obtained from the NIH to protect participants in case sensitive information was discussed (Appendix J).
- f. Dissemination of findings only includes aggregate demographic information.
- g. This manuscript was reviewed by a nurse scientist representing the health system where participant observations were conducted.

Benefits to Human Subjects

There were no anticipated direct benefits to participants. However, participating in focus groups and interviews may have brought greater clarity to the nurses' own role and work as patient flow managers. This study aimed to provide understanding about how nurses perform patient flow management, highlighting the importance of nurses' contributions to patient flow, and laying the foundation for developing patient flow management strategies.

Trustworthiness

Lincon and Guba's five criteria are widely accepted to evaluate trustworthiness in qualitative research; they are credibility, dependability, confirmability, transferability, and authenticity (Connelly, 2016; Lincoln & Guba, 1985).

Credibility

Authors demonstrate credibility by acknowledging the subjectivity of their data and with findings that “ring true” (Miles et al., 2014). Credibility was promoted through prolonged engagement with the data, triangulation, negative case analysis, and member checking. This study relied on lengthy immersion in data collection, manual verification of all transcriptions, and intensive data analysis. Geographic triangulation was accomplished through additional interviews that confirmed the perspectives of initial study participants. Negative case analysis is recommended by Lincoln and Guba (1985) to prompt consideration of all cases. This was intentionally explored through memo-writing. Finally, member checking is ingrained the methodology of grounded theory, where simultaneous data collection and data analysis allows researchers to repeatedly verify and clarify emerging categories and themes, but additional formal member checking interviews were also conducted to increase credibility of study findings.

Consistent with a constructivist grounded theory approach, frequent memo-writing was performed to prompt reflexivity. My work acknowledges my own experience as an emergency department nurse and the role that my own perspectives play in shaping study conclusions.

Dependability

Dependability relies on credibility (Lincoln & Guba, 1985). In addition to the efforts described above, dependability is demonstrated through coherence to the study

methodologies. Therefore, data collection and data analysis strategies were closely guided by the work of Charmaz and Clarke. This study also conveys dependability through coherence between its purpose, aims, research approaches, and findings.

Confirmability

Confirmability is established through audit trails, triangulation, and reflexive journaling (Lincoln & Guba, 1985). In addition to the strategies already described, this study created an audit trail. Coding was performed in NVivo12 software where all codes are recorded and are transparent. A codebook was created in NVivo12 to clarify and elaborate on code definitions. Memo-writing provided rich detail for coding analysis and decisions. Emergent themes, study findings, and conclusions are supported by participant quotations. Finally, aggregate participant characteristics and study procedures are described in detail to demonstrate confirmability.

Transferability

Charmaz (2006) argues that the power of constructivist grounded theories emerges from its situatedness. Situating theories within their social, historical, and local contexts allows researchers to draw generalities and make abstractions. As Charmaz (2006) states, researchers must first acknowledge the role of context before they can develop decontextualized theories. The methods of constructivist grounded theory and situational analysis were both employed to capture thick descriptions of participants and their departments. Deeply understanding the contexts and environments of participants aimed to support the development of a theory that is transferable across many settings.

Study Timeline

Month (2022-2023)	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
UMass IRB Review	X												
Health System IRB Approval			X										
Initial recruitment and scheduling			X	X									
Initial focus groups and interviews			X	X	X								
Recruitment and scheduling for follow-up interviews					X	X	X						
Follow-up in-depth interviews and think-aloud scenarios					X	X	X	X					
Member checking interviews									X				
Hospital 1 observations				X									
Hospital 2 observations					X								
Hospital 3 observations						X							
Hospital 4 observations						X							
Data analysis			X	X	X	X	X	X	X	X	X		
Theory development							X	X	X	X	X		
Manuscript Writing							X	X	X	X	X	X	X
Dissertation Defense													X

Figure 3.2: Study timeline.

Summary

This study employed constructivist grounded theory and situational analysis methodologies to develop a grounded theory of patient flow management in the emergency department. Data collection relied on focus group and interview strategies, and simultaneous, inductive data analysis. Data analysis relied on coding, constant comparative analysis, memo-writing, and diagramming. Initial and focused coding were used to identify emergent coding categories and themes. The resulting constructivist grounded theory aims to add critical knowledge to the body of patient flow literature, better prepare nurses for this work, and help inform future patient flow management strategies.

CHAPTER 4

ARTICULATING THE WORK OF PATIENT FLOW MANAGEMENT

This section is the first of three describing major study findings and focuses on articulating the work of patient flow management. This section will address the following two aims: (1) clarifying the goals of patient flow management, and (2) identifying the five tasks of patient flow management.

Clarifying the Goals of Patient Flow Management

This study expands on Chapter 3 that presented studies which first defined and subsequently clarified the concept of patient flow management (Benjamin & Jacelon, 2021; Benjamin & Wolf, 2022). Affirming previous findings (Benjamin & Wolf, 2022), ED nurse participants stated that the overarching goal of patient flow management is patient safety.

“My primary goal is always 100% patient safety” (Int10)

However, additional probing found that ED nurses often have a hard time articulating their understanding of patient safety. Patient safety is perceived as a complex state of meeting both patient and staff needs across the ED while not depleting department resources.

How do you determine patient safety? If our systems are functioning properly and the right patients are in the right place at the right time, and the patients that are the sickest in the department are receiving the most immediate care, and we have enough people to do the work, we're achieving safety.... patient safety is also about nursing wellness. (Int1)

Achieving a safe balance between available resources and patient care requires the management of four distinct priorities: the need for ethical, efficient, timely, and comprehensive care.

It's a multi-faceted diamond... you have so many different facets to it, and patient safety has to encompass all the facets. (Int2)

Ethical Care

First, in a theme not previously reported by Benjamin and Wolf (2022), participants described the goal of providing ethical care. Ethical care correctly prioritizes patients and weighs the needs of patients against the needs of staff. Although ED nurses describe a desire to care for all patients, the realities of high patient burdens and scarce resources mean that they must select which patient needs to meet.

...sort of had to change expectations. Before it was like, "Yeah, we got everybody moved through." Now it's like, "Okay. How many did we get moved through? Or, did we catch those critical ones?" (FG4)

ED nurses also balance the needs of patients and staff. In a context of high nursing burnout and turnover, promoting staff well-being is perceived as critical to maintaining patient safety.

Even more important is the wellness of the nurse...Because if the nurses aren't well, if they don't have the tools that they need to do their job, then nobody's taking care of the patients. (Int1)

Efficient Care

The goal of efficient care is concerned with the appropriate use of department resources. ED nurses aim to correctly allocate department beds and equipment to meet patient needs without waste or misuse.

Making sure that the patient is going to the appropriate spot so you have the appropriate resources is the number one thing. (Int3)

Efficient care also requires the appropriate allocation of patients to nurses who have sufficient time and capacity to care for them. As one participant described,

The utilization of resources within your unit has to come down to, first and foremost, utilizing the most important resources, your nurses. (Int3)

ED nurses work to remove resources from patients with less need for them and move patients out of the department who are no longer perceived as requiring ED care. This goal is commonly described as the desire to “*get patients where they need to go*” (RN3, RN6, FG11, Int8, Int9).

Timely Care

A primary priority of patient flow management is the delivery of timely care. This goal is often described as the effort to “*get patients in and out*” (RN5, FG15, FG16, Int1, Int11, Int14, Int8, Int9), reflecting the dual desires of expediting care to newly arrived patients and expediting the movement of patients out of the department. Upholding the findings of Benjamin and Wolf (2022), the goal of providing timely care to newly arrived patients was found to emerge from ED nurses’ desires to quickly assess and stabilize patients, to decrease the burden of waiting patients, to reduce patient walk-outs, and to minimize the danger of the waiting room.

The most unstable patients in the entire hospital are the waiting room patients. (Int4)

The goal of rapidly moving patients out of the ED emerges from the desires to move critically ill patients to needed resources, to reduce patient burden on the department, and to open space for waiting patients. As one participant described,

The faster I can move people out, the more I can move people in. (RN2)

Comprehensive Care

The final subtheme of patient safety is providing comprehensive care. This includes the goals of achieving good patient outcomes, meeting the holistic needs of patients, and increasing patient satisfaction. When describing good patient outcomes in

the context of an overburdened healthcare system, ED nurses emphasized the goal of keeping patients alive.

I'll be honest with you, I think the staff are just worried about keeping the patients alive. (Int6)

However, ED nurses also strive to meet the holistic needs of patients, including social, emotional, spiritual, mental, cultural, and safety needs. As one participant reported,

The priority is making sure the patients get what they need to get. Period. (Int4)

Finally, ED nurses readily acknowledge the impact of patient flow management on patient satisfaction, but this priority is emphasized less than achieving good outcomes and meeting patient needs.

The goal of comprehensive care is viewed in tension with the goal of timely care. At times, ED nurses may purposefully slow patient care to ensure that it is comprehensive. As an example, nurses may choose not to discharge a patient if their needs have not been fully addressed.

You may be worried about throughput, but you have to be safe in order to facilitate the flow of your patient... I think that's a fine balance. (Int2)

Identifying the Five Tasks of Patient Flow Management

Study data revealed numerous strategies used by ED nurses to manage patient flow. These nursing strategies illustrate the complexity of nursing work and are summarized in Table 4.1. These strategies can be understood by categorizing them into five tasks that describe ED nurses' efforts to promote patient safety while balancing the subgoals of providing ethical, efficient, timely, and comprehensive care. The five identified tasks are summarized as the following: (1) Information gathering is the work of

understanding department resources and patient care, (2) continuous triage is the work of ethically prioritizing patient and staff well-being, (3) resource management is the work of efficiently maintaining and allocating resources to patients, (4) throughput management is the work of expediting patient care, and (5) care oversight is the work of ensuring comprehensive patient care.

Table 4.1: Summary of ED nurse patient flow management strategies.

Information Gathering	<p><u>Understanding department resources and patient care:</u></p> <ul style="list-style-type: none"> • Knowledge of department resources <ul style="list-style-type: none"> ○ Knowledge of the physical location, availability, functionality, and cleanliness of beds and equipment ○ Keeping track of patient belongings and records ○ Knowledge of current staff assignments, workloads, well-being, and experience/personality/skill set • Knowledge of patient care <ul style="list-style-type: none"> ○ Keeping track of patient’s physical location ○ Understanding patient acuity and care needs ○ Understanding of patient progress along their care journey <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> • Use of the ED tracking board • Use of other electronic applications <ul style="list-style-type: none"> ○ Patient charts ○ Inpatient bed tracking board ○ Ambulance arrival tracking systems • Communication with staff and providers <ul style="list-style-type: none"> ○ Formal report ○ Informal exchanges ○ Phone calls ○ Active rounding ○ Huddling/running the board • Visual assessments of the ED and of patients • Subjective assessment strategies <ul style="list-style-type: none"> ○ Reading the ED mood or vibe ○ Watching staff demeanor and body language ○ Use of patient flow trends
Continuous Triage	<ul style="list-style-type: none"> • Prioritizing the sickest patients for movement into/out of the ED and for staff time/attention • Prioritizing patients using criteria other than clinical acuity • Prioritizing staff well-being <ul style="list-style-type: none"> ○ Considering workflow ○ Postponing patient placement and care

Resource Management	<ul style="list-style-type: none"> • Managing resource allocations <ul style="list-style-type: none"> ○ Placing patients in the right bed ○ Ensuring patients have the right equipment ○ Matching patients to the right staff ○ “Cohorting” patients ○ Shuffling patient locations and redistributing equipment ○ “Holding” a room ○ Making a mental plan for potential patient movement • Maintaining department resources <ul style="list-style-type: none"> ○ Cleaning and preparing rooms ○ Stocking and prepping supplies ○ Maintaining and fixing equipment • Managing staff <ul style="list-style-type: none"> ○ Shuffling and delegating staff ○ Making and editing the staff assignment ○ Planning for future staffing levels
Throughput Management	<ul style="list-style-type: none"> • Expediting patient movement into the ED <ul style="list-style-type: none"> ○ Identifying available rooms ○ Facilitating physical movement in ○ “Direct-bedding” • Expediting provision of patient care <ul style="list-style-type: none"> ○ Settling patients and getting care started ○ Placing protocol orders and treating patients in the waiting room ○ Pushing diagnostic testing ○ Helping others to promptly complete orders and care tasks ○ Coordinating interdepartmental services • Expediting movement of patients out of the ED <ul style="list-style-type: none"> ○ Advocating for inpatient bed placement ○ Confirming placements and inpatient bed readiness ○ Arranging transport ○ Expediting report and paperwork ○ Expediting discharges ○ Aligning disposition expectations between patients, families, and providers • Pushing staff and providers
Care Oversight	<ul style="list-style-type: none"> • Overseeing provider decisions <ul style="list-style-type: none"> ○ Verifying care orders ○ Verifying appropriateness of disposition plan • Acting as a second set of eyes on nursing care <ul style="list-style-type: none"> ○ Identifying and correcting care errors ○ Helping nurses care for high acuity patients ○ Educating and supporting others

Information Gathering

Information gathering is the task of understanding (1) department resources and (2) patient care using a variety of information sources. First, understanding department resources requires knowledge of the physical location, availability, functionality, and cleanliness of ED equipment and beds. Finding equipment is an especially burdensome task that nurses perform throughout their shift. When asked how much time is spent looking for equipment, one participant estimated,

Out of a 12-hour shift? Probably at least an hour.” (RN2)

To reduce the burden of locating equipment, ED nurses attempt to maintain an active awareness of equipment as they work and may collect or cohort supplies.

RN3 also overhears an announcement, “If anyone has an available IV pump, we need one in A4 stat.” RN8 appears outside A4 carrying an IV pump. “I saw this one yesterday in triage. “I hope it works!” (RN8)—Field Note 5

Understanding department resources also encompasses knowledge of staffing assignments, workloads, and well-being. In observations, knowledge of the staffing assignment was found to require frequent communication and clarification as shifts changed and staff were transferred to new tasks or locations.

RN1 calls a tech to transport the patient, the tech responds that she can’t because she’s on a 1:1. “Oh that’s right, I forgot I did that to you” (RN1)—Field Note 3

Nurses must also keep track of patient belongings and records. A loss of patient belongings or records may interfere with the ability to transfer or discharge patients out of the ED.

Two words every nurse hates, “patient belongings.” (Int3)

Knowledge of staff's workload and well-being requires gathering information about the number of patients in each staff members' assignment, patient acuity, the number of outstanding care tasks, and the time since previous patient arrivals. One participant summarized this task as "*knowing what each nurse has and what they can take*" (FG7). An accurate understanding of workload and well-being relies on a familiarity with staff member's experience level, skill set, and personality.

So the charge nurse that's really good knows the players.... who their good players are, who their bad players are. (Int9)

Second, information gathering involves the work of understanding patient care, including knowledge of patients' physical location, acuity, care needs, and current progress along their care journey. ED nurses maintain an awareness of patients' physical movement as they are transferred, discharged, or transported to diagnostic testing.

"Hall 4's gone?" (RN1) "I don't know, he was changing last I checked." (RN4)—Field Note 10

For bedside nurses, knowledge of patient care describes an intimate understanding of patients' acuity, resource requirements, treatment plan, and care tasks. In contrast, lead, flow, navigator, or charge nurses describe their work to "*know enough*" (Int3) about each patient with particular attention to understanding patient acuity and overall progress. As one participant reported, "*You need to know who is the most sick, at all times*" (RN2).

I don't know every detail when I'm in charge of every patient, but I do know where they are at in their visit. (Int1)

ED nurses rely on a variety of sources to gather information. These sources include the use of health information systems (HISs), such as the ED tracking board, patient charts, inpatient bed tracking systems, and ambulance arrival tracking systems.

HISs provide ED nurses with data about both department resources and patient care. Study participants report primarily relying on ED tracking boards to quickly understand an overview of patient volume, patient placement, staff and provider assignments, timing metrics, and patient characteristics including age, sex, chief complaint, and assigned acuity level (such as the emergency severity index score [ESI]). The ED tracking board may also provide a visual overview of a patient's ED care journey through icons, symbols, or colors to represent patient care tasks and timing metrics. As one participant stated, *“Really, the tracker board kind of steers everything.”* (Int1)

ED nurses use patient charts to gain a more comprehensive understanding of patient acuity and care needs. Patient charts provide access to nurse and provider care notes, patient orders, diagnostic reports, and other charted data such as vital signs, biophysical assessments, and medication records. The access and use of inpatient bed and ambulance tracking systems vary between hospitals but can further augment available data. Inpatient bed tracking systems are designed to provide notifications about inpatient assignments, inpatient bed availability, and bed cleanliness, while ambulance tracking systems contain information about incoming patient arrivals.

When describing their use of HISs to gather information, participants expressed concern with the accuracy of presented data.

You can't always trust what's happening on the screen. (FG5)

Common experiences of data inaccuracy include incorrect chief complaints, outdated or erroneous information about bed availability and cleanliness, outdated patient placements, and unreliable care task icons. The culture and use of ED tracking board

icons vary between hospitals and individual nurses such that some nurses clear all their care task icons without completing their assigned tasks and others never clear them at all.

We have a bad habit of our nurses just acknowledging all the orders. Well, if you acknowledge all the orders, then other people behind you don't know what needs to be done. (Int2)

Participants also criticized the reliability of understanding patient acuity by looking at the assigned ESI score. These scores often do not reflect a patient's real-time acuity status and are understood to be somewhat subjective, influenced by triage nurses' personality, experience, and clinical judgment.

The ESI is only as good as the person assigning it. (FG19)

Overall, the task of information gathering requires ED nurses to continually verify, update, and correct the data presented through HISs. ED nurses rely on (1) communication with staff and providers, (2) visual assessments, and (3) subjective strategies to accomplish this work.

(1) Communication with staff involves formal nurse reports and frequent rounding of the department. ED nurses receive formal report from off-going nurses at the start of their shift and when changing accountability for patients. In observations, formal reports between nurses in bedside roles were concise with an emphasis on describing patients' plan of care and outstanding tasks. Reports between nurses in lead, flow, triage, and charge nurse roles summarized patient acuity and care needs across multiple nursing assignments and described collective patient flow management considerations, such as staffing, equipment concerns, and anticipated patient movement.

They exchange information about the status of the patients and outstanding tasks/diagnostic tests. "I'm just going to hang the calcium" (RN3)... "Oh yeah, I already swabbed him." (RN3)... "What about the ECG?" (RN4)—Field Note 3

While reports are described as an important method to gather a baseline understanding of the department, participants emphasized the need for prompt and frequent active rounding of the ED throughout a shift.

I would ask for a report from the lead who's leaving and figure out who's sick... and then check with each nurse and confirm that that information is correct. (Int2)

In fact, active rounding of the department is seen as a core defining attribute of a good patient flow manager, contrasted against nurses who primarily sit at their desk and rely on the ED tracking board or “*chart-stalking*” (Int5).

To be a good flow manager I think you have to be walking constantly through your units, touching base with your pod leads, touching base with your charge nurse. (Int15)

ED nurses also communicate with bed management or logistics departments, nursing supervisors, ED managers, and inpatient charge nurses to try to predict future patient movement and better understand staffing considerations. This communication often relied on phone calls that aimed to augment data available from HISs and staffing documents.

I'm still checking in with my bed placement people. You know, what is our status gonna be? When are we expecting, you know, what kind of beds do we have? ... What are we waiting on? Are we waiting on housekeeping? Those kind of things, just to get some information. (TA6)

In addition to communication with staff, ED nurses gather information from providers. In observations, communication between bedside ED nurses and providers was largely informal and brief, serving to clarify questions and provide quick updates. Nurses in lead, flow, navigator, or charge roles may engage in more formal communication strategies described as “*running the board*” (TA2) or “*huddling*” (Int12, TA4) to clarify patient acuity, plans of care, and outstanding barriers to disposition for patients

throughout the department. In turn, ED nurses update providers on staffing issues, anticipated patient movement, and other patient flow management considerations.

(2) Information gathering through visual assessments describes both visual assessments of the department and of patients. ED nurses gain an understanding of department resources and patient care by looking out at the department and seeing the comings and goings of staff. They also walk around the unit to verify the availability and cleanliness of ED rooms, locate equipment, and find colleagues. As one participant stated,

You really just have a full knowledge of what's going on, because most of the time you can just see it. (Int1)

Bedside and triage ED nurses gather information through in-depth physical patient assessments, while nurses in non-bedside roles describe their visual patient assessments as “*across-the-room*” (RN2, RN9) or “*doorway*” (Int1) assessments, “*eyeballing them*” (FG16), or “*put[ting] an eye on them*” (RN10). ED nurses also gather insight into patient care using cardiac monitor and vital sign projections that are often mounted to ED walls or nursing station desks. With sufficient ED experience and strong clinical judgment, these brief visual assessments can rapidly provide nurses with a significant understanding of patients’ acuity and care needs.

(3) Finally, participants reported relying on subjective assessment strategies to gather information about the current state of the department. These approaches include strategies, such as “*getting a feel for the department*” (Int1, FG1), feeling “*the vibe*” (Int10), or reading “*the mood*” (FG1, Int11) of the ED, that are performed quickly and intuitively, often as nurses enter the department.

A lot of times I can feel the vibe, that initial walkthrough that I do before I've even clocked-in tells us 90 percent of what I need to know before I'm even in report. (Int 10)

ED nurses also read each other's body language and demeanor to understand staff well-being and comfort level.

I usually can tell like, "Whoop, their demeanor's a little bit off," and I need to go in there and provide that support. So, I think human behavior really gives away a lot in this environment. (Int1)

Third, nurses lean on their previous experiences with patient flow trends, including patterns in patient arrivals, inpatient bed assignments, and provider disposition decisions to anticipate department resources and patient care burdens.

Just the way the flow of the whole hospital works is, a lot of times, discharges don't happen until the 2 to 3 o'clock time. And that's right when most of the workups for the ER and admissions are ready to move. (FG5)

In sum, information gathering is the task of understanding ED equipment and beds' location, availability, functionality, and cleanliness; ED staff members' assignments, workloads, and well-being; and patients' physical location, acuity, care needs, and care journey progress. ED nurses gather information through HISs, but must update and verify its accuracy through communication with staff and providers, visual assessments of patients and the department, and subjective strategies. Information gathering is a complex and time-consuming process that supports the remaining four tasks of patient flow management.

Continuous Triage

Continuous triage is the task of providing ethical care by appropriately prioritizing patient and staff well-being. As opposed to traditional triage, whereby nurses assign patients an acuity score upon their arrival based on triage criteria that is meant to

be independent of the current state of the department, continuous triage is an ongoing strategy of actively comparing patients to weigh their acuity and needs against one another. Patient and staff prioritization are repeatedly reconsidered as patient volumes, acuity, and care needs change.

Nurses use their understanding of patient acuity, care needs, and care journey progress to make judgments about patient and staff prioritizations. Overwhelmingly, ED nurses prioritize patients who are perceived to have the highest clinical acuity. The sickest patients are prioritized for movement into the department, for movement upstairs to the floor, and for staff time and attention.

You know, those are my priorities, the high acuity people, the sickest of the sick. (Int5)

However, nurses may also prioritize patients using criteria other than acuity. Rather than relying solely on triage score and wait time, ED nurses weigh many factors when selecting the next patient to move in from the waiting room. Considerations that might increase patient prioritization for bed placement include patient behavior, isolation precautions, active bleeding or vomiting, age considerations (including elderly patients or very young patients), incontinence, patients in police custody, disability status or immobility, patients that are a burden to triage staff (such as those requiring toileting assistance), patients who are employees or known to staff, and considerations of pain.

One of the patients is elderly and incontinent of stool and the other one has hematuria with clots. She states, “We can’t justify making them 2’s” (RN10), but she doesn’t want them waiting too long.—Field Note 7

Nurses also consider patient factors other than clinical acuity when prioritizing patients for movement out of the department.

If you've got somebody who's super sick then we're going to be advocating for them to get up to the floor...but to be perfectly honest, someone who's a huge pain in the ass, and is on their call bell constantly, you know, things like that. (Int10)

Finally, continuous triage requires ED nurses to weigh the needs of patients against the needs of staff. Nurses prioritizing patients may consider their own workflows and may choose to complete quick tasks before turning their time and attention to sicker patients. One participant described prioritizing a less urgent task “*just so I don't forget, to be honest.*” (RN4)

Somebody needs to be discharged, some nurses would say “Well, they're stable, they can wait.” But it's gonna take me 5 minutes... I'm gonna go do that discharge really quick, because then somebody else can fill that bed while I'm doing this other thing. (Int1)

Nurses might also purposefully slow patient care to protect the well-being of staff. For example, low-acuity patients may be left in the waiting room a little longer to give nurses a chance to catch up, or patient care may be delayed so that nurses can take a break.

It's like a swinging pendulum. Sometimes, you can give the inside nurses a little bit of break and let there be a waiting room. And other times, it's like, “I'm really sorry we need to overwhelm you, but this patient cannot be in the waiting room.” And I think a really good flow nurse can manage that balance. (FG19)

Resource Management

The work of resource management describes the task of efficiently allocating and maintaining department resources. This task relies on an accurate understanding of department resources and patient care as well as continuous triage prioritizations. The work of appropriately allocating resources includes matching patients to the right beds, equipment, and staff.

Matching a patient to an ED bed is a complex task. A “bed” might include hospital beds, ED stretchers, specialized stretchers, chairs, and recliners. “Beds” may be located in a hallway, a room, a specialized treatment space such as a trauma or resuscitation room, or include informal treatment spaces such as chairs, waiting room seating, triage rooms, or even, as one participant reported, a conference room. Nurses match patients to stretchers versus chairs according to their acuity, physical abilities, and level of discomfort. Nurses must also consider the presence of designated treatment areas that group patients with similar care needs, such as mental health patients, inpatients, or fast-track patients.

There is an area of the department called “Results Pending.” This is a little room that sits at the entrance of the department where there are recliners. The ER uses this space for [ESI] level 4s and 5s who are waiting on results.—Field Note 1

Further, placement considerations include patients’ acuity, need for medical resources and procedures, need for proximity to other department resources (such as bathrooms or exits), need for isolation precautions, need to be visible or close to the nurses’ station, need for privacy, and patient behavior.

This patient who’s coming in with diarrhea, I don’t want to put her all the way around the corner and she needs a walker to get to the bathroom. (Int8)

Just as patients are matched to beds, they are also matched to department equipment including cardiac monitors, oxygen, suction, bedside tables, call bells, bedside commodes, and other medical equipment or care supplies.

This is a respiratory patient coming in, let me make sure RT [respiratory therapy] is aware of the fact that I’m bringing in a CPAP. (Int3)

Matching a patient to staff is similarly complex. Assigning a patient to a nurse may include considerations of that nurse's skill set, level of experience, personality and preferences, and current workload. Aside from nursing staff, patient placements must consider the capacity, skillset, and workload of other staff roles such as ED technicians, medics, and behavioral sitters.

Are you giving the appropriate nurse the appropriate patient? ...But also, is this an appropriate patient to come to my pod?... This patient needs to be in the psych pod because they need a sitter. (Int3)

The task of managing resource allocations requires ED nurses to continually reassess, reallocate, and plan for the future, work that is frequently compared to a “chess game” (F4, FG5, TA4) or “a puzzle” (TA2).

Like always thinking like a chess game, what the next move is... you always have to prepare for what's to come. (FG5)

Specific strategies used for resource reallocation and planning include shuffling patient locations, “cohorting” similar patients to designated care areas, redistributing equipment, “holding” a room by reserving it for emergent patients, and making a mental plan for future patient movement, such as identifying patients that could be pulled out of rooms if needed.

But if for some reason all my rooms are full, I'm kind of aware of who can be pulled out for an emergency...and where I can put them. I always kind of have up a plan 3 or 4 steps ahead of what could happen. (Int8)

In addition to managing resource allocations, the task of resource management encompasses a variety of strategies that ED nurses use to maintain and prepare department resources. Nurses are intimately involved in cleaning and preparing ED rooms, stocking and prepping supplies, and maintaining and fixing equipment.

RN2 walks away to the med room singing to herself, “Keep cleaning, just keep cleaning.” (RN2)—Field Note 8

RN4 has pushed over an IV pole to the nurses’ station, the bottom wheels are loose. “I’ll go get the wrench” (RN7)...”See? Easy fix! We can fix that!” (RN4)—Field Note 16

Finally, resource management involves the work of managing staff, including shuffling and delegating staff, making or editing the staffing assignment, and planning for future staffing levels. Consideration of future staffing levels might require ED nurses to relocate patients or adjust the rate of patient movement into the department.

I most likely have to shut down vertical track by 10 o'clock, so trying to push as much meat as I possibly can... before I lose those nurses. (Int10)

Throughput Management

Throughput management is the task of providing timely patient care. ED nurses increase throughput by (1) expediting patient movement into and out of the department, (2) expediting the provision of patient care, and (3) pushing staff and providers.

(1) Expediting patient movement into and out of the department relies on the facilitation and prompt recognition of room availability and the physical transportation of patients. ED nurses may employ direct-bedding during periods of low patient burden to place patients directly into ED rooms after triage rather than returning them to the waiting room. To expedite patient movement out of the department, ED nurses rely on strategies such as advocating for inpatient bed assignments with the bed management or logistics department, confirming assignments and bed readiness with inpatient floors, expediting reports and discharges, completing paperwork, arranging transportation, and aligning expectations about disposition plans between patients, families, and providers.

RN2 tells his orientee, “I would give the dexamethasone and then do your SBAR so if they get a bed they can go right up.” —Field Note 10

Whereas I can have one of my techs...take the patient upstairs and that would probably get the patient up there faster. (Int8)

Participants particularly emphasized great barriers when calling report to inpatient floors. ED nurses often employ strategies to encourage floors to take report or turn to charge nurses and managers to help facilitate this process.

The charge nurses are instrumental in making sure that report was called, or... the SBAR was sent. If we have a transfer, they take care of that transfer to make sure it goes quickly and smoothly. (Int4)

(2) Expediting the provision of patient care includes strategies to promptly initiate care upon patients’ arrival, often called “*getting patients settled*” (RN5, Int10, Int1, Int3) or “*starting patients*” (FG16, Int1, Int4, Int6). In burdened EDs, this may include caring for patients before ED bed placement using protocol orders or treating patients in the waiting room.

I had a STEMI from the waiting room that never went into the back. (FG11)

ED nurses also expedite patient care by anticipating and addressing patient needs and helping to promptly complete ordered care tasks.

So it's just ensuring that all of your outstanding orders are completed in a timely fashion. I think that contributes to flow. (FG17)

Finally, ED nurses expedite patient throughput by coordinating with other departments to hasten diagnostic testing and arrange other services such as case management or physical therapy.

I start making phone calls and say, “Hey, this has been ordered for 2 hours, it’s STAT, when can we get them over there?” (Int2)

(3) Timely patient care also relies on pushing staff and providers. This strategy describes the act of prompting or motivating others to complete outstanding tasks and resolve barriers to disposition.

Our charge nurses do a lot of pushing, and pushing the doctors for re-evaluations, and dispositions, and getting our patients out, not just sitting on 'em. (Int11)

Care Oversight

Care oversight is the task of ensuring that patient care is comprehensive. As described above, comprehensive care achieves good clinical patient outcomes, meets the holistic needs of patients, and increases patient satisfaction. Care oversight includes the work of (1) overseeing provider decisions and (2) acting as a second set of eyes on nursing care.

(1) Nurses oversee provider decisions by reviewing the accuracy of ED patient care orders and verifying that they appropriately meet patient needs. ED nurses describe themselves as a “*second-check*” (FG14, Int12) or a “*double-check*” (FG16) on patient care.

At the end of the day, that's what nurses are there for. Doctors do their assessment, we do our own assessment. We're like that second-check. (FG14)

In addition to ED patient care orders, nurses try to ensure appropriate discharge decisions by confirming that patients have sufficient resources to be safe at home, such as access to follow-up care, needed medical supplies, and the ability to fill their medications, that patients are medically stable, and that their concerns have been sufficiently addressed prior to discharge.

And how do people safely get out of the ED is, I think, a really big thing. And knowing that not everyone has the resources to independently leave

the ED after they're discharged. So what are those resources? ... it's helped with preventing bounce-backs. (FG18)

ED nurses also verify the appropriateness of patient admissions by double-checking inpatient orders, including patients' level of care, assigned care area, and isolation status, and by making sure they are medically stable before transport upstairs.

I do think that's part of flow, is to make sure, are the patients receiving the appropriate level of care, and are they going to the appropriate floor, can they be downgraded? (FG14)

(2) ED nurses, especially those in non-bedside roles and nurses with greater experience, also perform the work of overseeing nursing care. These nurses describe themselves as a second set of eyes to ensure that patient care is provided safely. Nurses frequently help their colleagues to care for high acuity patients.

If somebody's got an ICU level, like, is everything tied up as a bow? Are they starting drips, are their drips correct?...Is the person comfortable with what they're doing? (FG15)

When needed, ED nurses work to correct care errors, which include both missed and incorrect care. Care errors may result from insufficient nursing time, oversight, accident, and poor clinical knowledge. Common examples of care errors include medication errors, missed diagnostic tests, and the failure to reassess patients.

Just making sure that you're going through each and every patient's chart for orders and initiating them...when you see that they're not being done. (FG15)

ED nurses also engage in education and provide advice to help less experienced nurses learn new skills, assist with time management, correctly prioritize, critically think, and answer questions.

There's so much teaching going on, while we're helping these new grads try and understand the flow, and what needs to be done, and prioritized, and that kind of stuff. (FG4)

A Theoretical Model of the Work of Patient Flow Management

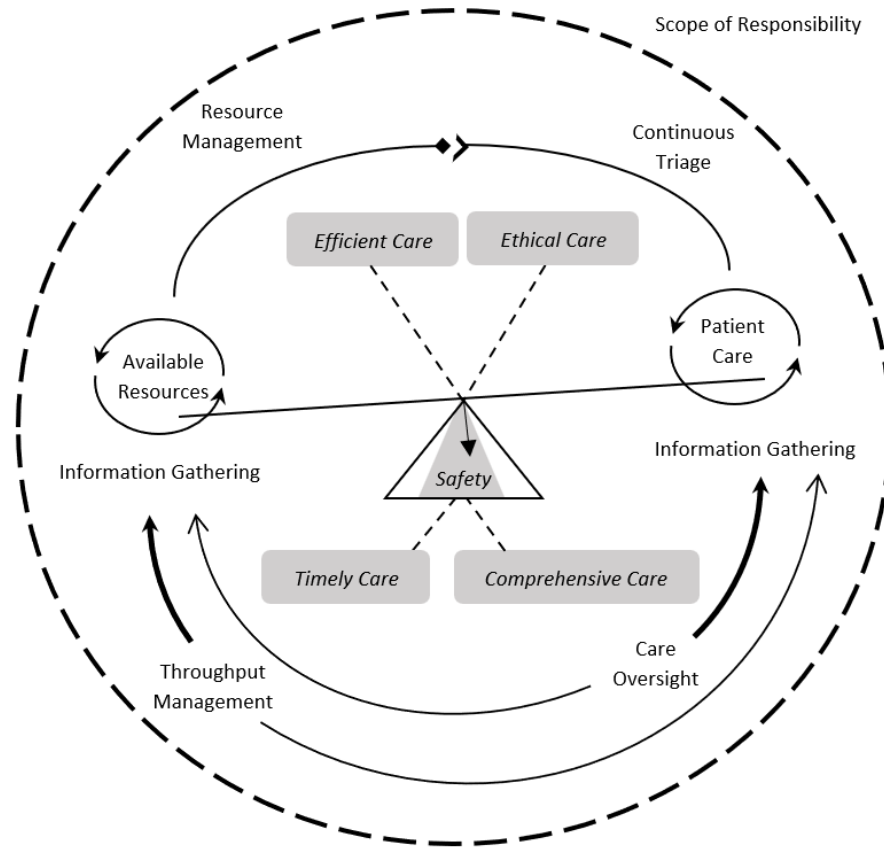


Figure 4.1: A theoretical model of the work of patient flow management.

Figure 4.1 illustrates a theoretical model to summarize the goals and five tasks of patient flow management. At the heart of the model is a scale that represents the balance between available resources and patient care. Patient flow management is the work of managing this balance to maximize patient care while not depleting resources. At the center of the scale is the perceived collective state of patient safety, representing the primary goal of patient flow management. When patient safety is compromised, ED nurses use patient flow management strategies to restore an appropriate balance between available resources and patient care to return to a state of perceived safety. The five tasks of patient flow management arise from this central balance and describe the work ED

nurses do to promote and manage the four subgoals of providing ethical, efficient, timely, and comprehensive care.

As shown in the top of this model, the tasks of continuous triage and resource management are understood as a matching process in which nurses try to match the right patient to the right resources. The bottom of the model demonstrates the tension between throughput management and care oversight that arises from a conflict between promoting timeliness versus comprehensiveness. ED nurses manage this balance according to the overarching goal of collective patient safety. Continuous triage, resource management, throughput management, and care oversight all impact the balance between available resources and patient care.

Finally, the model is surrounded by a dotted line to represent a nurse's scope of responsibility. As Benjamin and Wolf (2022) found, nurses manage patient flow across the patients for which they hold responsibility, whether that is an individual patient assignment, waiting room, pod or zone, or the entire department.

Discussion

The first aim of this chapter was to build upon previous concept analyses to clarify ED nurses' perceptions of the goals of patient flow management. In contrast to prior concept analyses, this study included participation by ED bedside nurses who do not serve in specialized roles. This study confirmed prior findings that nurses are primarily motivated by the desire to promote patient safety across multiple patients, whether in their own assignment, pod or zone, or across the whole department. Questions that probed more deeply into how nurses define patient safety revealed that safety is understood to be a complex phenomenon that encompasses the goals of ethical, efficient, timely, and comprehensive care. The addition of "ethical care," not previously identified

in concept analyses of patient flow management, clarified that nurses seek to appropriately prioritize their time, attention, and resources to the patients who need it the most, while also weighing patient needs against staff well-being. This goal of ethical care is especially important in a context of high patient volumes, acuity, scarce resources, and high nursing burnout, where ED nurses lack the ability to meet all patient care needs.

Offering a richer understanding of ED nurses' conceptualization of patient safety was not originally anticipated to be a key finding of this study, and yet it is striking because it conflicts with traditional narratives. Patient safety has been largely defined as the prevention of patient harm and error, and it is presented as one component within the overarching goal of "quality" healthcare (Mitchell, 2008). Indeed, the IOM's six domains of quality care and the World Health Organization's definition of quality both place patient safety beneath the umbrella of "quality" alongside other goals such as effectiveness, patient-centeredness, timeliness, efficiency, and equity (IOM (US) Committee on Quality of Health Care in America, 2001; World Health Organization, 2020). These characterizations of patient safety and healthcare quality have been adapted into ED healthcare research and guidance, as demonstrated by the recent IFEM Framework for Quality and Safety in Emergency Medicine (Hansen et al., 2020). In contrast to these prevailing definitions, this chapter finds that ED nurses perceive timeliness, efficiency, comprehensiveness, and ethicality as defining characteristics of patient safety, rather than distinct goals. Patient safety, not quality, is understood to be the main objective of ED patient flow management and is defined as a complex state of meeting both patient and department needs, rather than merely the avoidance of error.

Other studies have identified differences in the discourse and conceptualization of patient safety between nurses, other health professionals, and management (Nugus & Braithwaite, 2010; Rowland & Kitto, 2014; Wailling et al., 2019). Nugus and Braithwaite (2010) argue that the way healthcare providers conceptualize healthcare quality and efficiency has meaningful implications for healthcare delivery and may explain the disjunction between healthcare policy and practice. In their own ethnographic research, Nugus and Braithwaite (2010) argued that the traditional dichotomy between quality (which they define as the standard of patient treatment) and efficiency (which they define as the speed of patient care that maximizes department resources), that is presented throughout healthcare research does not reflect the viewpoints of ED providers and nurses. They instead propose that quality and efficiency are understood to be in a “dynamic equilibrium” rather than in opposition to one another or in a hierarchical relationship that favors one over the other. This idea aligns with study findings, where the goals of timely and comprehensive care are balanced with one another, seen as both complementary and in tension.

Braithwaite later went on to advocate for a new paradigm in patient safety theory, proposing that healthcare should not focus on reactively tracking past errors but rather identifying and empowering the work of frontline staff in promoting safety (Braithwaite et al., 2015; Hollnagel et al., 2013). Braithwaite’s perspective welcomes a more comprehensive understanding of patient safety in place of a focus on preventing harm. Braithwaite et al. (2015) argued that this requires a realistic knowledge of the way “work-is-done” rather than the overly simplified administrative imaginations of work (Braithwaite et al., 2017). This viewpoint embraces the complexity of healthcare and

recognizes the resilience of frontline workers in adapting to system variability. Braithwaite et al.'s (2015) perspective, known as "Safety-II" is criticized for creating a false dichotomy with previous safety approaches and for its unknown practical applications (Cooper, 2022; Verhagen et al., 2022), but it has been embraced by those frustrated by linear, narrowly-defined, and ineffective safety approaches (Woodward, 2019). While a discussion of the merits and faults of Safety-II are beyond the scope of this paper, it appears to be a paradigm more closely aligned with ED nurses' discourse and conceptualization of patient safety as a complex, broadly-defined goal of patient flow management.

The second aim of this chapter was to identify the five tasks of patient flow management. In 2021, arguing that nursing work is both multi-faceted and poorly represented by existing models, Jackson et al. presented a new framework to describe the work of nurses. They introduced five novel narratives of nursing labor to categorize their meta-narrative literature review findings: physical labor, emotional labor, cognitive labor, combined labor, and organizational labor. Among 121 identified articles, only one study was found to describe nurses' organizing work (Jackson et al., 2021). As introduced in Chapters 1 and 2, this concept of organizing work was proposed by Davina Allen, who first criticized the nursing profession for its lack of acknowledgement and inquiry into this important aspect of nursing (Allen, 2015a, 2015b). As Jackson et al.'s (2021) literature review revealed, there is still a significant lack of nursing research examining organizing work.

Allen (2015b) describes organizing work as the invisible labor of nurses acting as network builders within healthcare systems. Her final theory of "translational

mobilization” captures the ways that nurses employ their clinical and organizational knowledge to shape, coordinate, and progress patient care trajectories (Allen, 2018). Allen’s research of organizing work was both groundbreaking and comprehensive. Study participants echoed many of her central principles, describing the role of nurses in shaping knowledge of patient care trajectories by both relying on and augmenting the electronic medical record, the work of nurses to assemble and align needed resources for patient care, the labor of maintaining trajectory momentum, and the skill of matching patients to beds, people, technology, and space. However, Allen (2015b) argues that nursing organizing work differs between clinical settings. Despite many similarities to her theory of translational mobilization, which emerged from research across multiple hospital care units, the work of ED patient flow management also varies in several notable ways.

Allen (2015b) writes that the concept of “care trajectories” is a central organizing principle to her work. She draws on the research of Anselm Strauss to define a care trajectory as “the unfolding of a patient’s health and social care needs, the total organization of work carried out over its course and the impact on those involved with that work and its organization” (Allen, 2015b, p. 20). In her later development of the Care Trajectory Management Conceptual Framework, Allen argues that organizing work is fundamentally “care trajectory”-focused. She differentiates this idea from direct patient care, which focuses on a patient, and nursing management, which focuses on units (Allen, 2019).

In contrast to this idea, this study has found that ED nurses conceptualize their work around the goal of maintaining a collective state of safety within their scope of

responsibility. This means that ED nurses manage their time, attention, and resources to promote safety across multiple patients within their assignment, pod/zone, or the whole department in accordance with their role. Rather than orienting their work around patient care trajectories, ED nurses focus on optimizing the moment-to-moment balance between patient care and available resources. This distinction between Allen's conceptualization of translational mobilization and patient flow management may reflect the unique characteristics of working in an ED that is dynamic, unpredictable, and constrained by limited resources, most notably insufficient nursing capacity. In a world severely impacted by COVID-19, ED nurse participants expressed an acute awareness of the dangers of working amidst scarcity. These realities place the skills of rationing and prioritizing at the heart of ED nurses' work and fundamentally reorient nurses' focus away from individual patient care trajectories.

Also in contrast with existing descriptions of organizing work, a noteworthy strength of this study is that the articulation of patient flow management is grounded in the experience and discourse of ED nurses. The term "patient flow management" was chosen not only because it aligns with the prominent body of patient flow research, but also because it is language actively employed in EDs. Similarly, descriptions of "resource management," "throughput," and "overseeing care" all arose from the vocabulary of study participants. One especially interesting finding was the common use of the word "triage" to describe the ongoing assessment and prioritization of patients' acuity and care needs throughout their ED journeys. This understanding of triage differs from traditional definitions of triage as defined by the application of the Emergency Severity Index (ESI), the most commonly used ED triage system (Gilboy et al., 2020). According to the ESI

2020 Implementation Handbook, the purpose of triage is to “prioritize incoming patients and to identify those who cannot wait to be seen” (p. 1). The ESI algorithm describes itself as a standardized tool to determine how long each patient can safely wait and to estimate their resource needs (Gilboy et al., 2020). In contrast with this defined purpose, practicing ED nurses commonly rely on the ESI to appreciate the acuity of patients already inside the department and to continually weigh their needs against others’. This phenomenon, now defined as “continuous triage,” offers novel insight into the work and discourse of ED nurses. More research is needed to understand the validity of this practice and new instruments may be needed to more accurately describe patients’ real-time acuity level throughout their care journey.

Finally, in addition to articulating the nature of ED nursing work, this study has added needed understanding into ED patient flow processes. Patient flow research has been criticized for lacking sufficient description of the complexity of patient flow, including the influence of clinician behavior on flow processes (Bergs et al., 2016; Bond et al., 2018; Mohiuddin et al., 2017; Nugus & Braithwaite, 2010; Nugus et al., 2014; Saghafian et al., 2015). Amidst qualitative research that describes patient flow, the work of two scholars stands out. Nugus et al. (2014) and Reay et al. (2016) each published models that describe the nature of ED patient flow management and compliment the findings of this study.

Nugus et al. (2014), aiming to demonstrate the active agency of ED clinicians in managing patient flow, offered a model of ED patient flow known as the carousel model. Their metaphor describes patient flow as a circular, rotating state where ED beds are represented by carousel horses and clinician decision-making is compared to carousel

music. At the center of their model, Nugus et al. (2014) define the controls that ED clinicians use to influence patient flow: assessment, timeliness of diagnoses and admission/discharge decision-making, management of time and space, supervising of less experienced clinicians, intra- and inter-departmental problem-solving, and negotiations around transfer/discharge. While their research describes the work of both physicians and nurses, several common themes are evident. Most significantly, the carousel model emphasized the complexity and dynamic labor of managing limited resources to propel patient movement through the ED.

Reay et al. (2016) published a grounded theory called “Momentary fitting in a fluid-environment” to describe nurse triage decision-making. Triage nursing roles vary between EDs and Raey et al.’s work described triage nurses’ function as assessing patient acuity, determining patient priority, and assigning patients to beds. Raey et al. (2016) reported that nurses match patients to resources to achieve a temporary “fit” within a dynamic ED. This work is based on four categories: determining acuity, anticipating needs, managing space, and creating space. Most notably to this study, Raey et al. (2016) proposed the idea that nurses perceive boundaries of acceptable operating standards which they temporarily violate to create space for high acuity patients and then work to restore the ED back to a zone of normal operations. Their idea of a zone is similar to this study’s description of a balanced state of safety, where nurses employ patient flow management strategies to restore safety if the equilibrium between available resources and patient care becomes askew. Raey et al. (2016) did not describe the work of nurses performing patient flow management within the department, but their theory offers valuable insight into the role of some triage nurses.

Section Summary

In sum, this chapter has articulated the work of patient flow management by clarifying its goals and five central tasks. A theoretical model was presented to summarize and visually capture these findings. This is the first study, known to this author, to focus on the priorities, conceptualizations, discourse, and strategies employed by ED nurses performing this important task. Comparisons between study findings and existing narratives of patient safety, descriptions of nursing organizing work, and models of patient flow management highlight the unique contributions of this research.

CHAPTER 5

FACTORS THAT SHAPE DEPARTMENTAL CAPACITY AND NURSE ENGAGEMENT IN PATIENT FLOW MANAGEMENT

This chapter is the second of three describing major study findings and focuses on two aims: (1) describing the factors that shape departmental patient flow management capacity and (2) describing the factors that shape nurse patient flow management engagement.

Departmental patient flow management capacity is defined as the extent to which a department effectively employs patient flow management strategies to meet patient needs.

Nurse patient flow management engagement is defined as the extent to which a nurse effectively employs patient flow management strategies in his/her own practice.

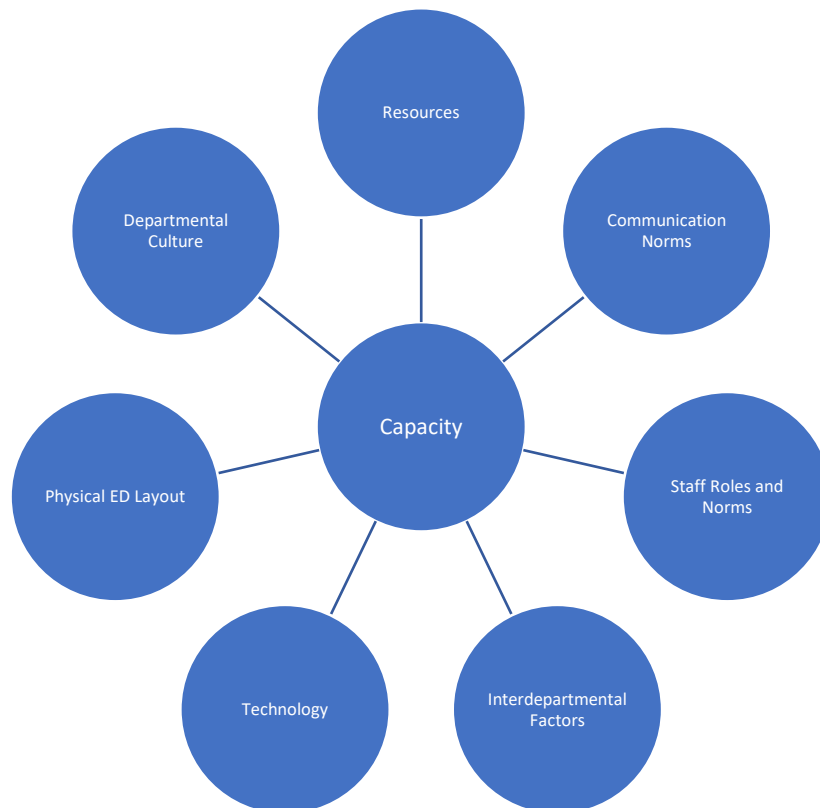


Figure 5.1: Factors shaping department patient flow management capacity.

Departmental Patient Flow Management Capacity

As summarized in Figure 5.1, departmental patient flow management capacity is shaped by the ED's resources, communication norms, staff roles and norms, interdepartmental factors, physical layout, technology, and departmental culture.

Resources

ED nurses report that access to resources is the leading factor impacting patient flow management capacity. Participants describe an overburdened healthcare system with EDs that lack sufficient equipment, beds, and staffing to meet patient needs. This deficit of resources is understood to have been exacerbated by the COVID-19 pandemic. Commonly provided examples of insufficient equipment are a lack of portable telemetry monitors and cardiac telemetry cables.

They have about 6 tele [telemetry] packs for hallway patients but one is currently on a fast-track patient. "We run out of them a lot, or we can't find them." (PCT 1)—Field Note 10

Insufficient bed capacity includes both a lack of physical stretchers and overall space to meet patient needs. This lack of sufficient beds was an extremely common participant experience, often attributed to high rates of inpatient and mental health patient boarding.

And it's because there's no bed in the back. There isn't even a hallway to stick somebody in. (FG11)

Capacity is further limited by poor staffing. ED nurses report significant challenges with staffing across all staff roles that forces the department to close care areas and increases the burden on nursing staff. Nurses describe high workloads, lack of sufficient time to meet all patient needs, and the loss of specialized nursing roles such as triage nurses, pod leads, flow coordinators, and navigators.

I know, but we have a 52-bed ER, but we're only utilizing maybe 36 beds, they don't have the staff. (Int6)

In addition to low overall staffing, ED nurses report a mismatch in staffing between shifts that often causes greater stress and delays overnight.

So then 2, 3 o'clock in the morning, when we don't have transport, we have less nursing staff, that's when everyone's getting the beds. (FG7)

Communication Norms

Communication between ED staff shapes the department's ability to manage patient flow effectively. Participants emphasized the importance of clear, continuous, and frequent communication to keep one another apprised of the status of department resources and patient care.

If you have [staff that] don't openly communicate, you are going to have significant delays in your patient flow management. (Int5)

However, observations revealed that communication between nurses and staff, providers, and pre-hospital personnel varies between EDs. Staff in some departments were found to engage less in direct communication and rely more heavily on the ED tracking board to provide updates.

I ask her whether she notifies the bedside nurses when she is pending them a patient from the waiting room. She says that she doesn't, unless there is a sick patient coming in, but that the nurse can see the room assignment comment on the screen.—Field Note 2

In several instances, ED nurses were observed to lack awareness of a new patient arrival in their assignment. Communication breakdowns also led to missed and repeated patient care.

"Do you have that guy?" (RN5) "Oh, so I probably have that guy. I don't know, I just came out and my name was on them. Alright, I guess I'll go see him." (RN4) I note that the patient they're talking about has been in the department for 2 hours.—Field Note 3

While intradepartmental communication norms vary between EDs, participants largely agreed upon a lack of effective communication with emergency medical services (EMS) crews and pre-hospital facility personnel. Poor pre-hospital communication results in significant patient flow challenges, including a lack of knowledge about the patient, conflicting information, and patients who are discharged and immediately returned to the ED.

They're discharged and immediately sent back because it's like "No, we didn't send them for alcohol, we sent them because their heart rate was 28." (FG18)

Staff Roles and Norms

Patient flow management is shaped by staff roles and norms that influence the organization and accountability for patient care. Variation in staff roles was found within nursing, other ED staff, and among providers.

Nursing roles vary between EDs. Participants in this study described a myriad of role titles and job functions within their own departments, including charge nurse, resource nurse, critical care nurse, stat nurse, trauma nurse, triage nurse, triage lead, rapid triage nurse, triage float, ambulance triage nurse, ambulatory triage nurse, triage express nurse, reassessment nurse, bed czar, pod leads, float nurse, flow coordinator, internal and external flow nurses, patient flow navigator, pivot nurse, streamer nurse, and fast-track or rapid medical evaluation nurses.

And then the roles within the department, your typical staff nurse-clinical nurse, but we also have a resource nurse, which are just a charge nurse. We also have a flow nurse and then triage nurses as well. (FG17)

ED nurses also collaborate with nurses from management and bed coordinator departments with titles such as patient care administrative manager, logistics center

nurse, bed manager, nursing supervisor, house supervisor, clinical supervisor, nurse manager, assistant nurse manager, clinical nurse preceptor, clinical coordinator, and educator. Furthermore, ED nursing roles include both registered nurses and licensed-practical nurses who may vary in their assigned scope of practice. In addition to a confusing array of role titles, the functions of these nursing roles differ between EDs and may fluctuate within a department based on staffing.

I worked as a clinical coordinator-charge nurse. I was also the clinical nurse preceptor ...but that kind of encompasses probably about 10 other roles at the same time, so kind of flow, working as triage. (FG7)

In addition to nurses, other ED staffing roles vary between hospitals. Participants described the use of technicians, medical assistants, student nurses, paramedics, behavioral sitters, orderlies, and ED transporters. These roles each have their own scope and function. When departments lack these staff roles or struggle with staffing levels, nurses must take on responsibility for a wider range of patient care tasks. Insufficient ED staffing impedes the completion of patient care tasks, patient transport, department stocking, and cleaning, among other duties.

A tech will be the one transporting because there is no transport team here.—Field Note 2

ED provider roles were also described as important to shaping patient flow management. Specifically, participants perceived that academic EDs with residents often experienced slower dispositions and reduced patient flow.

We're a teaching facility, so it's like almost every patient has been seen by a resident or medical student. So that really slows it down. (Int6)

In addition to differences in departmental staffing roles and structure, observations revealed that EDs vary in the norms and culture surrounding those roles.

Most notably, some departments demonstrated high levels of flexibility in the responsibility for patient flow management decisions while others had more formal role expectations. For example, in some departments the responsibilities of answering the EMS radio, assigning patients to ED rooms, and shuffling patient locations are strictly held by charge or flow coordinator nurses. In other departments, nurses in bedside roles readily take on these tasks when the charge/flow nurse is busy or elsewhere.

RN10 stands up, "Is this EMS for us? Do we know they're coming?" She looks at the EMS board and then mumbles to herself about cleaning Room 10. RN2 asks if they are "waiting room-able" and RN10 goes over to chat with EMS. I ask if the charge nurse is on break, RN2 says no, but she is busy discharging his patient in Room 1. Meanwhile, RN10 has gone to Room 10 to prepare it for the ambulance.—Field Note 10

Participants varied in their understanding of the impact of role flexibility on patient flow management. Several nurses stated that a strong structure was helpful for patient flow management clarity and accountability. As one nurse described, "*You need one person that just knows what's going on everywhere.*" (Int8) Too many nurses making independent patient flow decisions can compromise efficiency and create confusion.

If I'm lead that day, like, I have my plan... I have my system. And if people do try to help ...I think it adds to the chaos. (Int7)

However, other nurses were grateful for role flexibility because it freed up the charge nurse to complete other tasks, such as administrative duties, by dispersing the patient flow workload.

Different nursing roles also create norms around role preference and hierarchy. Some roles are seen as more desirable than others, but these preferred roles vary between EDs. Desirable roles may be perceived as easier, closer to peers, or less involved in direct patient care.

That's a bad job by the charge person, because you've got all your buddies doing all the fun jobs for the day, and then everyone else has to do the other ones. And if you don't think they notice that, you're out of your mind. So that's a cultural problem that will slow things down. (Int9)

Role structure can also create hierarchies between ED nurses. Some participants described their charge nurses as “dictators” (FG7) or sitting in a “white tower” (Int3) because they lack proximity and engagement with frontline staff.

I feel like when some people level-up they forget how it is to be in an assignment. And then they're in an assignment and they're drowning and they're asking you for your help. (RN4)—Field Note 6

Effective patient flow management is understood to require charge, lead, or flow nurses who are “in the trenches” (Int9, Int10) and willing to help on the floor. Role hierarchies that create too much distance between staff can create animosity and lack of understanding of the department.

Good patient flow has to be somebody who's willing to not sit in the White Tower... or “I'm gonna sit in the pod chair and get ‘charge butt’ and never move. You have to move.” (Int3)

Interdepartmental Factors

Interdepartmental factors found to shape the effectiveness of patient flow management included interdepartmental staffing and teamwork. First, the ED is heavily impacted by the staffing levels of diagnostic departments, environmental services, transport services, and inpatient units. Participants reported frequent challenges with insufficient staffing that led to delays in patient care and movement of patients out of the department.

That's our biggest pushback... we've had a CT scanner down and they're understaffed right now, and we had a 4-hour delay in CT's yesterday. (Int2)

Interdepartmental teamwork also has a significant impact on the work of ED nurses. Tension and pushback from inpatient floors during ED-to-floor reports were especially common experiences among study participants. Participants reported that inpatient nurses are often unavailable to take report, reluctant to accept patients from the ED, and engage in delaying tactics. This pushback from the floor results in challenges transporting ED patients out the department.

It's been like hand-to-hand combat with the floors, trying to get patients upstairs (Int10)

In contrast, some participants praised hospital-wide teamwork that was able to offer the ED additional resources and staffing during times of high patient burdens.

But the house supervisor will come and help—sometimes they'll send...a nurse over there, who comes in kicking and screaming. (Int8)

Technology

Technology profoundly shapes ED nurses' patient flow management. Accessibility to technology such as pyxis medication dispensers, portable computers, pneumatic tube systems for lab and medication transport, portable communication devices, and online applications that provide pharmacy or education support are only some of the technologies that can impact workflow efficiency and the quality of patient care. Despite their importance, observations revealed that dealing with technology failures and breakdowns is a time-consuming task that can compromise patient flow management effectiveness. Nurses frequently face challenges logging into computers, finding working portable computers, trying to fix medication scanning devices, struggling with phones and portable communication devices, and dealing with downtimes in pneumatic tube systems and health information systems (HISs).

Nothing is working... yawn...the computers aren't working. (RN3)—Field Note 11

HISs are especially integral to the work of patient flow management because of their influence on information gathering. The accessibility and usability of HISs varies between EDs and determines whether nurses are able to quickly gather needed information about department resources and patient care. Some participants described their ED tracking boards as very intuitive and supportive.

Our dashboard is actually pretty useful, surprisingly. (Int8)

However, many others criticized the usability and information accessibility of their HISs. Concerns surrounding HIS usability arose when participants described dashboards that were “*overwhelming...way too much on the eyes*” (RN10), systems with burdensome alert functions, and poorly designed interfaces. Observations revealed that ED nurses often lack an understanding of the meaning of some ED tracking board features including icons, symbols, or abbreviations.

I ask them about the stars, which indicate if an order is late by 15 minutes or 30 minutes. They both laugh, “See? I didn't even know that” (RN3)—Field Note 8

Other participants described old, outdated applications that functioned poorly and required time-consuming workarounds.

So we use our copy-to-scanners, and then we have the oldest ordering system of any hospital I've worked in... It's DOS, it's from the '80s and '90s. It's so old. (Int6)

Concerns with information accessibility arose from the need to navigate multiple non-integrated systems. ED nurses describe having to open several different electronic applications to find laboratory results, radiology results, and inpatient care orders. These non-integrated systems were also perceived to compromise real-time data accuracy.

To look up the actual lab numbers you have to go to different screen, to look up radiology results you have to go to different program, and so there's a lot of minimizing, you know, getting to this screen, or that screen, or this screen, or that screen, to figure out what needs to be done. (Int8)

Physical ED Layout

The physical layout of the ED impacts patient flow management by shaping ED nurse access to supplies and diagnostic testing, physical movement, proximity of staff, and visibility of patients. These characteristics may impede the efficiency and ease of ED nurses' work. Facing rises in patient volumes and acuity, many EDs were criticized as fundamentally lacking sufficient space for patient care.

I guess that's the biggest thing is just more space in general. I think we've grown, we've outgrown our ER a little bit. (Int8)

EDs appeared cluttered and cramped, often with a disarray of medical equipment and supplies. Participants described a lack of adequate storage space to hold their required materials, resulting in disorganization as staff tried to stuff in more equipment.

Another storage area seems to contain a mix of supplies. The shelves contain boxes of transducer covers, binders, and paperwork. The little room also holds the neuro-tele computer, a tablet on wheels, a glide scope, and a blanket warmer. On the floor are other boxes of paperwork and medical supplies. Some of the boxes are stacked on top of one another, 3-4 boxes high.—Field Note 9

ED nurses' access to supplies and diagnostic testing is also compromised by poorly designed layouts that place resources far away from where they are needed.

You have all your phones on one end of the ER, and then you have trauma which is way over yonder... you have to keep running back and forth. Which I just cannot stand. (Int7)

Crowded departments with high patient volumes impede the physical movement of patients and staff as they try to navigate through hallways filled with stretchers and supplies.

“Hey, when the resus [resuscitation] gets here have them come this way.” RN5 is standing in a little passageway in the middle of the nurses’ station between the computers and the med room/kitchen, pushing an ECG machine to the side and clearing the way. “They need to come this way, there’s too many beds over there.” (RN5)—Field Note 5

The physical ED layout also impacts the proximity of staff. The closeness of staff is viewed as helpful for communication, teamwork, and keeping track of the physical location of other staff members.

So layout is important...because there are rooms where you're kind of isolated, and it's hard because they don't hear the doctors talking, or updates on patients, so that an impact on patient flow. Just having everybody kind of close to the nurses’ station just really helps communication. (Int7)

Finally, the physical layout of the ED impacts the visibility of patients. The ability to see patients has important implications for patient safety and knowledge of patient care.

The worst setup that we did was fast-track. They were made all private rooms and you couldn't see the patients, 'cause they were behind a closed door. (Int6)

Department Culture

Finally, department culture shapes the effectiveness of patient flow management. Department culture is a broad category that encompasses five subthemes: staff teamwork and camaraderie, respect between ED providers and nurses, capacity for change, relationship between staff and administration, and patient flow culture.

Staff Teamwork and Camaraderie

Staff teamwork and camaraderie describes the cohesion of the unit and their ability to work together. Some participants described their EDs as like “a family” (Int1, Int11), while others reported that their co-workers were territorial and unkind.

They would step over your quivering body on the floor to get to where they're going, instead of picking you up or helping you. (Int9)

Teamwork is perceived as critical for providing both timely and comprehensive care. Recently, the teamwork and camaraderie in EDs has been impacted by a high rate of traveling nurses. In one observation, every nurse on shift aside from the charge nurse was a traveling nurse. Participants varied in their understanding of how these high rates of traveling nurses have impacted their departments.

We are still using some agency, which I'm not a huge fan of... there's more teamwork when they feel like they're a permanent part of the team, not when they're going to be at my hospital one day, at another hospital one day. They don't care as much. (Int4)

Respect Between ED Providers and Nurses

Participants stated that the level of respect between providers and nurses is consequential for patient safety and patient flow management. ED nurses who face pushback or perceive a lack of mutual respect may be less likely to approach providers with future questions or concerns. Participants stated that respect between providers and nurses varies between departments, according to the level of experience of the provider, and according to the level of experience of the nurse.

If you go to a doctor with a suggestion and immediately they shut it down, then you're probably not going to go back to them again with your next suggestion...that's one of our biggest barriers to flow, a physician can either make it or break it. (Int12)

Capacity for Change

Another element of department culture that is perceived as impactful on patient flow management is the capacity of the department to adapt and change. Several participants noted that ED nurses may be reluctant to embrace new policies or changes in practice. This capacity for change has been especially important over the past few years.

Nurses describe significant adjustments within their departments in response to COVID-19, climbing patient volumes and acuity, and poor nurse staffing. Departments that more effectively perform patient flow management are able to adapt to fluctuating circumstances.

She also tells me that some of the older nurses are “stuck in the old ways” when they only saw 5 patients in their whole shift and they’ve had trouble adjusting.—Field Note 11

Relationship Between Staff and Administration

Tension between staff and administration was found to be a common experience among participants. Administration is commonly viewed as having misaligned priorities, lacking understanding for the work that bedside nurses do, and failing to address the challenges of frontline staff. ED nurses perceive these problems as stemming from a preoccupation with financial concerns and a distance from frontline working experience.

Management doesn't have their pulse on the unit. (Int3)

This tension between staff and administration makes nurses skeptical of administrative recommendations and frustrated with their response to nursing concerns, impeding administrative efforts to change patient flow practices.

It's so frustrating, 'cause this is the 6th hospital I've worked in, and they're all the same. They're greedy, greedy corporations and they don't care about patients. (RN6)—Field Note 10

Patient Flow Culture

Finally, EDs vary in their culture surrounding patient flow practices. Patient flow culture includes the perception of provider incentives, the role of patient flow metrics, and whether patient flow is seen as primarily provider-driven or nurse-driven.

ED nurses perceive patient flow management as impacted by the incentives and culture of providers. Some participants described provider cultures that placed strong pressure on nurses to empty the waiting room, while others felt more freedom to manage the rate of patient flow into the department. ED nurses were especially critical of provider cultures that resulted in high diagnostic testing and high admission rates, arguing that these incentives impeded patient flow.

I'll have a patient come in from the waiting room and they're already admitted. And it's for bullshit reasons...They need to look at what they're admitting and send more people home. (RN7)—Field Note 10

An emphasis on patient flow metrics varies drastically between different departments. Some participants described a heavy focus on meeting timing and patient satisfaction metrics that impacted their daily patient flow management decisions, while other nurses were not even aware if their ED had timing and patient satisfaction goals. This emphasis, or lack of emphasis, on patient flow metrics is often credited to nursing leadership. Several participants noted a decrease in metric considerations with less experienced managers.

Like door-to-doc time less than 20 minutes, discharge time less than like 7 minutes...it was engraved in everybody's head. As soon as that manager left—we just got a new manager and there's no real guidance for this new manager. (Int7)

ED nurses varied in their opinion about the impact of metric considerations on patient flow management. Some participants reported that data about the speed of their care was helpful to increase staff engagement and performance. Others were very skeptical of metrics and feared that an overemphasis on metrics might compromise patient care.

It made it harder to be really thorough. Like you'd think "Hmm, I can either do a really thorough assessment, or I can meet my time." (RN2)—Field Note 7

Overall, ED nurses appear to perceive metric considerations as valuable when they are presented as helping patient safety and are less likely to describe metric considerations favorably when they are understood to be motivated by financial incentives.

Simple, I don't care about your billing, I care about my ability to take care of my patient. (Int15)

Finally, the perceived responsibility for driving patient flow varies between EDs. Overwhelmingly, participants viewed patient flow management as a nurse-led process, but some participants found variation between departmental cultures with some EDs feeling relatively more “*doctor-driven*” (RN3, RN2). An increase in provider oversight was described as arising in EDs with less experienced nurses. Departments with patient flow perceived to be more “*doctor-driven*” were described as those where the providers more closely monitored the waiting room patients, voiced their opinions about who should be assigned ED beds, and where providers tended to delegate more and engage less in collaborative decision-making.

RN2 said that post-COVID, with all the newer nurses, that patient care is more “micromanaged” and run by the doctors. “It never used to be like that.” (RN2)—Field Note 8

Summary of ED Patient Flow Management Capacity

The extent to which EDs effectively employ patient flow management strategies to meet patient needs is defined as departmental capacity. Patient flow management is impacted by both the physical and interpersonal characteristics of a department. ED nurses perceive that patient flow management is most profoundly shaped by the

sufficiency of department resources, including equipment, beds, and staff. However, several other departmental characteristics impact the work of nurses. ED layout, technology, departmental culture, communication norms, staff roles and norms, and the EDs relationship with other hospital departments all influence ED nurses' ability to successfully perform patient flow management.

Factors Shaping Nurse Patient Flow Management Engagement

As summarized in Figure 5.2, factors shaping nurse engagement in patient flow management include nurses' attitude, personality, situational awareness, time management, clinical judgment, and patient flow experience.

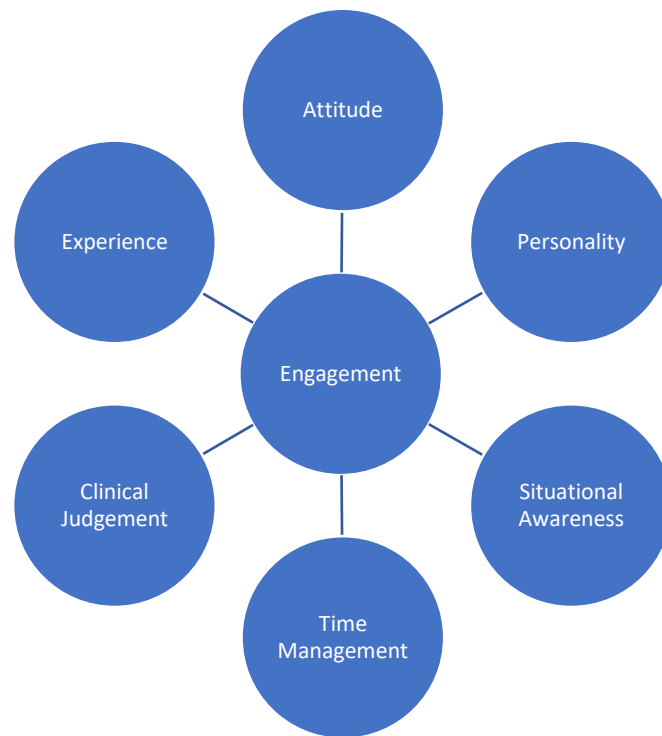


Figure 5.2: Factors shaping nurse patient flow management engagement.

Attitude

Nurses' attitude impacts their engagement in patient flow management. One participant described their attitude as the most important factor for determining departmental patient flow management.

My most important role for patient flow is my attitude. Because my peeps follow my attitude. (Int10)

Nurses engage more in patient flow management when they have a sense of accountability to the wider department. This attitude contrasts with nurses who are only focused on their own patient assignment.

The nurses are wrapped up in their own little section, and they don't want more because they're overwhelmed. (FG3)

ED nurses also vary in their level of motivation to move patients through the department. In general, participants perceive ED nurses as motivated to provide timely and high-quality patient care. However, many criticized colleagues as lacking urgency, having complacency, and being lazy. These nurses complete patient care tasks more slowly and may even purposefully delay patient care to avoid moving one patient out and receiving another.

But most people, it's like, "We've got to get these people moved, we've got to get them taken care of" and others are like "Well, you know the faster I get this out, the faster you're just gonna give me something new, and this never gonna end, so why should I hurry?" (FG4)

Another strong theme that emerged in discussions and observations was the degree of burnout among ED nurses. Participants described high rates of exhaustion, fatigue, and moral distress that impeded their engagement. As one nurse described, *"I've never seen nurses this exhausted, physically and emotionally."* (Int6)

Personality

ED participants also emphasized the importance of nurse personality. Nurses who are compassionate towards patients and fellow staff members are perceived as being more highly engaged in patient flow management because of their desire to provide safe patient care and help their colleagues.

Definitely a personality thing. They're definitely friendlier, more socially aware of other people's struggles, and they care about it. I think other nurses [don't] give a shit. (Int9)

Personality also includes a nurses' level of adaptability. Adaptability describes a nurse's ability to handle stressors. ED nurses highly engaged in patient flow management are perceived as able to remain calm under pressure, stay level-headed, not become overwhelmed, and persevere in difficult circumstances.

There's some people that they're like "Chicken Little the sky is falling" all the time, and it's like, "Take a deep breath. It's gonna be okay." (Int2)

Situational Awareness

Many ED participants emphasized the need for situational awareness to effectively engage in patient flow management. Situational awareness was described as having a global or holistic perspective of the department, including the needs of all patients and staff.

So you need to be able to look at the big picture, not just your one team of patients, or even your one ER. You have to be able to look and see globally what's going on. (Int4)

Nurses who lack the ability to simultaneously consider multiple patients and conflicting prioritizations have difficulty effectively engaging in patient flow management.

Which is why some people can't do charge or pod lead, because you have to be able to think with 1,000 different tabs open at a time. You have to be able to process all of that. (Int3)

Time Management

Next, participants described the skill of time management as important for patient flow management. When describing time management, two themes emerged: the ability to correctly prioritize care tasks and the ability to multitask. The skill of appropriately prioritizing time, attention, and resources is closely linked with having strong clinical judgment and situational awareness. Nurses who perform patient flow management well are those who correctly prioritize their time to promote patient safety within their assignment while also prioritizing the needs of the wider department.

So I guess prioritizing. Like, they are having a great awareness of prioritizing what is important at the time. And that's kind of the biggest thing is having priority and a greater awareness for the department. (Int7)

The skill of multitasking is important to be able to manage the care of several patients at one time. Participants described the need to not become overly focused on a single task or patient, but rather maintain the ability to juggle multiple priorities simultaneously.

And teaching them how to multitask. Because I think that's where a lot of nurses really get caught up, is they don't have the ability to effectively multitask and remember the 7 different directions that they need to go at once. (Int10)

Clinical Judgment

ED nurses believe that strong clinical judgment is essential for effective patient flow management. Strong clinical judgment encompasses good patient assessment skills, critical thinking, and knowledge of emergency patient care. Nurses with strong clinical judgment are described as nurses who can quickly recognize a sick or decompensating patient, and who can both anticipate and meet patient care needs. Clinical judgment serves as a foundation or the “*core knowledge*” (Int6) needed to manage patient flow.

Our charge nurses are really having to stretch and use a good clinical judgment to push that patient flow. (Int11)

Experience

Patient flow engagement is shaped by nurses' level of ED experience, experience in specialized nursing roles, and experience in burdened departments. ED patient flow management is perceived as a skill specifically learned within the environment of the ED, such that nurses with strong clinical judgment and many years of experience in other care areas may still struggle when entering the ED.

RN2 has significant ICU experience, including 8 years working in a MICU, SICU, NICU. "It's a totally different environment and flow than I'm used to." (RN2)—Field Note 14

Participants also reported that experience in non-bedside roles was important for patient flow management engagement. These specialized roles, including leads, float, flow, navigator, and charge roles, help nurses develop broader situational awareness and critical thinking. Notably, nurses placed in these roles often lack formal training and instead learn as they work.

You can't teach pod lead. You can't teach it. (RN2)—Field Note 8

Finally, patient flow management is described as a skill that nurses learn under hardship. Nurses who work in departments facing high patient burdens may be more adept at the skill of patient flow management than nurses who work in departments that require less problem-solving and critical thinking.

I think that it's just experience. If they haven't had to think outside the box, they don't know how to think outside the box. (Int14)

Summary of Nurse Patient Flow Management Engagement

Nurse patient flow management engagement is the extent to which nurses effectively employ patient flow management strategies in their own practice. Engagement depends on both personal characteristics, like personality and attitude, and nursing knowledge and expertise, including situational awareness, time management, clinical judgment, and experience.

Discussion

This chapter has reviewed the factors that shape departmental patient flow management capacity and nurse patient flow management engagement. While the body of patient flow research has explored the influence of many of these individual factors, research that considers holistic cultural and organizational influences is limited (Boiko et al., 2020; Chang et al., 2018; Gifford et al., 2022). This study has established a broad theoretical framework of structural, organizational, interpersonal, and individual nursing characteristics that influence the effectiveness of patient flow management. Specific strategies to address these departmental and nurse characteristics were not a focus of this study, but they have been explored by other researchers.

First, ED nurses perceive that the level of resources, including beds, equipment, and staff, is the most significant departmental factor impacting patient flow. The Agency for Healthcare Research and Quality (AHRQ) reports that nearly half of EDs operate at or above capacity, and that 90% experience inpatient boarding (AHRQ, 2018). Resource pressures grew during COVID-19, with EDs experiencing increases in boarding time and occupancy rates (Janke et al., 2022). Despite these significant burdens on EDs, several studies have found that expanding ED capacity alone is insufficient to improve patient flow metrics (Crilly et al., 2014; Han et al., 2007; Mumma et al., 2014). Many initiatives to improve hospital-wide patient flow have focused on increasing resource capacity, but

these interventions are costly and often infeasible (Winasti et al., 2018). In fact, the IHI continues to report that there is an oversupply of hospital beds nationally and recommends that hospitals focus on reducing demand or better matching demand and supply to improve patient flow, rather than increasing resource capacity (Rutherford et al., 2020). Therefore, although participants identified insufficient beds and equipment as a critical patient flow management barrier, current research does not endorse expanding resource capacity as a primary solution.

Staffing levels are another important resource consideration. Current nursing shortages and high nursing turnover rates hinder appropriate staffing levels, and low ED nurse staffing is related to increased ED LOS, LWBS rates, and declines in patient safety (Ramsey et al., 2018). Surprisingly, research examining the impact of ED nursing staff levels is much more limited than inpatient staffing research; a systematic review of literature published between 1994 and 2015 identified only 9 articles that examined the relationship between ED nurse staffing levels and patient outcomes (Recio-Saucedo et al., 2015). Further, there is little guidance for hospitals trying to establish safe staffing considering the ED's variability and unpredictability of patient volumes and acuity (Recio-Saucedo et al., 2015; Saaiman et al., 2021). More research is needed to explore the benefits of increased ED nurse staffing on patient flow.

Second, supporting study findings, ED communication has been recognized as important for shaping patient flow processes (Alowad et al., 2020; McBeth et al., 2017; Rutherford et al., 2020). Communication between ED nurses and providers is complex and is shaped by interprofessional trust built over time (Manojlovich et al., 2021). Recommendations to improve ED communication include the use of standardized

interdisciplinary huddles to address anticipated patient dispositions and flow bottlenecks, reducing ambient noise, decreasing overhead paging, and implementing deliberate communication methods such as whiteboard or track system communication, text messaging, or provided cell phones (Vashi et al., 2019; Welch et al., 2013). Participants in this study described the use of multiple communication modalities, such as radios, hands-free portable devices, and cell phones, but observations revealed that noise reduction, efforts to decrease overhead paging, and standardized huddles are not consistently implemented across EDs.

Participant criticism of communication with pre-hospital personnel is supported by evidence that pre-ED-to-ED patient handover is often inadequate due to a lack of structure, information loss, interruptions, a lack of sufficient time, poor interprofessional relationships and trust, failure to establish formal responsibility transfers, and a lack of standardization (Tortosa-Altet et al., 2021; Wood et al., 2015). Recommendations to improve pre-hospital communication include instituting standardized reports or the use of checklists and mnemonics, but systematic reviews have criticized these strategies as poorly supported and inadequate to address social and environmental challenges (Tortosa-Altet et al., 2021; Wood et al., 2015). Many hospitals have embraced pre-hospital communication technologies, but these technologies have also been criticized for technical, usability, and organizational challenges, lack of evaluative research, and a failure to consider the perspectives of end-users in the design process (Zhang et al., 2020)

Third, this study found that staff roles and norms impact patient flow management and vary widely between EDs. Participants praised the presence of nursing roles that managed departmental flow without a patient assignment, such as charge, float,

navigator, lead, and added triage roles. Literature substantiates the effectiveness of specialized nursing roles in improving patient flow outcomes (Sharma et al., 2020). In contrast, participants shared diverse opinions about the impact of role norms on patient flow management, with some ED nurses enjoying role flexibility and others arguing for more structured roles and responsibilities. Recent literature suggests more strictly structured roles may improve patient flow management. In a study employing CAS to investigate innovative behavior in hospital systems, Glover et al. (2020) found that within highly complex units, such as the ED, greater staff autonomy impedes innovation. Glover et al. (2020) proposed that high role autonomy can increase chaos and obscure task accountability. These findings were echoed by Boiko et al. (2020), who found that role flexibility can impair teamwork and even cause resentment between ED staff. Other researchers have also supported the importance of defined roles for successful patient flow management (Breen et al., 2020; Vashi et al., 2019).

Fourth, study participants emphasized the importance of interdepartmental relationships to patient flow management, most notably the tension between the ED and inpatient floors during patient report and transfer. Interdepartmental collaboration is impeded by deeply rooted cultural barriers, miscommunication, and the interpersonal relationships of staff (Kreindler et al., 2022; Michalec et al., 2015; Raeisi et al., 2019). Research suggests that increased interaction and exposure between staff, shared common goals, strong leadership, and organizational restructuring to align administrative priorities can increase interdepartmental collaboration (Kreindler et al., 2022; Michalec et al., 2015). Similarly, Rutherford et al. (2020) and McHugh et al. (2011) proposed that a unified system of interdepartmental metrics can create shared situational awareness and

buy-in for cross-departmental teamwork. Interdepartmental relationships also impact diagnostic imaging timeliness. Lean methods are the most commonly employed strategy to improve coordination with diagnostic imaging departments (Jessome, 2020), but hospital-specific Lean initiatives may be difficult to apply to other EDs and may face challenges with sustaining positive results (Flug et al., 2022).

Fifth, this study identified technology as an important departmental factor due to its impact on data accessibility and staff workflow. This finding is substantiated by recent research, which emphasizes the importance of HISs to information access, workflow processes, staff communication, care coordination, and decision support (Almasi et al., 2021; Leventhal & Schreyer, 2020; Nguyen et al., 2022; Tang et al., 2015). Echoing study findings, HISs have been criticized for their poor user-friendliness, data inaccessibility, and failure to meet the needs of patient flow managers (Almasi et al., 2021; Bauchwitz et al., 2018; Leventhal & Schreyer, 2020; Tang et al., 2015). HISs have also been associated with negative impacts on patient care, including error, miscommunication, alert fatigue, increased work interruptions, and an increased burden on staff related to documentation (Leventhal & Schreyer, 2020). Notably, a recent systematic review found that despite their importance to patient flow, how and why HISs impact patient flow processes remains poorly understood (Nguyen et al., 2022). Scholars have called for additional research into the use and improvement of ED technology (Nguyen et al., 2022; Tang et al., 2015).

Sixth, this study discussed physical ED layout. Participants highlighted the importance of supply accessibility, physical movement, visibility of patients, and the proximity of staff and diagnostic services. This finding is supported by research that

establishes the relationship between ED physical design and efficiency (Ahmadpour et al., 2021; Alowad et al., 2020; Dang et al., 2015; Fay et al., 2018; Gharaveis et al., 2019). Recent publications by Gharaveis et al. (2019) and Ahmadpour et al. (2021) offer concrete ED design recommendations to improve visibility and accessibility, including guidelines about the placement of nursing and provider stations, departmental layout and room placement, technology and communication locations, supply accessibility, and overall ED size. Unfortunately, many of these design recommendations may be challenging for existing EDs to implement. Existing EDs may rely on the Lean strategy known as 5S, which is commonly used in healthcare settings to organize workspaces and supplies in a process of sorting, setting in order, shining, standardizing, and sustaining (Breen et al., 2020). These strategies can provide stocking and equipment solutions that are specific to the context of a single ED.

Seventh, several recent studies have supported the importance of departmental culture on ED patient flow, with an emphasis on teamwork and interprofessional collaboration (Alowad et al., 2020; Boiko et al., 2020; Milton et al., 2023; Young et al., 2022). However, concrete recommendations to improve ED culture are more challenging to identify. Social and cultural dynamics are often deeply entrenched and not responsive to simple process changes or redesigns (Gifford et al., 2022). Milton et al. (2023) explored the impact of a multi-faceted intervention on ED teamwork, including simulation team-training, the establishment of a common space to facilitate side-by-side seating, and the encouragement of team triage assessments. Although a reduction in workflow interruptions was achieved, Milton et al. (2023) were unable to demonstrate improvements in interprofessional teamwork. Furthermore, the strong support of clinical

leadership has been described as critical for changing ED culture (Alikhan et al., 2009; Lovett et al., 2016; Rutherford et al., 2020), but this study found that participants commonly perceived a significant gap between management and frontline staff's priorities and perspectives. Strategies to improve the relationship between administration and staff include the use of walkarounds and focusing patient flow management improvement around the goal of high-quality patient care rather than financial considerations (Rutherford et al., 2020).

Encouragingly, a recent systematic review investigated the most effective interventions to improve ED teamwork and communication with a focus on patient safety. They found that TeamSTEPPS and crew resource management (CRM)-based training were the most impactful training interventions (Alsabri et al., 2022). TeamSTEPPS, a communication and teamwork training toolkit developed by the Department of Defense and the AHRQ, recommends the use of SBAR (situation, background, assessment, recommendation) structured reporting and closed-loop communication techniques (Matzke et al., 2021). CRM is a team-based training approach originally developed for pilots that focuses on developing teamwork behaviors and reducing human errors in high-risk situations (Alsabri et al., 2022). While changing an ED's culture is a challenging endeavor, these programs may offer an effective strategy to strengthen staff communication and teamwork.

Finally, this chapter described six factors that shape ED nurse patient flow engagement. Collectively, these characteristics emphasize the importance of improving nurse support, education, and training. Burnout and compassion fatigue are especially timely concerns. In 2016, a meta-analysis estimated that around 30% of ED nurses

experienced burnout (Gómez-Urquiza et al., 2017). Since the COVID-19 pandemic, burnout rates have sharply increased, with one international study of 3,537 healthcare professionals reporting burnout in 67% of respondents (Denning et al., 2021). Burnout may be impacted by personal characteristics including coping strategies and personality traits, but is also attributed to high job demand, low control, exposure to traumatic events, lack of organization support, and other organizational factors such as compensation or lack of staffing (Adriaenssens et al., 2015; Basu et al., 2017; Gómez-Urquiza et al., 2017). In ED settings, violence against staff, high nurse-to-patient ratios, high patient acuity, high stress, and the physical demands of the job place nurses at an increased risk of burnout (Phillips et al., 2022). Unfortunately, research-based interventions to reduce stress and increase ED staff support are severely lacking (Basu et al., 2017; Phillips et al., 2022).

Study participants also reported that patient flow management engagement is impacted by nurse knowledge and expertise, including situational awareness, time management, clinical judgment, and experience. Significantly, they described poor training in patient flow management. Other research has demonstrated little to no training for charge nurse roles (Wolf et al., 2022), and found that charge nurses feel inadequately prepared to manage the burdens of their role (Holmgren et al., 2022). Recent concerns over adequate preparation across all ED nursing roles during COVID-19, high nursing turnover rates, and a decline in experienced nurses exacerbate these training and education challenges (Leaver et al., 2022; McDermid et al., 2020; Michel et al., 2021).

Section Summary

This section has established a theoretical framework for future researchers, managers, and nurses to further examine and improve patient flow processes. It has also

reviewed recent literature for evidence-based strategies to improve these departmental and nurse characteristics, highlighting a need for further research and solutions. While much time and attention has been spent on patient flow process improvements (De Freitas et al., 2018; Javidan et al., 2020; Rutherford et al., 2020), these holistic organizational, structural, and individual nursing characteristics may offer great potential for strengthening patient flow management.

CHAPTER 6

ADAPTING PATIENT FLOW MANAGEMENT STRATEGIES ACCORDING TO PATIENT BURDEN: A GROUNDED THEORY

This is the third and final chapter describing major study findings. This chapter expands upon the findings presented in Chapters 4 and 5 but focuses on understanding how ED nurses adapt patient flow management strategies as patient burdens change. Here, “patient burden” describes both the volume and acuity of patients in the ED. These ED nurse adaptations are explored in four aims: (1) describing patient flow management through temporal orientations, (2) describing creative patient flow management, (3) describing changes in nurse patient flow management urgency, and (4) presenting a grounded theory of patient flow management capacity and engagement.

Describing Patient Flow Management Through Temporal Orientations

As described in Chapter 4, patient flow management is the work of responding to available department resources and patient care to promote a state of collective patient safety while managing the four subgoals of providing ethical, efficient, timely, and comprehensive care. Patient flow management relies on the five tasks of information gathering, continuous triage, resource management, throughput management, and care oversight. These five tasks emerge from the four subgoals of patient flow management and collectively organize the myriad strategies that ED nurses use while managing patient flow.

However, nurse patient flow management strategies can also be arranged in a different way. Observations, focus groups, and interviews revealed that patient flow management also describes nursing work across three different temporal orientations, meaning work that addresses resource and patient care needs in the past, the present, and

the future. When performing patient flow management, ED nurses must be retrospective, reactive to the current state of the department, and proactive to maintain a state of collective safety in a department that is both dynamic and variable.

Describing patient flow management strategies by their temporal orientation is important because it reveals how ED nurses adapt as patient burdens increase. While ED nurses continue to perform all five patient flow management tasks as patient care burdens increase, their ability to engage in strategies across all three temporalities narrows. At high levels of patient volume and acuity, ED nurses are only able to be reactive to current patient needs and they neglect retrospective and proactive strategies. Considering that the overarching goal of patient flow management is the promotion of patient safety, this narrowing of temporal orientations has important implications for the ability of ED nurses to retrospectively *identify and correct*, or proactively *anticipate and mitigate*, patient safety failures.

Retrospective Patient Flow Management

The term “retrospective” describes the act of looking backwards to the past. Retrospective patient flow management is the work that ED nurses do to consider past resource allocations and patient care. Aligning with the four subgoals of providing ethical, efficient, timely, and comprehensive care, retrospective patient flow management can be described as the effort to *identify and correct* (1) mis-prioritizations, (2) resource misallocations, (3) delays and breakdowns, and (4) care errors.

Mis-prioritizations describe a failure of continuous triage, where patient and staff well-being were not appropriately prioritized. This may reflect an error in judgment about patient acuity and care needs, an unexpected change in patient condition, or a need to

reconsider staff well-being. To identify and correct mis-prioritizations, ED nurses must continually reassess patient and staff well-being to reprioritize their time, attention, and resources. Staying apprised of changes in patient acuity and care needs requires repeated patient reassessments, re-evaluations of treatments and diagnostic results, and ongoing communication with other staff.

You get tied up with some patient. It's like, you haven't checked on your others in so long, and it's that gut feeling, "Oh, gosh! What has happened while I haven't been there? Are they still okay?" (FG4)

Participants expressed concern over the ability of ED nurses to perform patient reassessments, especially in triage, where nurses are often overburdened and fail to reexamine waiting patients. As one participant described,

Patients were going 4 hours without vital signs, and that's unsafe. (Int14)

As mis-prioritizations are recognized, ED nurses work to reallocate department resources to the sickest patients. This describes the retrospective work of correcting resource misallocations, defined as resources that were not optimally matched to patient care needs. Misallocations may also arise from an error in judgment or an unanticipated change in a patient's status. For example, one nurse (Int8) described placing a patient in a hallway stretcher who then suffered a cardiac arrest and had to be rapidly moved to an ED room. Resources may also be reallocated as patient care needs become better understood.

RN5 has decided to swap the locations of two patients because the patient is in a "pod" room but doesn't really need that room. "He's not really a pod, he's not sectioned or anything." (RN5)—Field Note 12

Resource allocations are also reconsidered and changed as the state of available resources and patient care within the department fluctuate. For example, patients may be pulled out of rooms and shuffled as staffing levels decrease or more acute patients arrive.

It's kind of like a chess game...And you're just constantly re-evaluating— 'cause of course, it changes from, you know, minute to minute. (FG4)

Third, delays and breakdowns describe resource or process inefficiencies that interfere with the work of throughput management by slowing down patient care. Delays and breakdowns commonly result from poor coordination with other staff and departments, such as laboratory and diagnostic services. Frequently identified examples of delays and breakdowns include blood tests that were drawn but lost or patients with prolonged waits for cat scans or x-ray testing.

You draw patient labs? It's been an hour and a half, where are my labs? Check to see if the labs are back. It's that constant re-evaluation of "Hey, we're waiting on this, hey we're waiting on that." ... that's how you catch those breakdowns." (Int2)

Although delays and breakdowns often arise interdepartmentally, the recognition of these failures frequently falls on ED nurses rather than other hospital staff.

The MRI has been delayed, they've [the nurses have] learned that there was paperwork missing... I ask why the MRI didn't notify the ER of the holdup in scheduling. "No, they'll sit there all day." (RN1, miming twiddling her thumbs)—Field Note 3

Finally, care errors describe failures in care oversight, including both missed and incorrect care. Care errors may result from insufficient nursing time, accident, or poor clinical knowledge. Examples of care errors include missed treatments, missed diagnostic tests, a failure to reassess patients, and medication errors. Identifying and correcting care errors requires ED nurses to retrospectively review past patient care, including previous medication administration record documentation, patient orders, and diagnostic results.

Popping into the charts on EPIC, just making sure if there's anything like second troponins...because sometimes it's not intentional unsafe situations, it's just that they, you know, other people get busy. (FG15)

Overall, participants stated that identifying and correcting mis-prioritizations, resource misallocations, delays, breakdowns, and care errors can require significant investigative time and effort. Retrospective patient flow management relies on ED nurses performing reassessments, sitting down and reviewing patient charts, making phone calls to inquire about delays or breakdowns, and questioning other staff. In one observation, a charge nurse even texted a nurse at home to try and determine if a medication had been administered.

It's pretty much just trying to piece together, "Why? What happened?" Like all, just all the in-between stuff. 'Cause most of the time, staff are too busy. (FG15)

As described in previous chapters, some HISs are criticized by ED staff for poor information accessibility and usability. While some ED tracking boards display information to signal overdue tasks, including icons or colors, participants report that these signals can be inaccurate or overwhelming.

That's a lot of our time is just trying to figure out where things are, and how to get to them, and make sure everything's been done. (Int8)

In addition to significant investigative time and effort, participants reported that a barrier to retrospective patient care is the need to return previous tasks to one's "mental checklist."

It's not directly in front of you needing your attention. It needs reattention—in your mind it's "I've already given this task attention. I've already spent time on it and energy on it." And in my head now it's done. To have to put it back in the queue of things you have to do, when you have so many things... (Int15)

Other participants proposed that ED nurses are poorly suited to be retrospective because of the fast-paced nature of the ED, where nurses are eager to quickly move patients out of the department and may spend less time engaged in re-evaluations and re-assessments. This observation contrasts ED nurses to nurses in other units, where nursing practice more regularly requires knowledge of patients' care journey over days, weeks, and even months.

Yeah it's not something that a lot of emergency rooms have had the exposure to. You know, doing the follow-ups and the re-evaluations of these interventions. (Int13)

Therefore, in contrast to reactive and proactive patient flow management strategies, study participants believed that ED nurses struggle to be retrospective. Barriers to reviewing past resource use and patient care are especially high as patient burden increases. This means that, as patient volumes and acuity increase, ED nurses may do a poorer job at identifying and correcting these past safety failures.

[You need] time to kind of be like, "Where is my delays?" When you're not in disaster mode, you're more able to be like, "Okay, my patient's been sitting here for 6 hours, why?" (Int13)

There's been scenarios where a patient's not moving, simply because they don't have a COVID swab that's back. You know, stupid things like that, that we're too busy to check-in on because we're taking care of other patients. (FG14)

Reactive Patient Flow Management

Reactive patient flow management is the work of responding to current department resources and patient care. Rather than *identifying and correcting*, or *anticipating and mitigating*, safety failures, reactive patient flow management aims to promote collective patient safety in real-time. Importantly, ED nurses understand that reactive strategies alone are insufficient to manage patient flow in a department that is

constantly changing. In fact, nurses who focus only on current patient needs are described negatively as “*task-oriented*” (Int10, Int14) and are perceived to be lacking in motivation, clinical experience, or critical thinking. Examples of these task-oriented nurses include nurses who don’t assess their patients until a provider has already seen them, nurses who only complete patient care tasks that are already ordered, and nurses who fail to anticipate future patient care needs.

These nurses are task-driven. “Oh, I must go give Tylenol. Oh, I need to get vital signs.” They’re not looking at their patients and thinking “Okay, this 19-month-old is now at 2 hours with accessory muscle breathing at 60, and we’re losing ground, what do I do next?” They’re not thinking ahead. (Int10)

Although reactive patient flow management strategies are insufficient to effectively perform patient flow management, as patient burdens increase, ED nurses become overwhelmed by meeting current patient care needs and neglect retrospective and proactive strategies. Participants often described this phenomenon using the analogies of “*drowning*” (RN4, RN2, RN10, FG4, FG10, Int2, Int7, Int9, Int10, Int12, Int14) or trying to “*keep our head above water.*” (FN10, RN10)

And I think during surge times, that a lot of the brain power, even with experienced and very tenured nurses... a lot of their brain power is going into mitigation mode. (Int13)

Proactive Patient Flow Management

Finally, proactive patient flow management is the work that nurses do to consider future department resources and patient care. Proactive patient flow management can be described as the effort to anticipate and mitigate future safety failures, including (1) mis-prioritizations, (2) insufficient available resources, (3) delayed dispositions, and (4) unsafe dispositions.

To mitigate future mis-prioritizations in patient and staff well-being, ED nurses must anticipate changes in patient acuity and care needs. Patients perceived to be at risk for decompensating may be prioritized or monitored more closely.

...or people who are like borderline, like are they gonna turn the corner for the worst here, you know, always keeping your eye on that. (FG3)

Nurses rely on strong clinical judgment and knowledge of patient care trajectories to understand future patient care needs.

And also, I think patient safety is recognizing how sick somebody is, or recognizing how sick somebody can become. (FG4)

Second, proactive resource management describes the work that nurses do to mitigate insufficient future available department resources. Participants stated the importance of being prepared for sudden changes in patient volumes or acuity. Strategies that ED nurses use to increase future available resources include holding a room for a code, making a plan for future patient movement, cleaning and preparing rooms, stocking and prepping supplies, maintaining and fixing equipment, making and editing staffing assignments, and adjusting patient assignments based on future staffing levels.

And that's kind of how I'm creating the plan or formula as to how I'm going to delineate my patient flow management to that particular area of the department, or where I'm going to go. (Int5)

Third, proactive throughput management describes strategies that ED nurses use to anticipate and mitigate delayed dispositions, including arranging transport in advance and preparing patient reports prior to disposition. Observations revealed significant delays in patient discharges related to poor ambulance and transport service availability.

Our EMS service's so short-staffed, they can hardly handle the 9-1-1 calls, let alone handling the transports out. Like, how do we get these people out? (FG4)

Finally, proactive care oversight involves the work of anticipating and mitigating unsafe patient dispositions. Nurses assess patient preparedness for discharge, assess vital signs to verify that patients are medically stable before discharge or transport, review patients' complaints and symptoms to ensure that patient needs have been met, and assess the appropriateness of inpatient admission orders.

We'll look at the admission order and make sure the order's placed correctly... you have to help your doctors order the right stuff in the appropriate facility. (Int2)

Whereas retrospective patient flow management is described as the work to “identify and correct” patient safety failures, proactive patient flow management requires “anticipation and mitigation.” As described above, identifying past failures often requires nurses to sit down, review charts, and communicate with staff to investigate delays and breakdowns or uncover errors. In contrast, proactive patient flow management relies more heavily on nursing clinical judgment to accurately predict patient care needs. Indeed, proactivity is frequently recognized as a core nursing skill that is developed with experience, often equated with strong critical-thinking, situational awareness, or time management.

And so having that ability to think 20 steps ahead, I think is important. (Int10)

As compared to retrospection, thinking ahead and anticipation are more readily recognized by ED nurses as an essential element of patient flow management. Proactivity is emphasized as critical for managing department variability and unpredictability.

I may have empty beds, but I have to anticipate what's going to happen always. Something always winds up happening. (Int8)

While a focus on the future is readily recognized as important for effective patient flow management, like retrospection, it can be neglected by overburdened nurses. ED nurses try to sustain their proactivity during periods of high patient volumes and acuity, but eventually current patient care tasks overwhelm nurses' ability to focus on the future.

Once we've reached the point of no resources. Most people at that point have either given up or reached a point of futility where they realize that proactive thinking or action is kind of out of their hands. And at that point, all they can do is focus on what's right in front of them and deal with that.
(Int13)

Summary of Temporal Orientations

When categorizing the strategies that ED nurses use to manage patient flow, this study found that nursing work addresses resources and patient care in the past, present, and future. Retrospective patient flow management is concerned with *identifying and correcting* past safety failures, including mis-prioritizations, resource misallocations, delays and breakdowns, and care errors. Reactive patient flow management is the process of responding to current department resources and patient care to maintain a real-time state of collective patient safety. Proactive patient flow management is concerned with *anticipating and mitigating* future safety risks, including mis-prioritizations, insufficient available resources, delayed dispositions, and unsafe dispositions. Table 6.1 presents an overview of the work of patient flow management as categorized by its five component tasks across three temporal orientations.

Table 6.1: Overview of the work of patient flow management by task and temporality.

Task	Temporality	Past	Current	Future
Information Gathering	Resources	Identifying delays, breakdowns, and resource misallocations	Understanding current department resources	Anticipating barriers to disposition and future resources
	Patient care	Identifying care errors and changes in patient care	Understanding current patient care	Anticipating disposition plans and future patient acuity/care needs
Continuous Triage		Correcting mis-prioritizations	Prioritizing current patients along with staff well-being	Mitigating mis-prioritizations
Resource Management		Correcting resource misallocations	Matching patients to current department resources	Mitigating insufficient available resources
Throughput Management		Correcting delays and breakdowns	Expediting patient movement through the department	Mitigating delayed dispositions
Care Oversight		Correcting care errors	Overseeing current patient care	Mitigating unsafe dispositions

Describing Creative Patient Flow Management

ED nurses also employ creative patient flow management strategies in response to changes in patient burden. Creative patient flow management is the work of expanding

departmental patient flow management capacity by changing or adapting resources and patient care strategies. As previously defined, departmental patient flow management capacity is the extent to which an ED effectively employs patient flow management strategies to meet patient care needs. The factors that shape this capacity were discussed in Chapter 5 and include department resources, communication norms, staff roles and norms, interdepartmental factors, technology, physical ED layout, and departmental culture. In contrast to the strategies previously described, which appear fairly consistently across EDs, creative patient flow management strategies are highly variable and are developed in response to the unique characteristics of each department. Creative flow management strategies will be described broadly according to the five tasks of patient flow management.

Information Gathering

ED nurses use creative strategies to decrease the burden of information gathering. These creative strategies allow ED nurses to quickly communicate information about patients' acuity and care needs and include classifying or categorizing patients, using informal communication notes, and developing new notation systems.

Classifying or categorizing patients offers a shorthand way to describe patient care. Patient classifications include descriptions of patients' acuity level, such as a "*resus*" (RN11) patient or an "*in-and-out*" patient (Int11, RN11), their care needs, such as a "*psych*," a "*crisis*" (RN3), or a "*walkie-talkie*" patient (RN1, Int4), or their familiarity to ED staff, such as a "*regular*" (Int3) or a "*frequent flier*" (RN9).

In addition to classifying patients using shorthand descriptions, ED nurses also quickly understand patient care needs according to their admission status and level of

care, such as critical care, intermediate or step-down care, inpatient telemetry, inpatient non-telemetry, or observation patients. Broadly, ED nurses understand the staff attention and resource requirements of admitted patients, who are described as being in a “*waiting zone*” (FG5) or a “*holding pattern*” (FG5), differently than active emergency patients. For example, a nurse with five admitted patients might be perceived as having a lower workload than a nurse with several patients who arrived recently. These classification systems are employed in both verbal communication and within ED tracking board comments.

Four patients are labelled “BOARDER” or “BOARDER TELE” in the comment field—Field Note 10

To facilitate information gathering through the ED tracking board, nurses in some EDs communicate using comments in dedicated comment columns. These comments are unstructured written notes that are used to describe patient and room assignment status updates, task reminders, patient care notes, and personal notations. Use of these notes varies between hospitals and according to staff culture. In one observation, ED staff reported that several additional comment columns had been created and adapted by nurses for distinct purposes, “*We need all those columns, we really need them.*” (RN8)—
Field Note 8

We just got new doctors in and a lot of them are... familiar with EPIC, but they definitely don't use the comments. They're like “What comments?” like, “I have no idea.” (Int7)

In addition to unstructured written notes, nurses adapt use of the ED tracking board using novel notation systems. Varying according to department, staff culture, and individual nursing practice, these notation systems are often used as personal reminders and for keeping track of patient characteristics. Examples of nursing notation systems

include assigning patients “Y”s or “N”s to identify which patients can be appropriately pulled out of ED rooms, numbering waiting room patients to indicate the triage nurses’ prioritization order, marking concerning patients with asterisks, or using color-coding systems to describe patient acuity levels.

The triage nurse notes that she will write “take next” to indicate the patient that she feels has the highest acuity...[then] “take 2nd,” “take 3rd”—Field Note 1

Continuous Triage

ED nurses also adapt continuous triaging practices to expand their capacity for meeting patient needs. As opposed to traditional triage, which primarily prioritizes patients of high clinical acuity, this strategy describes the act of assigning ED beds to patients who are felt to be easy or quick in an effort to quickly treat them and move them out of the department. These patients are commonly treated in hallway stretchers and may be cared for by leads, float nurses, or charge nurses seeking to decrease the waiting room patient volume.

Those are the patients that I take into my overflow hallway beds... I’ve got a finger lac, I got somebody’s ankle that needs a freaking ace wrap ... a lot of our more experienced nurses will start stuffing all the cracks with level [ESI] 5’s to try and get them through. (Int10)

Resource Management

Creative resource management strategies include expanding available resources, adapting resource use, and adjusting staff roles. ED nurses work to expand available department resources by borrowing or “stealing” equipment from other hospital units to increase their own resources.

And then I can run lower-acuity or easier dispositions through hallway beds, get some stretchers from PACU. (TA2)

Nurses also request more equipment from management. Observations revealed that ED nurses create informal request processes such as using whiteboards, sticky notes, or paper lists to keep track of needed equipment and supplies.

I notice another white board in the hallway with “3rd EKG machine, inter-dry, pediatric brown Spo2 monitor probes” written in dry-erase marker.—Field Note 12

Requests for more staff are often communicated to nurse managers or supervisors and may include the re-delegation of inpatient nurses or flex nurses to the ED. ED nurses also try to recruit more staff from home using managers and direct personal communication with their colleagues.

They talk about how they’ve texted and asked many people to come in to help out...”I don’t know who to text that I haven’t already texted.”—Field Note 14

ED nurses adapt their use of resources by using space creatively, using equipment creatively, and developing stocking solutions. Creatively using department space is an especially common practice of treating patients in unconventional care spaces to expand care capacity. Examples of unconventional care spaces include supply rooms, trauma rooms, back hallways, conference rooms, and even nearby departments.

We’ve had to make temporary rooms in our radiology department, we’ll take over some hallways and some holding rooms that they have to make into patient care rooms for us. (Int11)

Using equipment creatively describes strategies to adapt available equipment for different uses in the face of insufficient available resources.

You had to hook people up on the AED, you know, the ones with the Lifepack, or whatever we had available. Sometimes it was a Lifepack, ‘cause we’d run out if you had too many people. (Int 9)

ED nurses also invent novel stocking solutions to minimize the burden of finding and gathering equipment. These solutions might include the use of carts, buckets, or the clustering of equipment near to their workstations.

I've gotten burned a couple of times with things, like, you can't find a urinal so by the time you get back to your patient's room, they've already wet themselves. So... I have my own little stash I keep in there. (Int 12)

Finally, staff roles are adjusted to increase patient flow management capacity.

Role adjustments might include delegating ED staff or student nurses to perform untraditional duties such as patient transport or behavioral observation, nurses in charge, triage, or other lead roles taking on patient assignments, and even the use of ED managers or educators to complete patient care tasks.

If management is gonna come out, empty linen carts, offer to take a patient, wheel them over to radiology, offer to start a line for a nurse. (Int3)

Throughput Management

Creative throughput management strategies expedite throughput by changing traditional care processes. These approaches include engaging providers earlier in care and creating new disposition strategies. In contrast to departmental or administrative initiatives to institute formal rapid care practices, such as the creation of fast-track or rapid medical evaluation areas, these describe informal, ad hoc solutions to expedite patient care that are implemented by working staff.

ED nurses engage providers earlier in care by pulling them to different care areas to accommodate the needs of the department. This might include asking a provider to quickly evaluate a patient in the waiting room, requesting diagnostic testing orders in

triage that are not included in standardized protocol orders, or re-allocating providers to institute impromptu fast-tracks when fast-track providers are not officially scheduled.

I see this patient, this is what's going on, while technically it's not a protocol, would you be willing to order this? (Int13)

ED nurses also implement new disposition strategies to expedite movement of discharged or admitted patients out of ED treatment rooms. Participants described several creative approaches, including the use of impromptu discharge lounges, pulling discharged patients into hallways or informally designated ED areas, “*globally monitoring*” (FG5) discharged patients to decrease their individual nursing care burden, and holding admitted patients in other hospital care areas, such as radiology departments or on empty floors. In addition to increasing ED bed capacity, changing disposition processes to cluster or move out admitted patients can allow ED nurses to re-allocate providers to other care areas where they can more rapidly treat emergency patients.

We've taken the doctor from that pod because we've made it a hold pod, we've put them out in RME [rapid medical evaluation], or we've put them somewhere else seeing hallway patients. (Int2)

Care Oversight

Finally, creative care oversight strategies are efforts to improve nurses’ ability to provide accurate, comprehensive care. These strategies include increasing nurses’ scope of practice, improving training, and instituting new oversight strategies.

ED nurses may increase their capacity to provide comprehensive care by expanding their scope of practice. This strategy is seen positively when it provides nurses with the ability to perform a useful skill that improves patient care and decreases nurses’ reliance on other staff. Positive examples of expanded nursing scope include allowing nurses to insert ultrasound-guided IV’s, insert intraosseous (IO) devices, or provide

sexual assault examinations. However, expanding nurses' scope can also be viewed negatively if it pushes nurses to perform tasks outside of their comfort zone.

We are doing peritoneal dialysis in the emergency department on our admitted patients. I'm not. I have learned how to do it, I tell them I'm not comfortable. (Int14)

Improving training is a second strategy to enhance care oversight. ED participants varied in their perception of the quality of nurse training. While some ED nurses described very supportive orientation programs, many noted a decline in training at their institution. This decline in nurse training is largely attributed to poor staffing and lack of experienced nurses. As participants reported, "Everyone is training everyone." (RN1), and "We have new grads training new grads" (RN12).

Education is just different now. I feel like there's not a lot of seasoned nurses to train new nurses. (FG18)

Creative strategies to improve nursing training include seeking out educational opportunities during the shift, such as sending orientees to codes and high acuity patients and developing resource sheets or checklists for nursing peers.

I had a nurse that she created a checklist for rapid sequence intubation... it was almost like a little card, so that when you were in that scenario you didn't panic because you knew what to do. (Int12)

ED nurses also employ oversight strategies including safety huddles, bedside rounding, and buddy systems or team nursing to increase comprehensive care capacity. Safety huddles are meetings between nursing staff, often held at the beginning of a shift, to review the state of the department and safety concerns. In observations, safety huddles included discussions about high acuity patients, staffing needs, and current equipment or stocking considerations.

The nurses gather in the hallway next to the nurses' station for a morning huddle... "So safety, how'd we do this weekend in general?"—Field Note 12

Several participants also described instituting regular huddles with providers to “run the board” and update one another on the state of the department with an emphasis on discussing the sickest patients and identifying barriers to disposition.

I think it was every hour, she would say “Huddle up,” and then we'd all come in and like, “Okay,” and she would just go across the board...you always knew what was going on with your patients. (Int12)

Bedside rounding is the strategy of giving report at the patient's bedside. In observations, signage was noted to encourage nurses to perform bedside rounding, but little bedside rounding was observed. As one participant described,

It's always a push to do it, and you'll have like 6 months of intense pressure. Where “Oh!” you know, “the managers are on the floor,” and then they disappear, and then nobody does it anymore. (Int12)

While the success of implementing bedside rounding practices varies between EDs, the practice is intended to improve patient care by allowing the oncoming nurse to quickly assess patients and clarify any concerns with both the previous nurse and the patient.

Finally, some EDs have instituted buddy systems or team nursing. Buddy systems describe strategies to provide a newer, less experienced nurse with greater support from a dedicated peer mentor. Team or zone nursing, where nurses share responsibility for many patients rather than having their own dedicated assignment, was described by some participants as helpful for improving nurse teamwork. However, other ED participants criticized this practice for decreasing nurse's accountability and knowledge of their patients.

You had a buddy that would kind of help you if you have like a critical patient, things like that. (FG9)

Summary of Creative Patient Flow Management

Patient flow management is restricted by departmental capacity. Nurses employ creative problem-solving to expand and adapt available resources and change patient care processes in order to expand this capacity. These creative strategies are variable and are created in response to the characteristics of the department. This section has described some of the methods that nurses use according to the five tasks of patient flow management.

Describing Changes in Nurse Patient Flow Management Urgency

This chapter focuses on the ways that ED nurses adapt patient flow management strategies according to patient burden. It has described how nurses' temporal orientations narrow with climbing patient volume and acuity and how nurses increase departmental capacity through creative strategies. Two final observations describe how individual nursing engagement fluctuates according to a sense of urgency. A sense of urgency was recognized by participants as inherent to nurses' individual personality (as described in Chapter 5), but urgency also changes according to the level of patient care burden.

First, individual nurse engagement in patient flow varies according to the state of the department. ED nurses appear to be less motivated to engage in patient flow management at very low and extremely high levels of patient burden. When departments face low patient volumes and have ample available resources, nurses were observed to perform work more slowly, socialize more, and move with less urgency.

*I walk around the department to find RN5 and see her chatting with a sitter in the hallway. It's quiet. Nurses all stand at the station, some holding coffee and staring into space, some looking at their phones.—
Field Note 12*

As patient burdens increase, nurses work more urgently and increase their engagement in patient flow management strategies.

The sense of urgency definitely rises, you know, that level of stress rises and that urgency rises the more people that are piling into the waiting rooms and coming in by medic. (Int10)

Eventually, ED nurse patient flow management engagement again declines as departments become overwhelmed by high patient volumes. This phenomenon was described as giving up or “*throw[ing] your hands up*” (Int5, Int11) as a perceived point of futility was reached.

You only can push so hard for so long, you just kind of just throw your hands up in the air and say “What the hey.” You know it doesn't matter how hard we're trying, we just can't get, “Hey, we're not catching up.” (Int11)

Second, observations and focus groups/interviews revealed that some ED nurses express a fundamental frustration and skepticism about their ability to impact patient flow.

Figuring out disposition as soon as possible definitely helps with the flow. But I mean, besides that, there's not much we can do. I mean, even if they're admitted, if they don't have any beds available, there's nothing we can do. (FG12)

This study hypothesizes that these nurses engage less in patient flow management because they work in departments that quickly become overwhelmed by rising patient burdens. Smaller EDs can rapidly become overburdened by increases in patient volumes and acuity, causing nurses to quickly reach a sense of futility. Nurses in these EDs may feel less empowered to engage in patient flow management and see less benefit to this work.

When your resources are 12 beds, the chances of you overloading that resource is literally the difference between one or 2 patients. While, when

you're in like a 96-bed emergency room, one or two patients are a negligible factor on your patient flow management. (Int5)

This phenomenon may be explained by a lack of flexibility in resource use. Nurses working in larger EDs with greater resources have a wider range of available options and considerations to draw upon when facing patient flow stressors. This resource flexibility supports more engagement in patient flow management decision-making and creative problem solving.

Community hospitals have a harder time dealing with stress influxes on patient resource management, while larger hospitals are used to being consistently stressed... and handle that patient flow management under stress a little bit better because they're able to flex their resources. (Int5)

A Grounded Theory of Patient Flow Management Capacity and Engagement

Finally, this chapter presents a grounded theory to describe how patient flow management is adapted in response to changes in patient burden. This theory links together several key study findings, including the concepts of departmental patient flow management capacity, nurse patient flow management engagement, the three temporal orientations, creative patient flow management, and changes in nurse urgency.

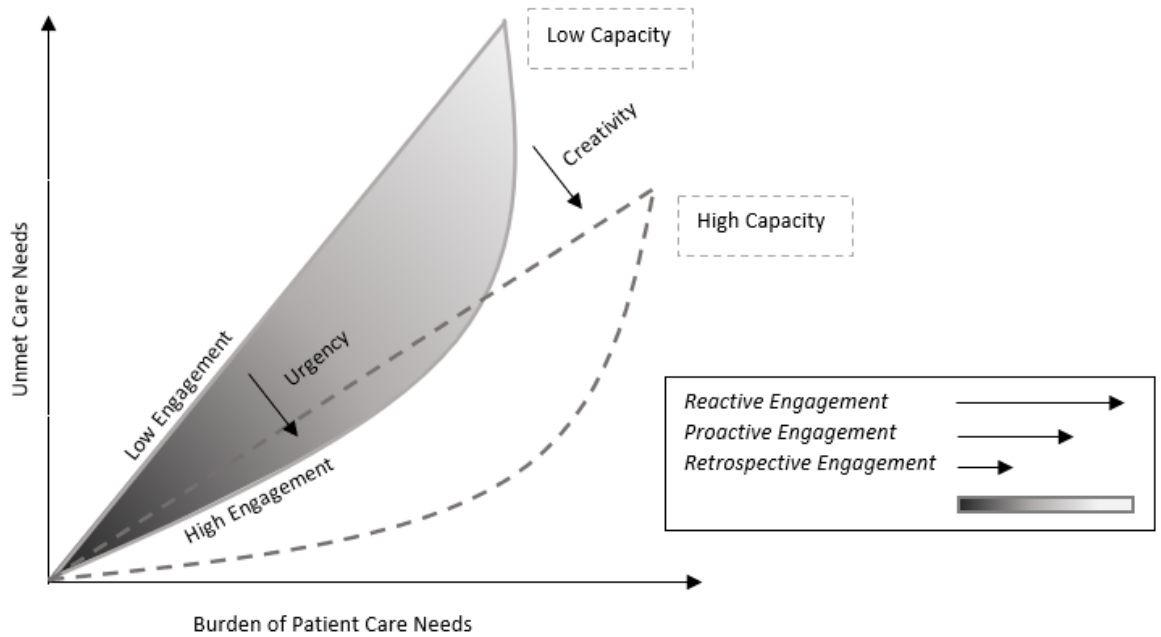


Figure 6.1: A grounded theory of patient flow management engagement and capacity.

Theory Tenets

This theory (Figure 6.1) illustrates how movement from low nurse patient flow management engagement to high engagement and movement from low departmental patient flow management capacity to high capacity increase an ED's ability to meet patient care needs. It also demonstrates how nurses' temporal orientation narrows as the burden of patient care needs rise. There are five central tenets to this theory:

1. With low nurse engagement in patient flow management, as the burden of patient care needs increases, so too does the number of unmet care needs. This is represented as the linear positive relationship between burden of patient care needs and unmet care needs.

2. With high levels of nurse engagement in patient flow management, nurses are able to meet more patient care needs for each degree of patient burden. The difference in unmet care needs between “low engagement” and “high engagement” is absent when patient care burdens are very low and very high. At low patient care burdens, there is little benefit to being highly engaged in patient flow management. As patient care burdens increase, a greater sense of urgency increases nurse engagement to reduce unmet care needs, but there is a diminishing benefit to this high engagement and a perceived point of futility is reached. At extremely high levels of patient burden, even high levels of nursing engagement fail to improve the department’s ability to meet patient care needs. This is represented by the curved line labelled “high engagement” which intersects with the “low engagement” line at both very low and very high points of patient burden.
3. Creative patient flow management strategies can increase departmental capacity, moving it from “low capacity” to “high capacity.” Greater departmental capacity means that, for each level of patient care burden, the department is able to meet more patient care needs. This is represented by the dotted lines. The benefit to unmet care needs between low capacity and high capacity is small at low patient burdens and becomes greater as patient burdens increase.
4. Levels of nursing retrospection, reactivity, and proactivity vary according to patient burden. At low patient burdens, nurses are able to address past, present, and future needs. As patient burden increases, nurses engage less in retrospection. At higher levels of patient burden, nurses’ engagement in proactivity also

declines. At very high levels of patient burden, nurses focus only on being reactive to current patient care needs. This variation in temporality is represented by the color gradient that fades from dark to light as nurses' temporal engagement shrinks.

5. Nurse engagement and departmental capacity are shaped by many factors not reflected in this image. This theory focuses on the ways that engagement and capacity may be increased through a sense of urgency and creative problem solving that arise from climbing patient burdens.

Discussion

This chapter first explored the work of ED nurses across three temporal orientations to describe how ED nurses consider resources and patient care in the past, present, and future. Temporality can be defined as the experience of time, including nursing engagement across time (Caldas & Berterö, 2012). The concept of temporality is categorized into three different ideas: “temporal patterns,” which describe the positioning of practices through time including task coordination, pacing, and sequencing, “temporal conceptions,” which describe people’s conceptualizations and subjective experiences of time, and “temporal orientations,” which describe how time is valued and understood through the past, present, and future (Rowell et al., 2016). Within nursing research, studies describing temporal patterns (Allen, 2015b; Waterworth, 2003) and temporal conceptions (Caldas & Berterö, 2012; Ihlebæk, 2021) can be found, but explorations of temporal orientation appear scarce even though its importance to nursing practice is theoretically evident (Jones & Yoder, 2015).

While research formally examining temporality is limited, studies support the idea that proactivity and retrospection are impeded by current workload burdens. An

integrative review about the work of nurse managers found that reactive management to daily tasks interfered with nurse managers' ability to think proactively and plan strategically for the future (Bjerregard Madsen et al., 2016). Additionally, a systematic review of testing follow-up in the ED applied the concept of temporality to argue that protected clinician time was needed to perform follow-up work because it could not be effectively completed with competing current tasks (Mikhaeil et al., 2020). More research is needed to understand and facilitate retrospective and proactive patient flow management in the ED, with a particular need for strategies that aid nurses in performing patient reassessments, and identifying and correcting delays, breakdowns, and care errors.

Second, this chapter presented the concept of creative patient flow management to describe the ways that ED nurses adapt their resources and patient care strategies to expand departmental patient flow management capacity. These strategies cannot be comprehensively described because they are highly variable between EDs and emerge due to the unique characteristics and challenges of departments. However, this chapter has illustrated several common creative solutions to facilitate information gathering, rethink patient prioritization, expand and adapt resources, alter traditional care practices, and improve care oversight.

Several creative nursing solutions have been mentioned in existing literature, but their application and impact are often poorly understood. One OR study described an “intriguing observation” when explaining the phenomenon of nurses prioritizing lower acuity patients with anticipated discharges, which ED nurses might describe as “quick in-and-out” patients, during periods of high patient volumes, noting that research exploring how waiting ED patients are prioritized is limited (Li et al., 2021, p. 19). Studies

investigating the impact of placing patients in hallway stretchers are similarly scarce (Feizi & Baker, 2021). Several studies support the use of nurse-driven safety huddles, bedside rounding, and handover tools (Campbell & Dontje, 2019; Larson et al., 2019; Martin & Ciurzynski, 2015; White-Trevino & Dearmon, 2018), but this evidence is largely based on quality improvement projects at single sites. Allen (2015a, 2015b) has also described a number of creative nursing strategies to share and collect knowledge of patients, including characterizing patients and developing personal documentation systems, but did not evaluate their impact or contributions to patient flow. Overall, a greater understanding of ED nurses' creative, informal patient flow management strategies may be a fruitful source of identifying novel patient flow interventions.

Third, this chapter described how nurses become more highly engaged in patient flow management as patient burdens increase. A sense of urgency can improve nurses' ability to meet patient care needs, but urgency ultimately declines as nurses become overwhelmed. This study also hypothesizes that nurse disengagement and fundamental skepticism about their impact on patient flow may be attributable to working in ED environments that quickly become overwhelmed and lack resource flexibility. This hypothesis should be further examined and tested.

Finally, this chapter introduced a grounded theory of patient flow management capacity and engagement. This theory ties together several study findings, including the concepts of capacity, engagement, work across three temporal orientations, creative patient flow management, and nurse urgency, to explain how ED nurses adapt patient flow management strategies according to patient burden. The central argument of this theory is that nurse patient flow management impacts an ED's ability to meet patient care

needs. This theory emphasizes the role of nurses as active agents in patient flow processes and illustrates the value of nursing engagement and creative nurse problem solving to improve patient care.

By placing nursing work at the center of understanding ED patient flow, this theory offers a new perspective for the well-established relationship between high patient burdens and poor patient outcomes. Research has demonstrated that overcrowding leads to delayed patient care, reduced patient satisfaction, greater lengths of stay (LOS), inappropriate patient placement, medical errors, poor health outcomes, and greater patient mortality (Javidan et al., 2020; Morley et al., 2018). This theory argues that insufficient nursing patient flow management engagement is a core contributing factor to adverse outcomes, in part due to an inability to identify and correct, or anticipate and mitigate, safety failures. As this chapter has described, nurses who are only able to respond reactively to current resources and patient care are unable to effectively maintain patient safety. Reframing ED patient flow around nursing engagement and capacity underscores the importance of appropriate nurse staffing, training, and support.

Another interesting implication of this theory is that it points to patient safety as the ultimate outcome measure for patient flow management. The failure of patient flow research to define consistent outcome measures is frequently criticized (Bergs et al., 2016; Javidan et al., 2020). Commonly employed metrics include time-based, volume-based, or occupancy-based metrics, quality of care measurements (including ambulance diversions and incorrect patient placement), patient and staff satisfaction, and financial cost metrics (Javidan et al., 2020). As described in Chapter 4, patient safety has been historically defined as the absence of harm and error. As an outcome measure, patient

safety is difficult to define and quantify, but several approaches have been suggested. One proposed framework offers a scorecard to evaluate patient safety by measuring the frequency of patient harm, the implementation of appropriate interventions, the ability to identify and correct errors, and the ED's safety culture (Bergs et al., 2016; Pham et al., 2014). While this framework describes itself as preliminary, it offers a promising alignment with ED nurses' understanding of patient flow management that may engage nurses more effectively in patient flow management improvement.

Section Summary

Climbing patient volumes and acuity place stress on EDs and threaten patient safety (Javidan et al., 2020; Morley et al., 2018). ED crowding became even more relevant with the COVID-19 pandemic (Rutherford et al., 2020), increasing the significance and impact of patient flow management strategies. This chapter has described the ways that nurses adapt patient flow management strategies according to changes in patient burden, including narrowing temporal orientations, the use of creative strategies, and fluctuating urgency. A grounded theory of patient flow management capacity and engagement summarizes several key study findings and underscores the contributions of ED nurses to patient flow.

CHAPTER 7

DISCUSSION, IMPLICATIONS, AND CONCLUSION

Limitations

Constructivist grounded theory studies rely on in-depth, rich data collection and situatedness to increase the transferability of findings (Charmaz, 2006). However, healthcare institutions vary widely in their organizational structures, staff roles, resources, and processes, and therefore findings may not apply across all settings. This participant sample also included high percentages of highly educated (26% with a masters' or doctorate degree) and experienced (33% with greater than 12 years of experience) nurses that may not be representative of the wider ED nurse population. Even with purposeful recruitment of geographically diverse participants to provide data triangulation, 65% of participants reported ED experience from the northeastern US.

Participant observations were limited to hospitals in a single state and within one health system. While the EDs varied in size, community setting, and had very different organizational characteristics, results may not be transferable to other health systems.

Discussion

Chapter 1 provided a brief overview of the history of patient flow and emergency care and introduced the role of nurses in patient flow management. The current body of patient flow literature was also explored to reveal significant knowledge gaps in descriptions of ED nurses' work and contributions to patient flow management. Current patient flow approaches have not comprehensively described the complexity of patient flow processes or considered the agency of nurses. Despite decades of research into this urgent issue, more strategies are needed.

Chapter 2 reviewed three models to provide a historical conceptual foundation of patient flow, highlighting the understanding of patient flow as the progressive, linear movement of patients through multiple stages of care. This study proposes that a lack of knowledge regarding patient flow management may be attributable to poor terminology to describe this work. A new conceptual foundation of patient flow management was first established using an evolutionary literature-based concept analysis, defining patient flow management as “the application of holistic perspectives, dynamic data, and complex considerations of multiple priorities to promote timely, efficient, and high-quality patient care” (Benjamin & Jacelon, 2021, p. 1). This analysis also revealed that there is poor delineation between the use of “patient flow management” to describe administrative, hospital-wide strategies to improve patient flow and the day-to-day, frontline decision making of hospital staff, again underscoring a lack of adequate vocabulary to describe the work of nurses.

Finding that the voice of nurses in patient flow research is limited, an expanded concept analysis was then performed to clarify the meaning of patient flow management within the context of the ED using the experience of working ED nurses. Most of the original defining attributes, antecedents, and consequences of patient flow management were confirmed, but patient flow management was re-defined as a nursing process that relies, in part, on nursing expertise and capacity. A new definition for ED patient flow management was offered, “The application of ED experience, holistic perspectives, dynamic data, and complex considerations of multiple priorities by ED nurses to promote patient safety within their scope of responsibility” (Benjamin & Wolf, 2022, p. 7). Other noteworthy findings of this study included the understanding that all ED nurses

contribute to patient flow management rather than only nurses in specialized nursing roles, and that timeliness, efficiency, and high-quality patient care were valued because of their ultimate contribution to patient safety, which ED nurses view as the primary goal of patient flow management. Finally, this study introduced the idea of a nurse's scope of responsibility, which describes the patients for which a nurse is accountable, including an assignment, pod/zone, or entire department.

Chapter 3 discussed the methodology of this dissertation research study, which drew from both constructivist grounded theory and situational analysis methodologies to explore how ED nurses perform patient flow management. Constructivist grounded theory employs an inductive analytical approach to examine social processes and situation analysis pushes researchers to examine situations at large, including an attentiveness to non-human elements, discourse, and power. These two methodologies align with symbolic interactionism, which argues that to understand institutions you must understand the social interactions of the people that comprise them. Data collection relied on focus groups, interviews, and 64 hours of participant observations across four EDs. Data analysis included line-by-line and gerund coding, constant comparative analysis, memo-writing, and the use of diagramming. Chapter 3 also reported the study participant sample and demographics, which included a total of 29 interviews and focus groups with 27 unique participants of diverse age, education, years of ED experience, and clinical setting.

Chapter 4 described the work of patient flow management by clarifying its goals and articulating five component tasks. Importantly, greater understanding was brought to ED nurses' conceptualization of patient safety. Adding clarity to the previous expanded

concept analysis, which proposed that timeliness, efficiency, and high-quality patient care were subthemes of patient safety, this chapter revealed that timeliness, efficiency, comprehensiveness, and ethicality in care all *define* patient safety. Patient safety is understood as a complex state of meeting both patient and department needs while balancing these complementary and, at times, conflicting priorities. This new conceptualization of patient safety establishes the core balance at the heart of patient flow management and re-affirms the need to apply holistic perspectives, dynamic data, and complex considerations of multiple priorities. Importantly, this study validated expanded concept analysis findings using bedside nurses, who were not previously represented in study samples. The subgoal of ethicality was added to describe ED nurses' desire to correctly prioritize patient and staff well-being.

Chapter 4 also described the many strategies ED nurses use to perform patient flow management. Several studies have described methods of managing patient care and resources (Nugus et al., 2014; Reay et al., 2016; Wolf et al., 2022), but lacked a primary focus on ED nurses performing patient flow management. This chapter aimed to provide a detailed description of the priorities, considerations, challenges, and strategies of nurses. One significant finding is the introduction of continuous triage as a process of ongoing weighing of patient and staff well-being. This task is notable because it contrasts with traditional definitions of ED triage and because it determines how ED nurses allocate their time, attention, and resources. The importance of continuous triage emerges from the realities of working in overburdened EDs with limited resources.

The most significant contribution of Chapter 4 is the generation of a descriptive theoretical model that organizes ED nurse patient flow management strategies into five

component tasks to describe their purpose and impact. The theoretical model of the work of patient flow management also creates a visual representation of the balance and tension of managing multiple subgoals. This model was generated from the discourse and conceptualizations of ED nurses, so it can be both accessible and easily applied by nurses. The hope is that this theory not only puts familiar words to the work that ED nurses do but also helps nurses to understand their own work more deeply. This articulation of patient flow management can serve as a foundation for future efforts to improve nurse patient flow management preparation and decision making.

Chapter 5 established a broad theoretical framework to explore the factors that shape departmental patient flow management capacity and nurse patient flow management engagement. Departmental capacity and nursing engagement were each identified as important for determining the effectiveness of patient flow management. A wide range of characteristics were considered, including department resources, communication norms, staff roles and norms, interdepartmental factors, physical layout, technology, departmental culture, and nurse attitude, personality, situational awareness, time management, clinical judgment, and experience. The purpose of this framework is to provide a more holistic understanding of the factors that impact patient flow management to identify potential future research and intervention foci. Because evaluating the impact of these factors on patient flow management was not an aim on this study, recent literature was then discussed to offer current insight into these considerations. While some evidence has described practical strategies to improve patient flow, Chapter 5 highlights a need for further investigation into these myriad departmental and nursing factors.

Finally, Chapter 6 discussed how nurses adapt patient flow management according to patient burden. First, ED nurse strategies are re-arranged and presented according to their temporal orientation to reveal how the work of patient flow management relies on retrospection, reactivity, and proactivity. Participants described that during periods of high patient burden, the temporal orientation of nurses narrows such that nurses are only reactive to current resources and patient care. Second, the work of creative patient flow management is presented to summarize the ways that nurses expand and adapt resource use and patient care strategies to increase departmental capacity. Examples of these strategies are presented, while acknowledging that they vary widely according to the characteristics of individual EDs. Third, observations of nurse urgency were used to describe how nurse engagement varies according to patient burden. Finally, a grounded theory of capacity and engagement is presented which emphasizes the role of nurses as active agents in patient flow. Nurse engagement in patient flow management and nurses' creative solutions fundamentally impact an ED's ability to meet patient needs.

Implications

This study hopefully will serve as the foundation for a program of research that continues to examine the work and contributions of ED nurses to patient flow, improve nurse training and preparation for patient flow management, and identify patient flow solutions. This work is still in its infancy and more research is needed. However, based on the findings of this study, several suggestions are offered that may help researchers and healthcare institutions to engage nurses, support nurses, improve patient flow processes, and further investigate patient flow management.

Engage Nurses in Patient Flow Management

This study has described ED nurses' perception of significant gaps between hospital administration and frontline staff. These divisions and "siloeing" threaten holistic, system-wide approaches to improve patient flow (Kreindler et al., 2022). Understanding ED nurses' conceptualizations, priorities, and contributions to patient flow is needed to effectively engage and partner with staff. Proposed strategies include the following:

1. Recognize nurses as active agents in patient flow processes who employ nursing knowledge and expertise in their decision making.
2. Acknowledge the contributions of all nurses to patient flow management, rather than only nurses in specialized roles.
3. Use shared terminology to describe the work of patient flow management and its five component tasks.
4. Increase walkarounds and administrative engagement in daily ED operations to strengthen the relationship between administration and frontline staff.
5. Engage and empower nurses to identify process improvement approaches and creative patient flow management strategies.
6. Re-frame patient flow improvement around the concept of patient safety and emphasize the role of metrics in supporting patient care, rather than focusing on operational or financial considerations.

Support Nurses in Patient Flow Management

The work of ED nurses has been poorly articulated, and nurses receive little training or preparation for patient flow management. This research can serve as a needed foundation to describe nursing strategies and decision-making, to share knowledge, to

investigate ways to improve nurse decision-making, and to better train and prepare nurses for this work. Proposed approaches include the following:

1. Use shared terminology to describe the work and central challenges of patient flow management.
2. This study discussed an enormous range of role titles and functions to describe ED staff. Hospitals and researchers should adopt shared terminology for nursing roles to facilitate information-sharing and consistency in role expectations.
3. This study found that nurses do not readily conceptualize their work across three temporal orientations, and ED nurses may struggle to prioritize retrospective patient flow management strategies. Articulating the work of patient flow management across three temporal orientations can help promote attentiveness and prompt strategies to improve this work.
4. Creative patient flow management strategies are often informal, employed on an ad hoc basis, and vary greatly between departments and staff. EDs should investigate the creative patient flow management strategies within their own departments to identify their effectiveness, support their use, and promote consistency.
5. This study used think-aloud clinical simulations to explore ED nurse decision making. It was found to be an effective method to understand nurses' considerations, priorities, and strategies. ED management may consider similar approaches to study and train nurses for patient flow management.

Improve Patient Flow Management

This study is largely conceptual and theoretical. However, observations, interviews and focus groups, and a review of recent literature have clarified many

challenges to patient flow management. The following strategies are proposed with the hope that they spark new conversation and approaches to improve patient flow management:

1. Finding ED equipment and supplies was found to be an especially time-consuming nursing task. Departments should prioritize supply stocking and equipment tracking capabilities as a strategy to improve patient flow.
2. Nurses were observed spending a significant amount of time managing and clarifying staff assignments. Departments may consider instituting technologies that allow for the updating and sharing of real-time staff assignment to decrease this burden.
3. Keeping track of patient records was observed to be a challenge for ED nurses. Departments may reduce their reliance on paper records to decrease delays in patient admission and transfer.
4. Participants described challenges in understanding patient care journey progress due to inconsistency in the use and clearing of ED tracking board icons. Departments may consider standardizing nursing practice around the management of ED tracking board icons to promote clarity.
5. Participants identified nurse-to-provider huddles as a helpful strategy for sharing information about patient flow considerations. Research supports this practice. Departments may consider formalizing regular nurse-to-provider huddles.
6. ED nurses spend significant time and energy trying to understand and anticipate inpatient bed assignments. Bed availability and readiness is often inaccurate. Hospitals should aim to increase transparency in bed availability and patient

- assignments between the inpatient floor, bed management or logistics department, and the ED.
7. Tension between the ED and inpatient floors is a widely recognized phenomenon. Hospitals should support strengthened relationships between inpatient floors and the ED by increasing understanding of one another's work environments, increasing exposure between staff, and aligning common goals.
 8. Reliance on interdepartmental services, such as case management, social work, physical therapy, and occupational therapy, was identified as a common cause of delay. Departments may consider investigating the practicality of increasing access to these services, especially on overnight shifts.
 9. Delays in patient care, bed placement, and transfer were common due to lack of staffing and support from environmental and transport services. ED nurses and other staff often perform cleaning and transport. Hospitals may consider investigating the implications of these staffing challenges on patient safety and prioritizing these services as a patient flow intervention, especially on over-night shifts.
 10. Although clear communication is understood to be essential for patient flow management, observations revealed inconsistent communication strategies. Departments should increase the practice of closed-loop communication regarding patient placement and bed assignments rather than relying on HISs to notify nurses of patient updates.
 11. Role structure and norms vary between EDs. Research suggests that EDs should clearly delineate specialized patient flow management role responsibilities to promote consistency and accountability.

12. Bedside nurses perceive role hierarchies that distance charge nurses, or nurses in other specialized roles, too much from frontline nursing practice as harmful to patient flow management. Departments may consider investigating this practice and, when feasible, encouraging ED cultures where charge and other specialized nurse roles maintain bedside experience.
13. Dealing with technology breakdowns was found to be a common barrier to nursing workflow. Departments may consider prioritizing technology maintenance as a strategy to improve patient flow.
14. Study findings and research supports that physical ED layout impacts patient flow management effectiveness. New and remodeling EDs should reference evidence-based recommendations to promote supply accessibility, mobility, proximity to staff and diagnostic testing, and patient visibility.
15. Existing EDs may consider the use of the 5S Lean process improvement strategy to redesign workspaces in order to promote ease of access to equipment/supplies. Nurses should be engaged in design and organization considerations.
16. ED cultures vary in the extent to which patient flow is perceived to be “nurse-driven” or “provider-driven.” These expectations are often not explicit and can create confusion, redundancy, and interprofessional tension. Departments may consider clarifying and clearly delineating nurse and provider responsibilities for patient flow management decisions.
17. Study findings and research demonstrate that ED communication and teamwork impact patient flow management effectiveness. Departments may consider employing

- evidence-based strategies, such as TeamSTEPPS or crew resource management, to improve ED communication and teamwork.
18. Participants identified the burden of recognizing interdepartmental delays and breakdowns as primarily falling on ED nursing staff. Hospitals may consider investigating the accountability of identifying these process inefficiencies and increase interdepartmental collaboration to reduce delays.
 19. Currently employed specialized nursing roles, such as flow coordinators or navigators, commonly focus on expediting patient throughput. This study has shown that effective patient flow management requires consideration of multiple priorities. Departments may consider creating additional dedicated roles to increase patient care oversight or to perform retrospective and proactive patient flow management strategies.
 20. Nurses use creative and informal notation systems to adapt their use of the ED tracking board. Departments may consider investigating and formalizing these notation systems to promote consistency and clarity in communication.
 21. Nurses were found to frequently lack understanding of all the icons/symbols within their ED tracking board systems. Departments may consider including refresher training to help nurses more effectively use these HIS features.
 22. Participants expressed concern about the training and support of newer nurses. Departments may consider instituting new nurse support systems such as dedicated buddies or mentors to improve care oversight.

Investigate Patient Flow Management

This dissertation highlights a need for additional research to further understand and improve patient flow management. Despite widespread calls to adopt holistic and comprehensive research approaches, many current patient flow strategies are not well-supported. Study findings suggest several areas of future research that may be helpful to improve patient flow management:

1. More research is needed regarding nurses' use of the ESI score as a method to understand real-time patient acuity within the department. More reliable methods may be needed to provide nurses with an ongoing assessment of patient acuity.
2. Nurses rely on informal methods to understand staff workloads. Researchers should further investigate measurements of nursing workload to improve nurse decision-making.
3. Further investigation is needed to better understand the impact of treating patients in informal treatment spaces, such as hallways, recliners, or waiting room chairs, on patient safety, satisfaction, and dignity.
4. Study participants identified challenges with pre-hospital communication. Recent research highlights a need for evidence-based strategies and tools to improve pre-hospital to ED handover.
5. Study participants identified HISs usability and accessibility challenges. Recent research corroborates these concerns and calls for increased work to understand and develop technologies that better serve practicing ED staff.
6. Participants varied in their understanding of the impact of strictly enforced time and patient satisfaction metrics on nursing practice. Researchers should investigate how these changes in patient flow culture impact ED nurse workflow and patient safety.

7. More research is needed to investigate the relationship between ED nurse staffing levels and patient safety and to explore increased ED nurse staffing as a strategy to improve patient flow.
8. Nursing burnout was identified as an especially timely issue that harms patient flow management. Evidence-based interventions to increase nurse support and decrease burnout are needed.
9. This study found that ED nurses use multiple criteria to prioritize waiting patients for ED room placement rather than relying strictly on ESI level and wait time. These prioritization decisions are poorly understood, and more research is needed to understand their impact on patient safety.
10. During periods of high boarding, nurses may prioritize treating low-acuity patients with the hope of rapidly discharging them. The impact of this practice on patient safety and flow outcomes should be evaluated to strengthen nurse decision-making.
11. The need for consistent patient flow outcome measurements is widely acknowledged. Researchers may consider exploring methods to measure patient safety in order to align nursing priorities with patient flow initiatives. Efforts to measure patient safety should embody a complex understanding of patient safety, rather than narrowly defining it as the avoidance of harm and error.
12. OR/OM methodologies have been embraced in patient flow research. OR/OM researchers should increase their attentiveness to the work of nurses and partner with nurses in simulation, modeling, and practice improvement approaches.
13. Overall, more research is needed that employs qualitative research methodologies to understand the work and contributions of nurses to patient flow management.

Conclusion

Throughout much of patient flow literature, patient flow has been presented as a linear process with poor consideration for the work of agents. Calls for increased attention to the complexity of patient flow have encouraged researchers to recently adopt more holistic methodologies including complexity science, systems theory, and Lean and Six Sigma approaches. However, qualitative studies are limited, and the body of patient flow research is criticized for lacking a fundamental understanding of patient flow processes. The work and knowledge of nurses have been largely divorced from this research.

This dissertation proposes that insufficient attentiveness to the day-to-day strategizing of patient flow management may be due, in part, to poor terminology to describe this work and fundamental differences between nurses' conceptualization of patient flow management and the concept as it has been defined by existing literature. Nurses perceive patient flow management to be a nurse-driven process that relies on nursing knowledge and expertise. Rather than seeing patient flow management as a process of facilitating patient movement along a care journey, ED nurses orient their work around the central goal of maintaining a collective state of patient safety. Nurses hold a complex understanding of patient safety, defining it as the ability to meet both department and patient needs rather than the avoidance of harm and error. In a context of high patient burden and restricted resources, patient safety requires care that is ethical, efficient, timely, and comprehensive.

This new conceptualization of patient flow management reveals that healthcare institutions should understand and support the work of nurses to better meet patient needs and improve patient flow. Patient flow management is the effort to maximize patient care

without depleting department resources. ED nurses achieve this balance by engaging in numerous strategies to gather information, continuously triage, manage resources, manage throughput, and oversee patient care. The effectiveness of patient flow management strategies is shaped by diverse structural, operational, interpersonal, and individual nursing characteristics. ED nurses adapt to increasing patient volume and acuity by limiting the breadth of their patient flow management strategies through a narrowing temporal orientation, adjusting their level of engagement through a fluctuating sense of urgency, and employing creative strategies to expand and adapt department resources and patient care processes.

In sum, the overall contribution of this study is a new conceptual and theoretical foundation of the work of ED patient flow management. This research moves the focus away from executive and administrative process improvement strategies and instead prioritizes the knowledge and skill of frontline healthcare providers. In 2006, Asplin proposed a paradigm shift from a focus on ED crowding to the study of patient flow. This dissertation argues that future research should move even further to embrace complexity and holistic approaches that partner with ED nurses to improve patient flow management.

APPENDIX A: SAMPLE RECRUITMENT MATERIALS

Hello!

Study Title: A Grounded Theory of Patient Flow Management in the Emergency Department

PI Name: Ellen Benjamin, MS, RN, CEN

Faculty Sponsor: Karen K. Giuliano, PhD, RN, FAAN, MBA

Funding Agency: Sigma International Honor Society of Nursing, Beta Zeta-at-Large Chapter

Study Purpose: You are being invited to participate in a research study. The purpose of this study is to explore how emergency department nurses manage patient flow in emergency departments. There is currently little understanding of how nurses perform this important task.

Study Commitment: Your participation is entirely voluntary. After completing a 15-minute Qualtrics survey that includes a brief screening questionnaire, the informed consent and confidentiality agreement, and a demographic survey, your participation will involve a **60-minute remote focus group** where you will be asked to discuss how emergency department nurses perform patient flow management. Those who are unable to attend a focus group may be contacted to participate in a 60-minute individual interview.

Participants may also be contacted to conduct subsequent follow-up interviews lasting 30-60 minutes each. These interviews will help provide additional data and clarification, and they may ask participants to think-aloud in response to a provided vignette. Your participation in these additional interviews is entirely voluntary and dependent on your continued interest in this study. Therefore, total participation in this study may take up to 165 minutes.

Eligibility Criteria: *In order to participate in this study, you must be (1) English-speaking, (2) over 18 years old, and (3) have at least 90 days of experience working as an emergency department registered nurse (RN).*

You must also have access to a remote online video conferencing platform, such as Zoom, and consent to being recorded for the purposes of transcript verification.

Compensation: Focus group and interviews participants will be compensated in the form of an Amazon gift card, distributed via email. Participants will be compensated \$35.00 for long sessions (lasting approximately 60 minutes), and \$17.50 for short sessions (lasting approximately 30 minutes), up to a maximum of \$87.50. Participants must complete at least one-half of a given session to be eligible for compensation. No compensation will be provided for the completion of the Qualtrics survey.

Additional Information: This study will be conducted according to the requirements

of the University of Massachusetts Amherst Institutional Review Board. Your participation in this study is entirely voluntary and every attempt will be made to maintain confidentiality, including obtaining a Certificate of Confidentiality from the National Institutes of Health. While you will not directly benefit from your participation, we hope that this study will help bring clarity to the critical role that emergency department nurses play in managing patient flow.

If you are interested in participating and for additional information, please follow the link below:

https://umassamherst.co1.qualtrics.com/jfe/form/SV_eeArRkhdf1MUeHA

Please consider sharing this email to help us reach more potential participants.

Thank you so much for your time!

If you have any questions, feel free to contact me at efbenjamin@umass.edu or (203)706-7837.

Ellen Benjamin, MS, RN, CEN

APPENDIX B: FOCUS GROUP AND INTERVIEW INFORMED CONSENT

Consent Form for Participation in a Research Study

11. University of Massachusetts Amherst

Researcher(s): Ellen Benjamin, MS, RN, CEN (Principal Investigator)
Karen Giuliano, PhD, RN, FAAN, MBA (Faculty Sponsor)

Study Title: A Grounded Theory of Patient Flow Management in the
Emergency Department

Funding Agency: Sigma International Honor Society of Nursing, Beta Zeta-
at-Large Chapter

WHAT IS THIS FORM?

This form is called a Consent Form. It will give you information about the study so you can make an informed decision about participation in this research. We encourage you to take some time to think this over and ask questions now and at any other time.

1. WHAT ARE SOME OF THE IMPORTANT ASPECTS OF THIS RESEARCH STUDY THAT I SHOULD BE AWARE OF?

- 1) *Consent is being sought for research and your participation is voluntary.*
- 2) *The purpose of this research is to explore how emergency department nurses perform patient flow management in an emergency department setting. Your participation in this study will involve (1) completion of this consent and confidentiality form, which may take about 10 minutes, (2) completion of a demographic questionnaire, which may take about 5 minutes, (3) participation in a remote focus group or interview that will last approximately 60 minutes, (4) additional participation in follow-up interviews that will last between 30-60 minutes each. Your total commitment may take up to 165 minutes, depending on your availability and willingness to participate in multiple sessions. During focus groups and interviews, we will ask you about how emergency nurses perform patient flow management in the emergency department setting. These remote meetings will be recorded and transcribed, and the de-identified transcripts will be used for our data analysis.*
- 3) *Potential risks of participation in this study include the breach of confidentiality, including the possibility that you may know other focus group participants. Other risks include the inconvenience of the time required to participate, social discomfort talking in front of other focus group participants, and feelings of stress or anxiety when thinking about emergency department overcrowding or patient flow.*
- 4) *There are no direct benefits to you for your participation in this study. Your participation is expected to help us to better understand emergency department patient flow management.*

5) *This is not a treatment study. You can choose not to participate in this study.*

2. WHY ARE WE DOING THIS RESEARCH STUDY?

The purpose of this research is to explore how emergency department nurses perform patient flow management in emergency department settings. Currently, there is a lack of understanding for how nurses perform this important task. We hope to develop a theory about patient flow management that can help identify strategies to improve patient flow management, strengthen emergency nurse training, or inform future research on this topic.

3. WHO CAN PARTICIPATE IN THIS RESEARCH STUDY?

People who speak English, are over the age of 18, and who have over 90 days of experience working as an emergency department registered nurse (RN) can participate in this research study. In order to participate, you also must have access to an online video conferencing platform (such as Zoom) and consent to being recorded.

4. WHERE WILL THIS RESEARCH STUDY TAKE PLACE AND HOW MANY PEOPLE WILL PARTICIPATE?

This study will be conducted remotely over online video conferencing technology (such as Zoom). We hope to enroll up to 30 participants for focus groups and interviews, or until no new information is gathered.

5. WHAT WILL I BE ASKED TO DO AND HOW MUCH TIME WILL IT TAKE?

If you agree to take part in this study, you will be asked to do the following:

1. Read and sign this consent form to indicate your desire to participate in this study. At the bottom of this form is a checkbox where you will indicate your agreement to keep all information discussed in this study confidential. This may take approximately 10 minutes to complete, but you can spend as much time and ask any questions that you'd like. At the end of this informed consent, you can choose to continue to the demographic questionnaire.
2. Complete a demographic questionnaire that will take approximately 5 minutes. This questionnaire will ask about you, your work experience, your place of employment, and your role in the emergency department. You will also be asked to indicate your scheduling availability and willingness to participate in a focus group or interview.
3. You will receive an email to confirm your focus group scheduling. You will also receive a meeting invitation link through email. Participants who are unable to attend focus groups may be contacted to participate in an individual interview.

4. Focus groups will be held remotely and will take approximately 60 minutes. During these focus groups you will be asked about how nurses perform patient flow management in the emergency department. You are free to leave the focus group at any point. You can contribute as much, or as little, as you like during the focus group. The focus group will be audio and video-recorded and transcribed.

5. If you participate in a focus group, you may be contacted via email to participate in additional interviews lasting between 30-60 minutes each. These interviews will also be held remotely and audio/video-recorded and transcribed. Your continued participation in these follow-up interviews is completely voluntary. These interviews may include a Think-Aloud interview, where you will be asked to think out loud about your considerations, priorities, and decision-making processes in response to a provided vignette.

6. If you express willingness to participate in a focus group but are unable to, you may be contacted to participate in an individual interview. These individual interviews will be held remotely and last approximately 60 minutes. They will be audio/video-recorded and transcribed. You will be asked to talk about your understanding of how emergency department nurses perform patient flow management.

In total, your time commitment for this study may take up to 165 minutes, depending on your availability and willingness to participate in multiple sessions.

6. WILL BEING IN THIS RESEARCH STUDY HELP ME IN ANY WAY?

You may not directly benefit from this research; however, we hope that your participation in this study will help us better understand how emergency department nurses perform patient flow management.

7. WHAT ARE MY RISKS OF BEING IN THIS RESEARCH STUDY?

1. A breach of confidentiality always exists during research studies. If you participate in a focus group, it is possible that you may know another participant. During the focus group, you may change your displayed name or participate with your camera turned off. Every participant will be asked to sign a confidentiality form that states that all information shared during focus groups should not be discussed outside of the focus group. Your email address and demographic information will be kept confidential.
2. You may experience stress or anxiety while discussing the topic of patient flow management. At the beginning of the focus group, we will share information about resources for nurses experiencing stress.
3. If you participate in focus groups, you may experience a sense of social discomfort talking in front of other nurses. We will keep focus groups small (around 3-5 participants), and you have the option of turning off your camera at any time.

8. HOW WILL MY PERSONAL INFORMATION BE PROTECTED?

Your privacy and confidentiality are important to us. All data collection will be conducted according to the requirements of the University of Massachusetts Institutional Review Board. The following procedures will be used to protect the confidentiality of your study records.

1. All participants will sign a confidentiality agreement and will be reminded to keep information discussed in this study confidential.
2. Participants may participate in focus groups or interviews with their video cameras turned off and have the option of changing their displayed name to protect their identity.
3. All remote meeting sessions will be private, requiring admittance to enter.
4. Audio/video recordings will be deleted after the written transcription of the meeting is verified for accuracy; they will be retained for no more than 6 months. The written transcription will have all names, places of employment, and other identifying information removed.
5. All identifiable data will be stored securely and will not be shared with anyone other than the researchers.
6. This research is covered by a Certificate of Confidentiality from the National Institutes of Health. This means that the researchers cannot release or use information, documents, or samples that may identify you in any action or suit unless you say it is okay. They also cannot provide them as evidence unless you have agreed. This protection includes federal, state, or local civil, criminal, administrative, legislative, or other proceedings. An example would be a court subpoena.

There are some important things that you need to know. The Certificate DOES NOT stop reporting that federal, state or local laws require. Some examples are laws that require reporting of child or elder abuse, some communicable diseases, and threats to harm yourself or others. The Certificate CANNOT BE USED to stop a sponsoring United States federal or state government agency from checking records or evaluating programs. The Certificate DOES NOT stop disclosures required by the federal Food and Drug Administration (FDA). The Certificate also DOES NOT prevent your information from being used for other research if allowed by federal regulations.

Researchers may release information about you when you say it is okay. For example, you may give them permission to release information to insurers, medical providers or any other persons not connected with the research. The Certificate of Confidentiality does not stop you from willingly releasing

information about your involvement in this research. It also does not prevent you from having access to your own information.

7. At the conclusion of this study, the researchers may publish their findings. Demographic information will be presented in summary format, any quotations will use a pseudonym only, and you will not be identified in any publications or presentations.

Please be advised that although the researchers will take every precaution to maintain confidentiality of the data, the nature of focus groups prevents the researchers from guaranteeing confidentiality. The researchers would like to remind participants to respect the privacy of your fellow participants and not repeat what is said in the focus group to others.

9. WILL MY INFORMATION BE USED FOR RESEARCH IN THE FUTURE?

The de-identified focus group transcripts collected in this study may be used for future qualitative research by the researchers.

10. WILL I BE GIVEN ANY MONEY OR OTHER COMPENSATION FOR BEING IN THIS RESEARCH STUDY?

Focus group and interviews participants will be compensated in the form of an Amazon gift card, distributed via email within 6 months of participation. Participants will be compensated \$35.00 for long sessions (lasting approximately 60 minutes), and \$17.50 for short sessions (lasting approximately 30 minutes), up to a maximum of \$87.50.

Participants must complete at least one-half of a given session to be eligible for compensation. No compensation will be provided for the completion of the Qualtrics survey. Since you are being compensated for your participation in this study, your personal information may be released to the accounting officials at University of Massachusetts, Amherst.

11. WHO CAN I TALK TO IF I HAVE QUESTIONS?

Take as long as you like before you make a decision. We will be happy to answer any question you have about this study. If you have further questions about this project or if you have a research-related problem, you may contact the researcher, Ellen Benjamin at (203)706-7837 or at efbenjamin@umass.edu or Karen Giuliano at kkgiuliano@umass.edu.

If you have any questions concerning your rights as a research subject, you may contact the University of Massachusetts Amherst Human Research Protection Office (HRPO) at (413) 545-3428 or humansubjects@ora.umass.edu.

12. WHAT HAPPENS IF I SAY YES, BUT I CHANGE MY MIND LATER?

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

13. WHAT IF I AM INJURED?

The University of Massachusetts does not have a program for compensating subjects for injury or complications related to human subjects research, but the study personnel will assist you in getting treatment.

14. SUBJECT STATEMENT OF VOLUNTARY CONSENT

I agree to voluntarily enter this study. I have had a chance to read this consent form and I have had the opportunity to ask questions and have received satisfactory answers. I understand that I can save a copy of this Informed Consent form for my own records. I have been informed that I can withdraw at any time. I agree to maintain the confidentiality of the information discussed by all participants and researchers during focus group sessions.

If you cannot agree to the above stipulations please see the researcher(s) as you may be ineligible to participate in this study.

If you wish to proceed, please click next to continue to the Demographic questionnaire.

APPENDIX C: EXAMPLE FOCUS GROUP TOPIC GUIDE

1. Can you tell me about your nursing background and your current role?
2. Please describe the emergency department settings in which you have worked, in terms of their size, their community setting, and how you might otherwise categorize it.
3. What are the different nursing roles in your emergency department and what are they responsible for?
4. Can you describe what you think about when you consider the goals of patient flow management?
5. How do you assess if you're doing a good job managing patient flow?
6. How do you define patient safety?
7. I'd like to talk broadly about the strategies that nurses use to manage patient flow. How do you think that charge nurses and/or leads manage patient flow within the department or otherwise contribute to the goals of patient flow management?
8. How do bedside nurses accomplish or contribute to patient flow management?
9. What qualities or characteristics do you need to be an effective flow manager?

APPENDIX D: THINK-ALLOUD SCENARIO INTERVIEWS

Introduction:

During this interview, you will be asked to think aloud about a clinical scenario. I'm hoping to learn more about what goes through your head as you consider patient flow management within the department. Please mention anything that comes to your mind, including your goals, prioritizations, things you wonder about, questions you might have, actions you might take, or strategies that you might use.

In this scenario you are acting as the charge nurse in a small emergency department with 16 beds and 4 hallway stretchers, for a total of 20 formal treatment spaces. All ED rooms are equally stocked and equipped. Your emergency department also has a waiting room and 2 triage assessment rooms. You are working with 4 bedside nurses who are each assigned to 4 rooms and 1 hallway stretcher. You have 2 triage nurses and 2 patient care technicians. As charge nurse, you have no assigned patients yourself, and have no dedicated ED transport staff.

For any other department details including equipment, staff, resources, and other spaces, feel free to assume that they are similar to the emergency department that you work in.

Scenario 1 (High). It is 3:00pm and you have just come into your shift as charge nurse. I am the off-going charge nurse and will give you a brief run-down of your department. (*run through bed-board*). So I am now leaving, good luck with your shift!

1. You sit down at your seat, please walk me through your initial thoughts, considerations, and actions you might take as you start your shift.
2. You now receive a call that an ambulance is arriving with a 28-year-old patient with cerebral palsy who has a misplaced G-tube. They will be arriving in 5 minutes.
3. Your triage nurse calls you to tell you that the 19-year-old with suicidal ideation has become combative and is yelling in the waiting room.
4. The cardiac arrest in room 2 is now called and the patient is deceased.
5. The triage nurse calls you to tell you that a 32-year-old has arrived in respiratory distress related to anaphylaxis.
6. The patient in bed 3 has now been assigned to an inpatient bed upstairs.

	A	B	C	D	E	F	G	H	I
1	Bed	RN	Pt ESI	Pt CC	Pt Age	Isolation	LOS	Pending tests	Admission status
2	1	Anne							
3	2	Anne	1	Cardiac Arrest	80		0:09	CXR	
4	3	Anne	2	High blood sugar (DKA)	54		1:12		Intercare, no bed
5	4	Anne	3	COVID +	28	Yes	1:40		
6	4-Hallway	Anne	4	Laceration	22		2:15		
7	5	Bob	3	Abd pain	36		2:30	CT	
8	6	Bob	3	UTI symptoms	23		1:45	UA	
9	7	Bob	4	Low back pain	40		0:50		
10	8	Bob	3	Migraine	32		2:45		Discharge pending
11	8-Hallway	Bob	5	Needs rehab	20		4:15		
12	9	Cathy	2	Fever, confusion	82		3:45		Inpatient, bed ready
13	10	Cathy	3	Abd pain	68		4:15	CT	
14	11	Cathy	2	Chest pain	54		3:15		Observation, no bed
15	12	Cathy							
16	12-Hallway	Cathy	3	Rectal bleeding	72		0:18		
17	13	Doug	2	SOB on BiPAP	60	Yes	1:10	CXR	
18	14	Doug	2	Fever, weakness	68	Yes	2:20		Intercare, no bed
19	15	Doug	3	RUQ pain	34		3:15	Ultrasound	
20	16	Doug	4	Wrist pain	30		1:30		Discharge pending
21	16-Hallway	Doug	3	Cough	44	Yes	0:06	CXR	
22									
23									
24									
25									
26	Anne	Newly off orientation							
27	Bob	Traveler, 3 years experience							
28	Cathy	2 years experience, low engagement							
29	Doug	12 years experience, high engagement							
30									
31	Triage Nurses								
32	Eva	6 years experience							
33	Frank	4 years experience							
34									
35									
36									

Waiting Room			
ESI	LOS	Pt CC	Pt Age
2	0:08	Chest pain	87
3	0:12	Abd pain	54
2	0:24	R-sided weakness x30 min	54
2	0:28	Suicidal ideation	19
3	0:34	Headache	32
4	0:40	R ankle pain	40
5	0:54	Suture removal	42

Scenario 2 (Low). (*new bed-board*) It is now 4:30 and the overall volume in the waiting room has decreased. You've been able to move several patients upstairs and discharge others. The acuity in your waiting room is lower. You have no incoming ambulances at this time and, for the moment, all of your nurses seem to be doing well. What are your next steps? What are you thinking about and what tasks are you prioritizing right now?

1. Cathy asks you to go on break.
2. You notice that disposition times appear to be longer than you'd like. What are your next steps or thoughts?

	A	B	C	D	E	F	G	H	I		
1	Bed	RN	Pt ESI	Pt CC	Pt Age	Isolation	LOS	Pending tests	Admission status		
2	1	Anne	2	Suicidal Ideation	19		2:42	Mental Health eval			
3	2	Anne	2	SOB, anaphylaxis	32		2:15				
4	3	Anne									
5	4	Anne	3	COVID +	28	Yes	3:10		observation, no bed		
6	4-Hallway	Anne									
7	5	Bob	3	Abd pain	36		5:00		Inpatient, no bed		
8	6	Bob	3	UTI symptoms	23		3:15		discharge pending		
9	7	Bob									
10	8	Bob	2	Chest pain	87		2:38	2nd Trop			
11	8-Hallway	Bob	5	Needs rehab	20		6:45				
12	9	Cathy	3	Rectal bleeding	72		2:48	CT, orthostatics			
13	10	Cathy	3	Abd pain	54		2:42	CT			
14	11	Cathy									
15	12	Cathy	2	R-sided weakness x30 min	68		2:48	MRI	Inpatient, no bed		
16	12-Hallway	Cathy	4	R ankle pain	40		3:10		discharge pending		
17	13	Doug	2	SOB on BiPAP	60	Yes	3:40		Intercare, no bed		
18	14	Doug	3	Headache	32		4:04				
19	15	Doug									
20	16	Doug	3	Cough	44	Yes	2:36	CXR	Observation, bed ready		
21	16-Hallway	Doug	3	G-tube misplaced	28		2:25	xray			
22											
23											
24	Anne	Newly off orientation						Waiting Room			
25	Bob	Traveler, 3 years experience						ESI	LOS	Pt CC	Pt Age
26	Cathy	2 years experience, low engagement						3	0:08	Rash	20
27	Doug	12 years experience, high engagement						4	0:12	Back pain	54
28								3	0:32	RUQ pain	38
29	Triage Nurses										
30	Eva	6 years experience									
31	Frank	4 years experience									
32											
33											

Scenario 3 (Over-capacity). A couple hours have passed. It is now 6:30pm and the bed management department has informed you that there are no more available inpatient beds. The acuity in your ED has greatly increased. (*new bed-board*).

1. Your triage nurse calls you concerned about an 80-year-old ESI 2 on blood thinners who is altered after a fall down the stairs. Their condition has worsened in the waiting room
2. An ambulance is arriving in 4 minutes with a 40-year-old with chest pain x2 hours. Vital signs are currently stable, but the patient has a history of hypertension and hyperlipidemia.
3. The cath lab is now ready for the patient in room 15.
4. The triage nurse calls you again, the 92-year-old with rectal bleeding has synopsized and fallen in the waiting room

Your shift ends at 7:00pm. Walk me through how you have spent the last 30 minutes of your shift. Describe your critical thinking, your priorities, and the strategies you focused on to manage the department during this time

	A	B	C	D	E	F	G	H	I
1	Bed	RN	Pt ESI	Pt CC	Pt Age	Isolation	LOS	Pending tests	Admission status
2	1	Anne	2	Suicidal Ideation	19		4:42	1:1 in restraints	
3	2	Anne	2	SOB, anaphylaxis	32		4:15		Intercare, no bed
4	3	Anne	2	Diarrhea, weakness	89	Yes	0:48	CT, sepsis workup	
5	4	Anne	3	COVID +	28	Yes	5:10		Observation, no bed
6	4-Hallway	Anne	2	Confusion	79		1:10	UA	
7	5	Bob	3	Abd pain	36		7:00		Inpatient, no bed
8	6	Bob	3	Abd pain	38		2:32	CT	
9	7	Bob	1	New facial droop	92		0:07	CT	
10	8	Bob	2	Chest pain	87		4:38	2nd Trop	Observation, no bed
11	8-Hallway	Bob	5	Needs rehab	20		8:45	Case mgmt	
12	9	Cathy	3	Rectal bleeding	72		4:48		Inpatient, no bed
13	10	Cathy	3	Abd pain	54		4:42	CT	
14	11	Cathy	2	CHF exacerbation (CPAP)	62		0:30	Xray	
15	12	Cathy	2	R-sided weakness x30 mir	68		4:48	MRI	Inpatient, no bed
16	12-Hallway	Cathy	2	Overdose, unresponsive	22		0:06		
17	13	Doug	2	SOB on BiPAP	60	Yes	5:40		Intercare, no bed
18	14	Doug	3	Headache	32		6:04		
19	15	Doug	1	STEMI	49		0:12		Cath lab not yet ready
20	16	Doug	2	Chest pain	63		0:38	CXR	
21	16-Hallway	Doug	3	G-tube misplaced	28		4:25		waiting on amb discharge
22									
23									
24	Anne	Newly off orientation			Waiting Room				
25	Bob	Traveler, 3 years experience			ESI	LOS	Pt CC	Pt Age	
26	Cathy	2 years experience, low engagement			2	0:07	Chest pain	83	
27	Doug	12 years experience, high engagement			3	0:12	Diverticulitis	54	
28					2	0:28	AMS after fall	80	
29	Triage Nurses				2	0:32	Acute R testicular pain	33	
30	Eva	6 years experience			3	0:38	UTI symptoms	93	
31	Frank	4 years experience			4	0:43	R shoulder pain	34	
32					2	0:44	BS > 500, N/V	23	
33					3	1:15	Worsening confusion	87	
34					3	1:28	Rectal bleeding	92	
35					3	1:34	High blood pressure	69	
36					3	1:54	RLQ abd pain	29	

APPENDIX E: PARTICIPANT OBSERVATION INFORMATION SHEET

Hello emergency department staff!

The following is an information sheet that describes a research study that will be conducted in your department.

Study Name: A grounded theory of patient flow management in the emergency department: Participant Observation

Principal Investigator: (redacted)

Co-investigator: Ellen Benjamin
Doctoral student, Elaine Marieb College of Nursing, University of Massachusetts, Amherst

What is the purpose of this study?

The purpose of this study is to explore how emergency department (ED) nurses perform patient flow management.

When will the study be conducted?

A researcher will conduct observations of the ED in four 4-hour blocks, for a total of approximately 16 hours. These periods of observation will occur at variable times throughout the day/night.

What data will be collected?

The researcher will collect data in the form of handwritten fieldnotes that will be recorded in a spiral notebook. These notes will focus on describing how ED nurses perform patient flow management, including their actions, decisions, strategies, and considerations. Fieldnotes may also describe the context of the ED, including narrative descriptions of observations of crowding and acuity, staffing, available resources, and interactions between staff.

Who will be included?

This study will include ED staff who are working during the hours of data collection. ED staff will be identified based on their standardized hospital work attire. ED staff working in designated pediatric and psychiatric treatment spaces will be excluded. I

What will be asked of me?

If you are willing to talk to the researcher, you may be asked to think aloud or briefly explain your actions, decisions, strategies, or considerations while managing patient flow. You do not have to participate. If you choose to speak to the researcher, you may choose to withdraw at any time. The researcher will aim to limit their interference with your work.

Do I have to participate?

If you are uncomfortable being observed while you work, you may tell the researcher that you do not want to participate. There are no penalties or repercussions for choosing not to participate.

Will I be compensated?

You will not be compensated for your participation in this study.

What are the risks and benefits of this study?

You may experience some discomfort or anxiety while being observed. The researcher will try to maintain a comfortable physical distance. If you feel uncomfortable, you are free to withdraw from participation by telling the researcher that you do not want to be observed. Your name and personal identifiers will not be recorded for this study. Data collection will identify staff using a pseudonym only. There are no anticipated benefits to participants. However, we hope this research will increase understanding of patient flow management in the emergency department.

Who can I talk to if I have questions?

You can contact Ellen Benjamin at (203)706-7837 or efbenjamin@umass.edu if you have any questions or concerns about this study. If you have questions or concerns about your rights as a research participant, please contact (*redacted*).

APPENDIX F: PARTICIPANT OBSERVATION SCRIPT

Hi! My name is Ellen and I'm a nurse researcher from the University of Massachusetts. Is now an okay time to talk to you briefly about my study? (*await response*)

1. Great, thanks! I'm conducting research to learn more about how emergency department nurses perform patient flow management. I have an information sheet that more fully explains my study. (*provide information sheet*) I was hoping to ask you a couple of short questions to learn more about how you manage patient flow. Would you be willing to participate?

OR

2. No problem. Would it be okay if I come back a little later at a better time?

APPENDIX G: PARTICIPANT OBSERVATION SCHEDULE

Emergency Department #1:

Friday, September 9th: 0700-1100
Sunday, September 11th: 1900-2300
Monday, September 19th: 1500-1900
Wednesday, September 21st: 0300-0700

Emergency Department #2:

Sunday, October 9th: 0700-1000
Wednesday, October 12th: 1500-1900
Saturday, October 22nd: 1900-2300
Friday, October 28th: 0300-0700

Emergency Department #3:

Tuesday, November 1st: 1500-1900
Wednesday, November 2nd: 1100-1500
Wednesday, November 9th: 1900-2300
Monday, November 14th: 0700-1100

Emergency Department #4:

Tuesday, November 15th: 1500-1900
Saturday, November 19th: 1900-2300
Sunday, November 20th: 1100-1500
Monday, November 28th: 0700-1100

APPENDIX H: UNIVERSITY OF MASSACHUSETTS IRB EXEMPTION LETTER

UMassAmherst

Human Research Protection Office

Mass Venture Center
100 Venture Way, Suite 116
Hadley, MA 01035
Telephone: 413-545-3428

LETTER OF EXEMPT DETERMINATION

Date: June 15, 2022

To: Professor Karen Giuliano and Ellen Benjamin, College of Nursing

From: Professor Lynnette Leidy Sievert, Chair, University of Massachusetts Amherst IRB

Protocol Title: *A Grounded Theory of Patient Flow Management in the Emergency Department*

Protocol ID: 3643

Review Type: EXEMPT -NEW

Category: 2 (ii)

Review Date: 06/15/2022

No Continuing Review Required

UM Award #: 017066-00002

The Human Research Protection Office (HRPO) has reviewed the above named submission and has determined it to be EXEMPT from the federal regulations that govern human subject research (45 CFR 46.104)

Note: This determination applies only to the activities described in this submission. All changes to the submission (e.g. protocol, recruitment materials, consent form, additional personnel), must be reviewed by HRPO prior to implementation.

A project determined as EXEMPT, must still be conducted in accordance with the ethical principles outlined in the Belmont Report: respect for persons, beneficence, and justice. Researchers must also comply with all applicable federal, state and local regulations as well as UMass Amherst Policies and procedures which may include obtaining approval of your activities from other institutions or entities. All personnel must complete CITI training.

Consent forms and study materials (e.g., questionnaires, letters, advertisements, flyers, scripts, etc.) - Only use the consent form and study materials that were reviewed by the HRPO.

Final Reports - Notify the IRB when your study is complete by submitting a Close Request Form in the electronic protocol system.

Serious Adverse Events and Unanticipated problems involving risks to participants or others - All such events must be reported in the electronic system as soon as possible, but no later than five (5) working days.

Annual Check In - HRPO will conduct an annual check in to determine the study status.

Please contact the Human Research Protection Office if you have any further questions. Best wishes for a successful project.

APPENDIX I: HEALTH SYSTEM IRB EXEMPTION LETTER



Institutional Review Board



DATE: August 16, 2022

TO: [REDACTED]

FROM: [REDACTED]

STUDY TITLE: [1938415-2] A grounded theory of patient flow management in the emergency department: Participant Observation

IRB REFERENCE #: [REDACTED]-22-146

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: August 10, 2022

EXPIRATION DATE: August 10, 2025 *(3 years from initial approval unless otherwise specified by reviewer)*

REVIEW CATEGORY: Exemption category #2i

Thank you for your submission of New Project materials for this research study. It has been determined that this research meets the federal criteria for exemption.

Any proposed changes to the research that could potentially change the exempt status must be submitted for review and approval prior to implementation, unless such a change is necessary to avoid immediate harm to subjects, in which case the IRB must be notified as soon as possible.

If this research is going to extend beyond the expiration date noted above, you must request another exemption. When the research is complete an End of Study report must be completed and submitted to the IRB.

Exempt studies are subject to institutional oversight including reviews and audits by the Human Research Protection Program.

If you have any questions regarding this determination of exempt status, please contact the IRB office at [REDACTED]

APPENDIX J: NIH CERTIFICATE OF CONFIDENTIALITY



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
Bethesda, Maryland 20892
www.nih.gov

CERTIFICATE OF CONFIDENTIALITY

Number:

CC-OD-22-3204

Issued To

University of Massachusetts Amherst

conducting research known as

A Grounded Theory of Patient Flow Management in the Emergency Department

In accordance with the provisions of section 301(d) of the Public Health Service Act, 42 U.S.C. 241(d), this Certificate is issued to *University of Massachusetts Amherst* to protect the privacy of subjects in the above named research study, which is collecting or using identifiable, sensitive information. *Ellen Benjamin* will serve as principal investigator. If there is a discrepancy between the terms used in this Certificate and section 301(d), the statutory language will control.

Research data and biospecimens containing identifiable, sensitive information collected or used during this study are covered by the Certificate beginning on the later of the approval date of this Certificate or the commencement of the project, until the collection or use of identifiable, sensitive information concludes. Identifiable, sensitive information protected by the Certificate and all copies thereof are protected for perpetuity.

The recipient of this Certificate shall comply with all requirements of subsection 301(d) of the Public Health Service Act. This Certificate does not represent an endorsement of the research project by the Department of Health and Human Services.

06/22/2022

ANGELA Chambers

Approval Date

NIH Certificates of Confidentiality Coordinator
Office of Extramural Research
National Institutes of Health

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