

**NURSING LEADERSHIP PERCEPTIONS OF CLINICAL PATHWAYS AFTER
TRANSITIONING TO AN ELECTRONIC HEALTH RECORD IN THE ACUTE CARE
SETTING**

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Preface

Approvals to Conduct Thesis

Ethics approval was obtained from the research ethics board which oversees research at the organization in which this study took place, as well as from the University of Ottawa.

Contributions

This thesis represents my original work. I was drawn to the topic of clinical pathways before beginning my studies as a Master's student. I personally completed the protocol, literature review, interviews, and data analysis, as well as the five chapters included in this document.

Dr. Brandi Vanderspank-Wright oversaw completion of this thesis. Dr. Vanderspank's contributions included development of the research design and analysis. She critically reviewed and revised all chapters of this thesis.

Dr. Christine McPherson and Nicole Pyl were members of my Thesis Advisory Committee; both critically reviewed and revised all chapters of this thesis. They also provided guidance on the research design and implications of the findings of this study.

All contributors have read the thesis in full and approve of its submission.

Abstract

Background: Both clinical pathways (CPs) and electronic health records (EHRs) increase the quality and efficiency of health care; however, no known studies have examined the integration of CPs into the EHR during an organizational EHR launch.

Aim: To understand how nursing leadership perceives the nursing practice changes that accompanied the transition from paper to EHR-based CPs.

Methods: A case study design was utilized, focusing on CPs utilized by one acute care unit within a tertiary care organization.

Findings: Transfer of paper CPs into an EHR not built for the Canadian health care context proved to be difficult. In the integration process, a single paper document became spread throughout the EHR. EHR-based CPs are not as clear, and represent a larger documentation burden, than their paper counterparts.

Conclusion: Nursing agency has been greatly affected by the change in format of CPs. Further exploration of nursing agency regarding CPs is warranted.

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Chapter 1: Introduction

Background

In the face of rising healthcare costs, healthcare organizations and systems are turning towards value-based care models, where *value* entails improved patient outcomes at a decreased cost (Prada, 2016). One method of care provision that has demonstrated an ability to reduce cost and improve patient outcomes is the clinical pathway (CP)¹ (Lawal et al., 2016; Rotter et al., 2010). CPs were introduced in the 1980s, with a goal of enabling healthcare organizations to deliver safe and efficient care through ensuring that all patients receive the same standard of care (Lawal et al., 2016). A CP is a “structured, multidisciplinary care [plan] used by health services to direct the care of patients with a specific clinical problem” (Rotter et al., 2010, p. 1). To be considered a CP, a care plan must meet three of four criteria: evidence-based; detailed algorithm or guideline; progression through the pathway is indicated using timeframes or the meeting of criteria; and the pathway attempts to standardize care for a specific medical problem or procedure (Kinsman et al., 2010).

Another means of improving the quality and efficiency of health care is use of the electronic health record (EHR) (Chin & Sakuda, 2012; Mollart et al., 2020). An EHR, or electronic medical record (EMR), is an “integrated collection of a person’s encounters with the health care system [...] a comprehensive digital view of a patient’s health history” (Canada Health Infoway, n.d.-a). The EHR improves the quality of patient care by prompting providers to adhere to best practice guidelines (Menachemi & Collum, 2011) and alerting providers to possible medication errors and critical laboratory values (King et al., 2014). Similarly, the EHR can improve the efficiency of care by reducing the ordering of unnecessary diagnostic tests

¹ Clinical pathway (CP) and pathway are used synonymously throughout this thesis.

(Menachemi & Collum, 2011) as well as reducing the time required to document (Chaudhry et al., 2006). The EHR has also been received positively by nurses (Eden et al., 2020; Juliet & Sudha, 2013). Currently, 93.8% of Canadians have health data stored in an EHR (Canada Health Infoway, n.d.-b). Data describing EHR usage rates by care setting (e.g., primary care versus tertiary care) could not be located. As EHR adoption becomes more widespread, these programs must evolve to meet users' changing needs, and users must simultaneously be willing to learn how to use the EHR effectively (Honavar, 2020).

Since both CPs (Lawal et al., 2016; Rotter et al., 2010) and the EHR (Chin & Sakuda, 2012; Mollart et al., 2020) are tools with the purpose of increasing the quality of patient care and the efficiency of providers, a probable assumption is that the integration of CPs within the EHR would further improve care quality and provider efficiency. According to two studies, the integration of CPs into the EHR significantly improved documentation (Grabowiecki et al., 2012; Hyde & Murphy, 2012) and increased staff satisfaction (Hyde & Murphy, 2012). However, in both studies, the EHR was already fully implemented within the respective contexts; thus, integration of CPs within the EHR represented a streamlining of documentation processes and not a new EHR implementation. EHR implementation has been shown to cause stress among nurses due to altered workflows and time pressures (Heponiemi et al., 2021), thus the findings of Grabowiecki et al. (2012) and Hyde and Murphy (2012) cannot be generalized to the context of the current study. I am unaware of any studies that have assessed how an organization-wide transition from paper documentation to a newly implemented EHR influences nurse experiences with CP use within the EHR. Martin et al. (2020) note that assessing the effectiveness of EHR integration is necessary for providers to be able to utilize the EHR to its full potential.

Documentation is a necessary component of nursing practice; it acts as a communication tool between health professionals and serves as a record of nurses' provision of "safe, effective, and ethical care" (College of Nurses of Ontario, 2019c, p. 3). Yee et al. (2012) note that documentation represents a large portion of a clinical nurse's shift, taking up 19% of their time. This is second only to direct patient care, which takes up approximately 47% of a nurse's shift (Yee et al., 2012). A study by Hendrich et al. (2008) has even estimated that clinical nurses may spend over 35% of their shift on documentation activities. Due to the large portion of time that nurses must dedicate each shift to adequately document the provision of patient care, implementing changes to the documentation process can be challenging. Brunt et al. (2000) assert that a transition between documentation systems represents a difficult change, and note the "major attachment" (p. 93) that nurses have to their existing charting systems, which have often been in place for many years. Staff resistance to change has been recognized as a challenge to implementing new practices (Cohen & Goberman-Hill, 2019). Additional barriers to change, from nurses' perspectives, include change fatigue, staff culture, and lack of time for involvement in practice changes (Smith-Miller, 2022; Wellings et al., 2017).

Numerous strategies exist to facilitate coping with organizational changes. For example, individuals may turn to internal resources, such as hardiness or resilience (Callan, 1993; Shin et al., 2012), as well as make use of external resources, which include colleagues, supervisors or managers, and friends and family members (Callan, 1993). Comparably, organizations must communicate well with their employees, ensure role clarity, as well as rely upon transformational leaders (Callan, 1993). Transformational leaders are individuals who empower and support their employees, as well as align employees' goals with those of the organization (Bass & Riggio, 2006). Bommer et al. (2005) demonstrated that transformational leaders can

reduce staff pessimism surrounding change. Leaders must also foster an organizational learning culture, where ongoing learning is supported, to facilitate effective change (Choi & Ruona, 2011). Leaders are important facilitators of change because they are depended on by, and thus act as a link between, individuals and organizations (Callan, 1993). Leadership and its importance in organizational change will be further discussed in Chapter 2. Ultimately, the problem that informs this research study is that it is unknown how nursing leadership perceives the transition from paper-based CPs to EHR-based CPs within the acute care setting.

Thesis Objectives

The purpose of this study was to understand how nursing leadership perceives the nursing practice changes that accompanied the transition from paper to EHR-based CPs. The aims were:

- 1) To understand how CPs were originally developed at a large tertiary care hospital, and subsequently integrated into the EHR;
- 2) To explore, from the perspective of nursing leadership, how the transition from paper to EHR-based CPs affected CP-specific roles and responsibilities of nurses at this centre;
- 3) To identify, from the perspective of nursing leadership, barriers and facilitators to CP use in nursing practice.

Central Concepts

To adequately explore nursing leaders' perceptions of practice changes regarding the use of CPs within the EHR after transitioning from paper documentation, the concepts included within this research must be adequately defined. Concepts were defined as follows:

- A *registered nurse* (RN) was defined as a nurse who has successfully written the Canadian Registered Nurse Exam, Quebec Professional Examination, or the National

Council Licensure Examination, and is licensed to practice with the College of Nurses of Ontario (CNO) (CNO, 2020).

- A *nurse leader* was defined as a nurse who is not necessarily in a managerial role, but who displays leadership qualities in their daily work tasks such as “moral and ethical perspective, self-awareness, relational integrity, shared decision making, and caring” (Giordano-Mulligan & Eckardt, 2019, p. 165).
- *Acute care* was defined as inpatient hospital care provided to treat a disease or illness for a short time (Canadian Institute for Health Information, n.d.).

Thesis Layout

Chapter 1 has provided the pertinent background and rationale for the proposed research as well as the research question and objectives.

Chapter 2 will provide an in-depth review of the literature that informed the current study.

Chapter 3 will describe the research design and methods used.

Chapter 4 will present the findings of the research study.

Chapter 5 will conclude the thesis with an integrated discussion and implications for nursing practice and future research.

Chapter 2: Literature Synthesis and Critical Appraisal

This chapter provides an overview of the peer reviewed literature that informed the current study. Within this chapter, I examine the acute care setting and the use of CPs within this context. A review of the EHR and its role in the Ontario health care system, within which the current study takes place, is also provided. A summary of examined literature regarding the role of nursing leadership during nursing practice changes is then presented. Existing literature on nurses' perceptions of CPs is explored; nurses' positive perceptions, negative perceptions, and needs regarding CPs are discussed. Finally, I discuss gaps in the existing literature, which provide justification for the current study.

The Acute Care Setting

Acute is defined as “having a sudden onset, sharp rise, and short course” (Merriam-Webster, n.d.). Thus, the acute care hospital setting is defined as inpatient hospital care provided to treat a disease or illness for a short time (Canadian Institute for Health Information, n.d.). The acute care setting is fast-paced and task-based, and emphasizes the streamlining of care as well as shortened lengths of stay (Osuoha et al., 2021). According to the Canadian Institute for Health Information (2022), the most common reasons for acute hospitalization include giving birth, myocardial infarction, heart failure, and substance use disorders. To provide timely management of illness or injury, the acute care setting relies on a multidisciplinary team to holistically care for patients. Some of the professionals that are employed by acute care settings include physicians, nurses, pharmacists, dietitians, social workers, physiotherapists, occupational therapists, speech language pathologists, and spiritual care professionals (University Health Network, 2021).

Due to the fast pace and high acuity of the acute care setting, nurses employed in acute care experience high levels of stress, especially new nurses who do not have experience in caring

for unstable patients (Della Ratta, 2016). While streamlined, short hospital stays are preferable from the patient perspective, such conditions have led to increased nursing workloads, burnout, and intent to leave among nurses (Phillips, 2020). Due to the challenging nature of the medical-surgical (acute care) nursing specialty, nurse turnover rates in this area are high (Phillips, 2020). The ongoing COVID-19 pandemic has exacerbated challenges in nursing retention, for example, Statistics Canada reported 7200 new RN job vacancies during the first quarter of 2021 (Statistics Canada, 2021).

Acute has been described by some authors as an ambiguous term due to the emergence of intermediate care step-down units and the occurrence of acute exacerbations of chronic conditions (Gabrielsen et al., 2009). In the context of this study, acute care is provided by nurses employed on the unit that will constitute the case.

Clinical Pathways Within the Acute Care Setting

CPs are seen across the acute care setting, and have been used to care for patients undergoing surgical procedures such as total joint arthroplasties (P. Edwards et al., 2016) and coronary artery bypass grafts (Kebapçı & Kanan, 2018), to acute conditions such as strokes (Pöder et al., 2015) and heart attacks (Bårdsgjerde et al., 2020), to end of life care (H. Collins & Raby, 2019; K. Collins et al., 2016; Sleeman et al., 2015). To reiterate, a CP is an evidence-based, time-bound care plan, which standardizes care for patients who have a certain condition, or have undergone a certain procedure (Kinsman et al., 2010), such as those previously mentioned.

A defining factor of CPs is their multidisciplinary nature (Kinsman et al., 2010; Lawal et al., 2016; Rotter et al., 2010). Disciplines that utilize CPs include physicians, nurses, occupational therapists, physical therapists (Atwal & Caldwell, 2002), social workers (Clark et

al., 2012), pharmacists, and dieticians (Kinnaer et al., 2019). Despite the wide range of health care professionals that utilize CPs, nurses arguably spend the most time providing individual care to patients (Jarva et al., 2021). Furåker et al. (2004), in their qualitative study on CPs, note that nurses often act as coordinators of care by relaying information across disciplines. The authors elaborate that although the role of care coordinator is not a formal nursing responsibility, nurses provide continuity and are a constant presence in patient care (Furåker et al., 2004). Shaw et al. (2016), in their study on CPs for anxiety and depression in oncology patients, also describe nurses as important care coordinators for CP-based care. However, these authors note that staff and resource availability, as well as patient preference, also factor into who is responsible for care coordination (Shaw et al., 2016). For nurses to act as care coordinators of the CP, as well as provide CP-appropriate care, it is critical that nurses are knowledgeable about the trajectory of care, and goals of care, within CPs.

Sterner et al. (2020), who developed a validated scale to assess novice nurses' perceptions of care provision in acute situations, found that competence and communication are important factors in perceptions of care provision. Nursing competence (Colandrea & Eckardt, 2016) as well as nurse communication with other professionals, patients, and families (Di Leo et al., 2011; MacLean et al., 2008) have been shown to improve with the use of CPs. Thus, CPs can be of benefit in the acute care setting by improving nurse competence and communication.

Although CP implementation has been shown to increase knowledge among nurses (Bhuvana et al., 2012; Clark et al., 2012), usability of CPs is integral to their introduction, especially within the EHR. Stagers et al. (2013) define usability within the EHR as "efficiency, effectiveness, and satisfaction in accomplishing goals in a specific context" (p. 242), and note

that poor EHR usability has been linked to patient safety concerns, suboptimal use, and interruptions in workflow.

In Canadian acute care settings, hospital beds are in chronic short supply (Sutherland & Crump, 2013). Thus, the decreased lengths of stay and reduced complication rates that CPs demonstrate (Rotter et al., 2010) are favourable in the acute care setting. The ongoing COVID-19 pandemic has exacerbated hospital bed flow issues, with an estimated 11 413 surgeries in Ontario being backlogged every week to conserve acute care beds for patients with COVID-19 (J. Wang et al., 2020). Thus, the structure and efficiency that CPs provide may be beneficial in ensuring nursing competence and short hospital stays for patients. Overall, CPs represent an important aspect of quality, efficient care.

Clinical Pathway Development

CP development is a multi-step, multidisciplinary process. Before development can begin, a need for a CP must be identified, and the breadth of the CP must be determined (Flores et al., 2019). As CPs are often evidence based (Kinsman et al., 2010; Lawal et al., 2016), the examined literature endorses that the first step in CP development is to identify and review existing evidence to inform the CP (Curran, 1994; Flores et al., 2019; Howarth & Drake, 2021; Sharkh et al., 2019; Traynor et al., 2016; Yetzer et al., 2017). Next, a model, or prototype, is created; usually this model is based on an existing pathway identified during evidence review (Flores et al., 2019). Stakeholder involvement is also crucial to CP development; stakeholders can be involved either before (Traynor et al., 2016) or after (Flores et al., 2019) a prototype is created. Stakeholders should represent all disciplines relevant to the CP, including but not limited to nursing, pharmacy, laboratory medicine, nutrition, physiotherapy, and medicine (Flores et al., 2019; Howarth & Drake, 2021; Yetzer et al., 2017). Once multidisciplinary

approval is obtained, a pilot trial may take place before the design is finalized and the CP is broadly implemented (Traynor et al., 2016). The steps described in initial CP development closely mirror the beginning steps in Graham et al.'s (2006) Knowledge to Action Framework, a knowledge translation cycle in which a problem or need is identified, existing evidence is reviewed and adapted, and interventions (in this case, a CP) implemented and evaluated. The Knowledge to Action Framework was developed through review of over 30 change theories, and has effectively guided change in various areas (e.g., nursing education, public health, rehabilitation) around the world (Field et al., 2014).

Nurses are described as vital to successful CP implementation (Brady et al., 2015); however, they have reported poor experiences surrounding the CP implementation process when they are not involved in the development of such CPs (Jakobsson & Wann-Hansson, 2013). The CP implementation process was not the focus of Jakobsson and Wann-Hansson's (2013) study, and reasons for poor nurse experience were not hypothesized on by these authors. However, Pace et al. (2002) report that organizational culture can greatly influence nurses' feelings towards new CPs. Curran (1994) also notes the importance of obtaining input from clinical nurses, the end users of CPs, in the preliminary stages of CP development. CP implementation from a nursing leadership lens will be further discussed later in the chapter.

The Electronic Health Record

At the case organization, CPs that once existed on paper now exist within the EHR. An EHR is "a secure, integrated collection of a person's encounters with the health care system [that] provides a comprehensive digital view of a patient's health history" (Canada Health Infoway, n.d.-a). EHRs generally include several components: physician and nursing notes, test results, electronic reminders, clinical decision support, and computerized physician order and test

order entry (Keyhani et al., 2008). EHRs have been in development since the 1970s; however, widespread use did not occur until the early 1990s, when computers became more affordable and Internet-based EHRs were implemented (Evans, 2016). Despite the growing use of EHRs, adoption of these programs in Canada has been slow (Webster, 2015) compared to elevated EHR adoption rates in the United States (Adler-Milstein & Jha, 2017).

EHRs are used across health care settings, from primary to acute care (Lee et al., 2020). Chin and Sakuda (2012) note advantages of the EHR to include better patient care and greater provider efficiency. The EHR can improve the quality of patient care by prompting providers to adhere to best practice guidelines (Menachemi & Collum, 2011) and providing warnings regarding medication errors and critical laboratory values (King et al., 2014). The EHR can also improve the efficiency of care by reducing the ordering of unnecessary diagnostic tests (Menachemi & Collum, 2011) as well as reducing the time required to document (Chaudhry et al., 2006). Other benefits of the EHR include ease of information sharing (Bodenheimer & Grumbach, 2003; Rathert et al., 2019), and decreased practice costs (Bates, 2010). The EHR also streamlines care by including elements such as standardized CPs (Dent & Tutt, 2014).

In contrast to the EHR's benefits, concerns regarding EHR use include its unknown effects on the patient-provider relationship (Holroyd-Leduc et al., 2011; Liu et al., 2013; Rathert et al., 2019), concerns of lack of privacy and confidentiality (Holroyd-Leduc et al., 2011; Liu et al., 2013), greater workload (Rathert et al., 2019), and fears of overreliance on technology (Rathert et al., 2019). Health care providers have been shown to have mixed feelings regarding adoption and use of the EHR. This is evidenced by a study carried out by Eden et al. (2020) in an Australian hospital, which showed that nurses generally viewed the EHR positively, while physicians held a more negative view. A study performed by Juliet and Sudha (2013) in the form

of a questionnaire echoes the finding of nurses having an optimistic view of the EHR. Nurses in Juliet and Sudha's (2013) study cited reasons for this positive perception that included hopes of the EHR saving time and decreasing workload when compared to paper documentation.

Contrarily, interviews performed by Rathert et al. (2019) show that reasons for physician negativity towards the EHR may be due to their perceived duty to perform excessive tasks, a surplus of information being contained in the record, or lack of trust in the data provided in the EHR.

Prevalence of the Electronic Health Record in Ontario

In Ontario, the Ministry of Health and Long-Term Care and eHealth Ontario have a goal of a province wide, comprehensive EHR that stores health data on every Ontarian and is accessible to hospitals, community physicians, medical laboratories, and more (Office of the Auditor General of Ontario, 2016). This goal was originally meant to be realized by 2015 (Office of the Auditor General of Ontario, 2016); however, eHealth Ontario (n.d.) indicates that this goal has not yet been realized. Although EHR usage has increased greatly over the last ten years (Lee et al., 2020), it is difficult to pinpoint exact rates of EHR usage and adoption across Ontario, as well as Canada as a whole. For example, F. Chang and Gupta (2015) reported data from several surveys administered to physicians on EHR adoption. Although rates of EHR adoption from these surveys was generally high (for example, Alberta and British Columbia displayed adoption rates of greater than 70-80%), response rates for these surveys only ranged from 2-23% (F. Chang & Gupta, 2015). The Canada Health Infoway (n.d.-b) reports that 93.8% of Canadians have health data stored on an EHR; however, it is not elaborated on whether this data is a comprehensive record of health care access or an isolated health appointment. A brief search of Ontario's government agencies and health care professional organizations (e.g., eHealth Ontario,

Registered Nurses Association of Ontario) does not appear to provide data on EHR prevalence rates across the province. Overall, it is difficult to pinpoint exactly how prevalent the EHR is in today's health care climate. However, as the province of Ontario has set a goal of having all health data stored electronically (Office of the Auditor General of Ontario, 2016), exploration of the integration of paper charting methods, such as CPs, into the EHR is warranted.

Nursing Leadership Perceptions on the Electronic Health Record and Clinical Pathways

Having outlined the development and use of acute care CPs, as well as EHRs and their prevalence, nursing leaders' perceptions on these tools will now be discussed. To identify existing literature on nursing leadership's perceptions of the nursing practice changes that accompanied the transition from paper to EHR-based CPs, I performed a search across four databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, Nursing and Allied Health Database, and Scopus. The search terms included nursing leadership (and related terms), EHR (and related terms), and clinical pathway (and related terms). Articles were limited to those available through online databases but were not limited to a defined time period. Although this search was not systematic, only one relevant article was located across the four databases using the described search strategy. Therefore, separate searches were performed for existing literature on nursing leadership in the context of the transition to an EHR, and nursing leadership in clinical pathways. The results of these searches are now discussed.

Nursing Leadership and the Transition to an Electronic Health Record

Johnson and Ehrenfeld (2017) describe the transition to an EHR as an extended process consisting of several phases, each with different priorities for end-users. In the initial go-live phase (lasting approximately one month), where the EHR is implemented, the focus is on the safe provision of care through the new system and consistent at the elbow support for end-users.

In the following stabilization phase (lasting one to three months), major system issues are repaired, and end-users adjust to the use of the EHR. Finally, the optimization phase is ongoing and, as the name suggests, focuses on optimizing workflows and functionality of the EHR. Unfortunately, studies have demonstrated that “information technology literacy and health information system education were largely treated as afterthoughts by senior management in many hospitals” (Chu, 2001a, p. 23). However, adequate training on EHR use may assist in decreasing the negative effects of EHR implementation on nurses, such as reduced well-being and increased cognitive load (Heponiemi et al., 2021). Thus, leadership involvement and engagement are important throughout the extensive EHR implementation and transition process (Furlong, 2016; Johnson & Ehrenfeld, 2017), which Sugrue (2010) describes as “an ongoing program that needs to be embedded in the culture and spirit of the organization” (p. 20).

A review of the literature surrounding nursing leadership and the transition to an EHR revealed several tactics that nursing leaders can employ to support the EHR transition before, during, and after implementation. I will now discuss these tactics.

Represent Nursing Perspectives/Empower Nurses to Share their Perspective. Nurses comprise the largest group of EHR users, and the EHR has the power to change nursing practice (Xiao et al., 2014). Unfortunately, some authors have stated that EHRs are fraught with usability issues (Staggers et al., 2013, 2015; Xiao et al., 2014). Karsh et al. (2010) note that there is no such health information technology that can meet the needs of all the clinical professions that use it. However, historically, nurses have been fairly silent on advocating for increased EHR usability (Staggers et al., 2015). Thus, existing literature on EHRs and nursing leadership stresses the importance of nurse leaders voicing, or encouraging nurses to voice, input on how EHRs can be improved. Hirsch (2014) notes that nursing leaders are in an ideal position to

provide input because of their roles in various advisory and organizational governance committees. Nursing leaders can also, through observation, suggest workflow modifications “so documentation doesn’t become the essence of care” (Smith, 2015, p. 51). Leaders also need to ensure nurses themselves can voice concerns and suggest improvements that could be made to the EHR (Smith, 2015; Stonham et al., 2012; Waneka & Spetz, 2010). Nurse participation in EHR development fosters a sense of partnership with the system (Hirsch, 2014). Therefore, by implementing and optimizing EHRs with nursing input, nurses are able to effectively use such technologies (Waneka & Spetz, 2010).

Support Good Documentation Practices. The CNO (2019c) mandates that nursing documentation must fully portray the nursing process with minimal duplication, and be timely and chronologically correct, relevant, and secure. The CNO (2019c) also calls on nurses to advocate for comprehensive policies surrounding documentation at their respective organizations. Nurse leaders, who often guide EHR development and implementation (Houston-Raasikh, 2014), have been recognized as proponents of good documentation in the EHR in existing literature. For example, C. Edwards (2012) tasks nursing leaders with ensuring that an EHR allows for complete and timely documentation, both of which are recognized by the CNO (2019c) as the standard of practice. Søndergaard et al. (2017) describe how crucial nursing leadership can be in improving nursing documentation practices; these authors note that individuals in leadership roles must support reflective practice and “[acknowledge] the value of documentation [to establish] a culture of effective documentation” (p. 38). Leaders can also promote successful time management by encouraging documentation at the point-of care (Hirsch, 2014). As EHR implementations are often difficult transition periods for nurses (Furlong, 2016), extra guidance and support from nurse leaders during these times are important

(Schenk et al., 2016; Søndergaard et al., 2017). As an example, Schenk et al. (2016) note that extra support may include additional personnel available to provide care for a time after EHR implementation, due to nurses taking extra time to navigate a new charting system.

The Nurse Leader as a Clinical Workflow Expert. As discussed, nurse leaders often assist in the creation and implementation of EHRs (Houston-Raasikh, 2014). C. Edwards (2012) notes that nurse leaders' expertise in clinical workflows makes these individuals skillful contributors towards excellent EHRs. More broadly, a nurse leader can consider how workflows meet regulatory, clinical, and organizational standards in a new EHR (Hirsch, 2014). For example, with documentation being estimated to take up anywhere from 19% (Yee et al., 2012) to 35% (Hendrich et al., 2008) of a clinical nurse's time, streamlining workflows to decrease documentation requirements was noted by several authors to be an important task for nurse leaders (Hirsch, 2014; Smith, 2015). Decreasing required documentation in the EHR has the benefit of allowing nurses more time to spend in direct patient care activities (Hirsch, 2014).

Nursing Leadership and Clinical Pathways

Based on an initial search across four databases (CINAHL, Medline, Nursing and Allied Health Database, and Scopus), minimal research was located on the intersection of nurse leaders and CPs. Some authors report the process of implementing CPs. For example, Curran (1994) highlights the importance of using CPs to standardize evidence-based interventions: “[g]ut instincts about patient care are not enough. You need actual, factual data” (p. 9). Curran (1994) also recommends using literature and nurse input to guide CP workflow and implementation. Clarke (2005) also describes the lessons she learned from observing the implementation of CPs. These lessons include ensuring adequate time and resources are available to develop and enact

CPs, using audit data and patient feedback to guide changes to CPs, and ensuring adequate end-user education on use of CPs (Clarke, 2005).

Other literature that exists on nurse leaders and CPs paints an interesting picture of CPs as a form of governance (Allen, 2009, 2014; Clarke, 2005; Dent & Tutt, 2014). CPs as clinical governance tools can be seen both negatively and positively. For example, CPs are easy to audit, and therefore enable leaders to assess nurses' "effectiveness and efficiency" in care provision (Dent & Tutt, 2014, p. 177), despite nurses being autonomous practitioners (CNO, 2019a). Georges and McGuire (2004) also criticize that CPs are overly focused on resource control, with the most valuable resource being time. Conversely, Allen (2009; 2014) describes that, on a positive note, the governance that CPs provide enables clinicians and managers to unite over a focus on quality care, as CPs combine quality improvement and evidence-based practice. However, Dent and Tutt (2014) note that this only makes CPs difficult to ignore by clinicians who may reject the notion of being audited in their care provision; forced to provide care according to a recipe. Overall, this literature search revealed little information and further inquiry into nursing leadership and CPs is warranted.

Nurses' Perceptions of Clinical Pathways within the Electronic Health Record

As described above, current research on the intersection of nursing leadership with CPs and the EHR has proven difficult to find. However, much of the literature that was discovered on these topics highlighted the importance of nurses providing input on implementation and optimization of CPs and EHRs, as well as nurse leaders providing support during the challenging implementation period of such technologies. This section will summarize analyzed literature on nurse perceptions of CPs in the EHR, to identify how nurses think these technologies could best be used, and how nurses themselves can be supported.

To find current literature on nurses' perceptions of CPs within an EHR, I completed a search across four databases: CINAHL, Medline, Nursing and Allied Health Database, and Scopus. Search terms used included "nurs*", clinical pathway (and related terms), EHR (and related terms), and acute care (and related terms). "Perceptions/attitudes/opinions/perspectives/experiences" was also searched for in relation to "nurs*" as well as "clinical pathway" and related terms. Searches were not limited by time period, as many countries, such as the United States, have used CPs in the EHR since before the 1990s (Harris, 1990). Relevant literature identified through this search was published between 2000 and 2020. I also screened reference lists of pertinent articles for other relevant studies. The literature search was not systematic and therefore may not capture all relevant literature on the topics searched. Literature on CPs within pediatric care was not examined because it is outside of this study's scope.

Across the literature, nurses' perceptions of CPs within the EHR were explored in different ways. Several articles included interviews with nurses to discuss perceptions of CPs (Bårdsgjerde et al., 2020; H. Collins & Raby, 2019; Di Leo et al., 2011; Freemantle & Seymour, 2012; Furåker et al., 2004; Sleeman et al., 2015), while other articles gathered nurse perceptions towards CPs through surveys or questionnaires (K. Collins et al., 2016; Dahm & Wadensten, 2008; Hyde and Murphy, 2012; Jakobsson & Wann-Hansson, 2013; MacLean et al, 2008). Some literature also described the implementation of a CP (Brunt et al., 2000; Grabowiecki et al., 2012; Pöder et al., 2015) as a quality improvement project. Finally, one systematic review analyzed qualitative studies regarding health professionals' attitudes towards Enhanced Recovery After Surgery pathways (Cohen & Gooberman-Hill, 2009).

Studies were of varying sizes; for example, many of the studies that used individual interviews had sample sizes of less than 20 (H. Collins & Raby, 2019; Dahm & Wadensten,

2008; Di Leo et al., 2011; Freemantle & Seymour, 2012; Furåker et al., 2004). Of the identified studies with small sample sizes, most were qualitative, except for Dahm and Wadensten's (2008) study, which was quantitative. A benefit of these small sample sizes is that they allow the phenomenon of interest, in this case, CPs, to be studied in great detail (Polit & Beck, 2017). However, small samples are not representative of a population and therefore may not be transferable or generalizable to the current study's context (Polit & Beck, 2017). Similarly, the current study is not generalizable to other similar practice contexts due to the specificity of the case (Stake, 2005).

Contrarily, studies that used questionnaires or surveys had much larger sample sizes. For example, K. Collins et al. (2016) distributed a Likert-style survey to various health professionals in the United Kingdom regarding their perceptions of an end-of-life CP; these authors received 1331 responses. Although large studies allow for gathering of large amounts of data, instruments used in data collection should be tested for reliability and validity (Polit & Beck, 2017); one weakness of K. Collins et al.'s (2016) study is that it does not describe testing for either measure. Due to a lack of nurse-specific literature, I have included several studies of nurse perceptions (e.g., H. Collins & Raby, 2019; Dahm & Wadensten, 2008; Jakobsson & Wann-Hansson, 2013), as well as perceptions of nurses alongside those of physicians and other allied health professionals (e.g., Di Leo et al., 2011; Freemantle & Seymour, 2012; Furåker et al., 2004), on CPs.

I identified common themes across the examined literature, which were divided into nurses' positive perceptions of CPs, nurses' negative perceptions of CPs, and nurses' identified needs regarding CP use. These themes, which have been further divided into sub-themes, are discussed below.

Nurses' Positive Perceptions of Clinical Pathways

Good. Standardized. Several benefits of CP use were uncovered within the examined literature. One of the identified benefits includes the provision of good care that is equal among patients (K. Collins et al., 2016; Dahm & Wadensten, 2008; Freemantle & Seymour, 2012; Jakobsson & Wann-Hansson, 2013). Specifically, Dahm and Wadensten (2008) note, in their quantitative questionnaire study, that the sample of nurses studied believed that providing care according to standardized care plans increased their capacity to provide evidence-based care; and that evidence-based care is correlated with quality care standards. Jakobsson and Wann-Hansson (2013) note that CPs are helpful in introducing new nursing staff to evidence-based practice. Internationally, nurses are called to incorporate evidence into their practice; however, barriers exist to implementing evidence-based practice (DiCenso, 2003). For example, lack of expertise in interpreting research findings has been cited as a barrier to evidence-based practice by some authors (Bradshaw, 2010; Parahoo, 2000). Other major barriers to implementing evidence-based practice include time constraints (Bradshaw, 2010) and a perceived lack of power to change care delivery (Parahoo, 2000). CPs are thus an important tool as they connect evidence with practice (Rotter et al., 2010), making evidence-based practice more attainable for nurses whom research has shown struggle to implement evidence-based practice at an individual level (Bradshaw, 2010; Parahoo, 2000).

Improved Communication. Another benefit of CPs perceived by nurses is the role of CPs in improving communication. Use of CPs has been shown to improve communication in at least three ways. First, CPs have improved communication between nurses and other health care providers, such as physicians (Clark et al., 2012; Di Leo et al., 2011; MacLean et al., 2008). Clark et al.'s (2012) study followed implementation of a palliative care CP, the Liverpool CP, on

two acute care wards in New Zealand. Interdisciplinary communication is stated to have improved because the CP reduced uncertainty surrounding goals of care, and thus gave “nursing staff the ability to look after their patients better without fighting” (Clark et al., 2012, p. 470). Similarly, Di Leo et al.’s (2011) study also followed implementation of the Liverpool CP, this time in an Italian hospital. Before CP implementation, nurses reported that their physician colleagues “did not trust their reports regarding patients’ comfort and symptoms” (Di Leo et al., 2011, p. 300). After CP implementation, both nurses and physicians displayed more trust and respect towards each other, leading to better communication and thus improved control of patients’ symptoms (Di Leo et al., 2011). Thus, implementation of a CP has demonstrated in the instances of both Clark et al. (2012) and Di Leo et al. (2011) that interdisciplinary communication is improved when an evidence-based tool assists in helping to guide care across disciplines. Atwal and Caldwell (2002), who note that “[i]n theory multidisciplinary integrated care pathways should improve the communication process” (p. 364), differentiate between types of interprofessional communication in their study on hip fracture CPs in the United Kingdom. These authors describe how a failure to complete interdisciplinary CP documentation can fragment communication; the conclusion is made that, in this way, CPs may endorse better written communication, while verbal communication may not improve (Atwal & Caldwell, 2002).

CPs have also been shown to improve communication between patients and health care providers (MacLean et al., 2008). MacLean et al. (2008) do not suggest specific reasons for improved patient and health care provider communication through CP implementation. However, it is noted by these authors that implementation of a *Clostridium difficile* CP included a staff teaching session on care of patients with *Clostridium difficile* as well as a patient teaching leaflet

provided to patients being cared for under the CP. In a study on communication of medication information by Begum et al. (2020), it was found that education of both patients and nurses was associated with a significant improvement in medication communication. Therefore, the education of patients and nurses may facilitate better communication between these groups of individuals.

Finally, Di Leo et al. (2011) also reported improved communication between health care providers and patients' family members with implementation of the Liverpool CP. Di Leo et al. (2011) give partial credit to improved interprofessional communication, that is, co-operation towards common goals, in improving communication with patient relatives. Overall, improved communication through CPs is demonstrated in several instances.

Improved Documentation. The implementation of CPs is associated with improved documentation practices in several studies (Dahm & Wadensten, 2008; Grabowiecki et al., 2012; Hyde & Murphy, 2012; Jakobsson & Wann-Hansson, 2013). The CNO (2019c) declares documentation as a skill and legal requirement in which all registered nurses must take part in. Documentation acts as a multidisciplinary communication tool and demonstrates how a nurse has shown “the nursing knowledge, skill and judgment required by professional standards regulations” (CNO, 2019c, p. 3) in the provision of care. Nurses are required to document all aspects of the nursing process: assessment, planning, intervention, and evaluation (CNO, 2019c). As CPs, by definition, strive to standardize care (Lawal et al., 2016), it is logical to assume that CPs should incorporate documentation of all components of the nursing process.

Several authors have described facilitation of CP documentation when CPs were introduced to an existing EHR. For example, Hyde and Murphy (2012) describe that when a paper CP was transitioned to the EHR, when all other documentation was already completed

within the EHR, some audited documentation areas increased by as much as 69% when compared to paper CPs. In this study, an electronic CP streamlined the documentation process by existing in the same format as all other documentation, therefore complementing the existing workflow (Hyde & Murphy, 2012). Grabowiecki et al. (2012) describe similar findings; these authors also incorporated a paper-based CP into an existing EHR. Through chart audits, Grabowiecki et al. (2012) noted a 200% increase in documentation rates of plans of care, as well as goal progression. Of note, only an abstract is available for Grabowiecki et al.'s (2012) study, making it difficult to accurately assess the entire study, such as documentation rates when the CP was paper-based. The findings of Hyde and Murphy's (2012) study and Grabowiecki et al.'s (2012) study are consistent with other research findings that support that the EHR as a whole improves the quality and quantity of nursing documentation, in part through an improved structure over paper documentation (Akhu-Zaheya et al., 2018; N. Wang et al., 2013).

Taking a different approach, Jakobsson and Wann-Hansson (2013) surveyed Swedish nurses working at a university hospital on their perceptions of CPs. These authors found the nurses surveyed had mostly positive perceptions of documentation within CPs; most nurses either partly or totally agreed that CPs are quicker and simpler to document in than normal health records, and that CPs help reduce double documentation (Jakobsson & Wann-Hansson, 2013). Jakobsson and Wann-Hansson's (2013) study demographics included nurses who use paper-based, electronic-based, and both forms of CPs. Survey questions did not differentiate the type of pathway nurses were providing perceptions on. Similarly, Dahm and Wadensten (2008) also surveyed nurses in Sweden on their perceptions of care plans; this study focused exclusively on CPs within the EHR. Like Jakobsson and Wann-Hansson (2013), Dahm and Wadensten (2008) found that nurses perceived CPs within the EHR to decrease documentation time as well as

double documentation. Overall, literature appears to indicate that CPs improve documentation by improving rates of documentation when incorporated into the EHR (Grabowiecki et al., 2012; Hyde & Murphy, 2012), and reducing documentation time and redundancy (Dahm & Wadensten, 2008; Jakobsson & Wann-Hansson, 2013).

Nurses' Negative Perceptions of Clinical Pathways

A Lack of Individualized Care. Two criticisms of CP use stood out in the literature. One of these criticisms is that CPs inhibit individualized care. Several studies have noted that CP use is not compatible with individualized, person-centred care (Atwal & Caldwell, 2002; Berthelsen & Frederiksen, 2017; Cohen & Gooberman-Hill, 2019; H. Collins & Raby, 2019; Pöder et al, 2015; Sleeman et al., 2015). Person-centred, or patient-centred care (PCC) is defined as “care that incorporates valuing patient differences, including the patient in decisions, listening, advocating, and coordinating care, as well as promoting health, wellness, and disease prevention” (Lusk & Fater, 2013, p. 91). PCC has been described as a goal that all health care providers should pursue to increase the quality of health care (Institute of Medicine, 2001). To make the Institute of Medicine’s goal of PCC for all a reality, professional groups like the Registered Nurses Association of Ontario (2015) have created best practice guidelines to help provide PCC across a broad range of settings.

Berthelsen and Frederiksen (2017) describe how fast-track programs, or pathways, “serve as a ‘one size fits all’ trajectory; however, [surgical] patients... are not a homogenous group and have individual needs for care and treatment” (p. 41). Despite the acknowledgement of patients as individuals, Berthelsen and Frederiksen (2017) have found that nurses have adhered to standardized CPs at the expense of individual care needs and nursing ethics. When patient needs or trajectories differ from the prescribed CP (e.g., nausea leading to lack of diet tolerance and

mobilization), these differences are termed variances; the goal of a successful CP is to have minimal to no variances (Georges & McGuire, 2004). This principle does not seem to encourage individualized care (Georges & McGuire, 2004). Cohen and Gooberman-Hill (2019) describe in their systematic review that although patients may vary from the CP, nurses lack clarity on how and when to stray from CP guidelines. Pöder et al. (2015) and Sleeman et al. (2015) conclude that CPs must be flexible to maximize adherence; however, guidance is not provided by these authors on how to provide this flexibility.

Ilott et al. (2006) attempt to offer a solution to the criticized lack of individualization with a reminder that patient choice and consent are necessary in protocol-based care, such as CPs. Berthelson and Frederikson (2017) elaborate, noting that patients being cared for under measures such as CPs must be informed and active participants in the plan of care for positive outcomes to occur. Nurses caring for patients under CPs must not interfere with a patient's ability to participate and make decisions regarding their care (Andreae et al., 2011). Patients have a right to information regarding their care, as well as a right to refuse any and all aspects of care (CNO, 2017). The concern over lack of individualized care is complex; CPs are powerful (Georges & McGuire, 2004) and, because of their evidence base, are difficult to disregard (Dent & Tutt, 2014). Therefore, patients must consent to be cared for through a CP, and nurses and other care providers should receive proper education on when it is appropriate to stray from CP guidelines.

Risk of Lacking Continuity of Care. CPs have also been criticized as potentially leading to fragmented care. Some nurses have expressed concern about the lack of continuity that a CP provides (Bårdsgjerde et al., 2020; Furåker et al., 2004; Jakobsson & Wann-Hansson, 2013). For example, nurses in Bårdsgjerde et al.'s (2020) study noted that a myocardial infarction CP was fragmented because nurses were unaware of what education the patient had

received versus what education the patient still needed. Although some nurses in this study thought that adding a discharge teaching checklist to this CP would be helpful in reducing care fragmentation, other nurses “thought it would be just another instance of increased bureaucracy” (Bårdsgjerde et al., 2020, p. 1611). Furåker et al. (2004) also discussed care fragmentation within CPs, noting that nurses described feeling like “the spider in the web” (p. 311) when using CPs, as it was the nurses’ responsibility to coordinate other disciplines’ involvement with the patient—if they did not act as the patients’ care manager, care would become fragmented. Although nurses were not formal care managers, additional organizational expectations such as these contribute to the high workload and increased rates of burnout amongst medical-surgical acute care nurses (Phillips, 2020). The concept of the nurse as the central care coordinator is not novel to the CP arena. In an Australian study, Cheek and Gibson (2003) describe the nurse as the “linchpin” (p. 141) who must provide care to multiple patients under multiple admitting services and relay information between various consultants.

Atwal and Caldwell (2002) also note that there is the potential for CPs to lead to fragmented care. One nurse interviewed in Atwal and Caldwell’s (2002) study communicated that “[w]hen [the pathway] is done right, it works” (p. 364). However, care can become disorganized when all disciplines involved in the CP do not complete their respective portions of CP documentation (Atwal & Caldwell, 2002). In the aforementioned studies, it appears as though a lack of communication (Bårdsgjerde et al., 2020), role clarity (Furåker et al., 2004) or documentation (Atwal & Caldwell, 2002) may lead to risk of diminished care continuity more so than the CP itself. It should be noted that ideally, CPs aid in care continuity as they attempt to guide care for an extended period; this effect was noted by Berthelsen and Frederiksen (2017), MacLean et al. (2008), and Sleeman et al. (2015).

Nurses' Needs Regarding Clinical Pathway Use

Adequate Training. Dahm and Wadensten (2008) reported in their study that only 46% of nurses surveyed felt that they were using CPs optimally. Despite this statistic, in the same study, 92% of nurses surveyed reported *rather or completely satisfactory* theoretical comprehension of standardized care plans (pathways), and 90% of nurses surveyed reported *rather or completely satisfactory* technical comprehension of standardized care plans (Dahm & Wadensten, 2008). Thus, it is unclear why nurses who profess to know the why (theoretical knowledge) and how (technical knowledge) of CPs would not all be using them optimally. Dahm and Wadensten (2008) communicate the importance of educating nurses on how to work with CPs, but do not go into detail about what this teaching may include. Several other studies have also identified adequate training on pathway use to be essential for pathway implementation and effective use (Cohen & Gooberman-Hill, 2019; K. Collins et al., 2016; MacLean et al., 2008). Cohen and Gooberman-Hill (2019) and Kent and Chalmers (2006) identify CP champions as helpful in ensuring successful CP implementation. Cohen and Gooberman-Hill (2019) have also shown that champions can enhance collaboration. A champion is defined as “a local visionary who uses expert knowledge and vision to persuade others to adopt an innovation; and help others to see the advantages of making a practice change and mentor them through the process” (Cranley et al., 2017, p. 10). Champions are noted to be especially supportive in implementing CPs because of the complex nature of CPs (Cohen & Gooberman-Hill, 2019). As CPs are multidisciplinary, champions can also be multidisciplinary (Cohen & Gooberman-Hill, 2019), helping all professions involved in CP-based care to engage in its proper use.

K. Collins et al. (2016) describe adequate training as essential to CP implementation, but do not elaborate on what adequate training may comprise. MacLean et al. (2008) also give credit

to multidisciplinary training and support for successful pathway implementation. It is described by MacLean et al. (2008) that when a *Clostridium difficile* CP was initiated, staff received several training sessions on its use; this level of training is described as equivalent to the level of training that staff would receive for any other practice change. However, because of the wide variety of care settings and health care systems around the world, what this training may comprise is difficult to imply. Overall, it has been noted throughout the literature surrounding CPs that adequate training is necessary for a smooth implementation process; clinical champions have also been described as helpful in this process because of the multifactorial, multidisciplinary nature of CPs. Clinical champions are also congruent with Graham et al.'s (2006) Knowledge to Action Framework, which posits that when new interventions are enacted, strategies must be in place "to facilitate and promote awareness and implementation of the knowledge" (p. 20).

Evaluation. Another need surrounding CP use is the need to evaluate CPs (Jakobsson & Wann-Hansson, 2013; Sleeman et al., 2015). When practice changes, as in the implementation of a new CP, evaluation can serve as a measurement of practice improvement, as well as help staff to feel involved in changing care (Jakobsson & Wann-Hansson, 2013). Nurses are vital to CP success (Brady et al., 2015), therefore, it is important for nurses to make their voices heard when CPs are being evaluated, especially when nurses feel as though they are the co-ordinator of other disciplines surrounding the patient (Cheek & Gibson, 2003; Furåker et al., 2004). Evaluation of CPs is necessary as it ensures that CPs are used optimally; in Jakobsson and Wann-Hansson's (2013) study, some nurses that were surveyed noted that the layout of CPs in the EHR made them hard to read and comprehend. Pöder et al. (2015) also speculate that a lack of documentation on CPs within the EHR could be because of an impractical layout of the CP

within the EHR. In van der Kolk et al.'s (2017) study on implementation of a surgical CP, these authors described that evaluation was performed every two months for six months and then on an ad hoc basis. Although needs vary across settings, the aforementioned authors demonstrate the need to evaluate the process of CP implementation or a change in CP format. Evaluation is also a key component in the Knowledge to Action Framework (Graham et al., 2006).

Clinical Pathways and Agency

Georges and McGuire (2004) describe CPs as having “*acquired [their] own speaking voice, [being] unquestionable, and wielding great power*” (p. 4, emphasis in original). Essentially, these authors have described that CPs have agency. Although the articles examined throughout this chapter did not specifically state that CPs have agency, or power, the themes discussed throughout this chapter seem to agree with Georges and McGuire’s (2004) statements. For example, CPs have the power to standardize care across patients. As discussed above, the standardization of care can be seen in a positive light (see: *Good. Standardized.*, p. 19) or a negative light (see: *A Lack of Individualized Care*, p. 24).

As Furåker et al. (2004) stated in their study on CPs, nurses feel like “the spider in the web” (p. 311), leading the co-ordination of care for patients on CPs. Thus, nurses arguably interact the most with the agency that CPs hold, and this can be assumed to affect nursing agency. Chu (2001b) criticized paper CPs for being simple checklists, and advocated for computerized CP systems that incorporate patient data and allow for modification of the CP according to patient status. The computerized system described by Chu (2001b) seems to increase the agency of the CP, however this research does not explore whether a more powerful CP enhances or hinders nursing agency. Nursing leaders, in their position as representatives of the profession (Hirsch, 2014), therefore must be aware of the effects CPs have on nursing agency

when decisions on CPs and changes in CP format occur. CPs and agency will be further explored in the discussion chapter.

Identified Literature Gaps

The Role of Nursing Leaders in the Context of Clinical Pathways

The examined nursing leadership literature identified several ways in which leaders can support the creation and transition to an EHR. These strategies include providing nursing input (Hirsch, 2014), supporting good documentation standards (C. Edwards, 2012; Søndergaard et al., 2017), and optimizing workflows (Hirsch, 2014; Smith, 2015). However, relevant research on nursing leaders and CPs appeared to be sparse, and though some CP implementation guidelines were lightly discussed, examination of this body of research also uncovered the power struggle between nurse autonomy and organizational management that exists in CP use (Allen, 2009, 2014; Dent & Tutt, 2014). Very little relevant literature combined the researched topics of nursing leaders, CPs, and EHRs. Therefore, a research gap appears to exist within the intersection of these three topics.

Transition from Paper- to Electronic Health Record-Based Clinical Pathways

I was unable to find any literature regarding the transition that nurses experience when paper CPs are replaced with CPs integrated into the EHR during an organizational EHR implementation. Some literature was identified in which paper CPs were integrated into an existing EHR. For example, Hyde and Murphy (2012) describe how, in their study, a single CP was transformed into an electronic format at a medical facility where all other documentation was completed electronically; that is, nurses and other staff members were already familiar with the EHR. The results of Hyde and Murphy's (2012) study, which were improved documentation and staff satisfaction, are not transferable to the current study due to the different stage of staff

EHR familiarity in the current study. Other studies have minimized the effect that an EHR implementation, or documentation change, can have on nurses. For instance, Dahm and Wadensten (2008) reduce the transition to the EHR to a very simple process and merely speculate that this transition “presumably” (p. 2143) facilitates nursing work. Brunt et al. (2000) described observing staff grieving when documentation processes changed, but this study did not explore what exactly staff were grieving.

Conclusion & Justification of the Current Study

A review of the existing literature on CPs has identified several research gaps and needs, which justify the current study. First, a literature gap exists within nursing leadership-focused literature on the use of CPs within the EHR. Very little information exists on the creation and integration of CPs by nurse leaders. Second, no quality improvement initiatives that I am aware of have sought input on CPs in the chosen study setting. Finally, a lack of examination into the process of documentation change through the CP also justifies the current research.

By examining, through the lens of nursing leadership, how nurses work with CPs within the EHR, this study will further knowledge and understanding of how to best facilitate an EHR transition so nurses and patients can benefit from pathways. Examining the experiences of nursing leaders, and anecdotally, nurses, in working with CPs on paper versus within the EHR, will help identify specific knowledge or practice gaps that may exist with the use of EHR-based CPs. Role overload and role ambiguity can lead to turnover, especially in new graduate nurses (E. Chang & Hancock, 2003). Discovering barriers and facilitators to CP use may help in clarifying the role of the nurse in CPs within the EHR, and therefore assist in nursing retention. It is important for nursing leaders to identify such barriers and facilitators to CP use because of their important role in advocating for clinical nurses through the leader’s place in various

organizational committees and memberships (Hirsch, 2014). Hence, there is a need for this proposed study because, to the best of my knowledge, there is no study to date that has examined nurse leaders' perceptions of CP use within the EHR in an acute care hospital during the early years of EHR implementation.

Chapter 3: Methods

Study Design

The current study utilized a case study design. A case study is defined as “an in-depth description and analysis of a bounded system” (Merriam & Tisdell, 2016, p. 37). Specifically, I modelled the approach on Stake’s (2005) description of an instrumental case study. Stake (2005) elaborates that an instrumental case study aims to gain an understanding of an issue where the case itself “is of secondary interest...plays a supportive role, and... facilitates our understanding of something else” (p. 445). Essentially, Stake (2005) posits that through a defined case, the researcher is able to further understand phenomena that are present within, but larger than, the case itself. Thus, the instrumental case study methodology was an appropriate choice for the current study because the case supports and facilitates the investigation of CPs as stated in the aims of the research. CPs are not exclusive to the acute care inpatient unit defined as the case, however this unit provides a lens through which I can examine CPs.

Stake’s case study approach is founded in the constructivist paradigm (Boblin et al., 2013). In constructivism, reality is viewed as subjective, and the researcher interacts with the case being studied (Boblin et al., 2013; Polit & Beck, 2017); it is appropriate for the researcher to have an insider’s perspective of the case (Boblin et al., 2013). As the researcher, I am not independent from the phenomenon under study; I have recent clinical nursing experience on an acute inpatient surgical unit similar to the case unit, and I have worked with both paper- and EHR-based CPs. The difficulty I experienced in adapting to EHR-based CPs is what drew me to perform the current research. I feel that having background knowledge of how pathways were laid out on paper, and thus knowledge of which orders are CP-specific versus which are not, has helped me to continue to provide care according to CPs even though I find CPs not optimally

integrated within the EHR. In my experience, CPs within the EHR are no longer seen as a whole order set, and daily care plans are not consistently documented on. Under the constructivist research paradigm, the biases and values that I feel are recognized and welcomed (Polit & Beck, 2017). However, this lack of objectivity can weaken the credibility of the research (Polit & Beck, 2017). Reflexivity, in which my own effect on the research is continually evaluated (Berger, 2015), was practiced to maintain credibility.

The goal of the constructivist approach is understanding through interpretation (Boblin et al., 2013). To achieve this goal, study design and conceptual frameworks remain flexible and can evolve over time (Boblin et al., 2013; Polit & Beck, 2017). In fact, the study design was altered over the course of the research. The original goal of the study was to examine registered nurses' perceptions of EHR-based CPs using Benner's (1984) Novice to Expert theory. However, due to a lack of nurse participants, the goal of the study was altered to explore nurse leaders' perceptions of the change in CP format. Thus, to prevent further restriction of the research aims, and to conform to the constructivist approach, neither a conceptual nor theoretical framework were chosen to further bind the defined case. However, the findings of this research may lend themselves to further investigation through a more rigid study design.

Overall, the instrumental case study approach was appropriate due to a lack of in-depth research on the phenomenon of interest. Instead of condensing and attempting to generalize the experiences of a wide variety of informants, the case study approach has allowed me to focus on a "functioning body" (Stake, 2005, p. 444), or nursing unit, with its own culture, care provision, and inner workings. Thus, the case study approach has provided thorough, comprehensive elaboration of the experiences of individuals working within or in conjunction with a single

inpatient unit. A benefit of the case study approach is that this approach allows for data collection from various information sources (Merriam & Tisdell, 2016).

The Case

Prior to 2019, an acute care CP at the case organization, a tertiary care centre within a Canadian urban centre, consisted of a paper booklet that was documented on by the patient's primary nurse. The CP was specific to a certain surgical procedure and encompassed the plan of care for multiple post-operative days, including the necessary assessments, interventions, involved allied health professionals, and goals for the patient. When the case organization transitioned to an EHR in 2019, CPs were integrated into the EHR. CPs are no longer tangible or time-bound, they are fluid within the EHR. As opposed to having a dedicated trajectory document outlining goals and expectations, it is now difficult to identify where the CP begins and ends within the EHR. The CP also no longer appears as a multidisciplinary tool. Nurses who worked with paper CPs until 2019 understand the goals of specific clinical pathways and how they are supposed to be used. However, newer nurses may struggle to plan care when goals are not explicit (Nurse Educator, personal communication, May 14, 2021).

In this study, the defined case consisted of a single acute care surgical ward within a tertiary care hospital. The unit specializes in urology, gynecology-oncology, plastic surgery, and general surgery patients. This unit was chosen to define the case based on the wide range of complex surgical procedures, and CPs, that are utilized. Some of the CPs that are utilized on this unit include total abdominal hysterectomy, transurethral resection of the prostate (TURP), and bladder cystectomy. The complexity of these CPs varies; for example, some pathways encompass a one night hospital stay, while others estimate a seven day hospital stay.

The surgical unit consists of RNs and health care aides, whose focus is on direct patient care, as well as formal leaders: a Nurse Educator, a Clinical Leader, and a Clinical Manager. RN has been defined in Chapter 1 (see: *Central Concepts*). A health care aide, or orderly, is an unregulated care provider who assists patients with activities of daily living, such as bathing, feeding, and transfers or ambulation (Afzal et al., 2018). The Nurse Educator assists in orienting new nurses to the organization and teaching nurses how to best provide care according to scientific evidence. During the transition to the EHR, Nurse Educators exemplified transformational leadership by fostering a positive culture around the transition to the EHR and encouraging continuous learning of EHR functionality during and after implementation. Next, the Clinical Leader facilitates excellent patient care through liaising with nurses, physicians, and allied health team members; coordinates complex discharges, and seeks to ensure patients and their family members are satisfied with the level of care they are receiving. Finally, the Clinical Manager oversees the functioning of the unit by ensuring quality and safety standards are met, leading initiatives at the unit level, and performing various administrative duties.

The medical-surgical acute care setting has high turnover rates (Phillips, 2020), which contribute to variable levels of nursing experience in such environments. For example, as part of a study by Orique et al. (2019), nursing experience level was classified based on Benner's (1984) Novice to Expert Model, which progresses through five levels of competence: "novice, advanced beginner, competent, proficient, and expert" (p. 13). In Orique et al.'s (2019) study, the largest cohort of nurses was the experts, making up 33.7% of the sample, followed by advanced beginner (31.4%), proficient (16.3%), competent (14%), and novice (4.7%). As the case unit is a medical-surgical acute care setting, I assumed that the case includes nurses from novice to expert levels of experience. The CNO also collects demographic data on its members. The percentage

of younger (and presumably less experienced) nurses (aged 18-34) has increased from 26.3% of the nursing workforce in 2014 to 34.4% in 2021; similarly, the percentage of older (and presumably more experienced) nurses (aged 45-64) has decreased from 47.2% of the workforce in 2014 to 38.6% of the workforce in 2021 (CNO, 2021). Thus, I expect that the case unit may have also experienced a change in unit demographics in the past several years.

Data Sources

The case did not consider any CPs external to the chosen unit, even if patients on external pathways (e.g., orthopedic surgical pathways) were cared for on the unit during the time in which data collection took place. Within the case, information sources included two nurse leaders, as well as examples of paper and electronic pathways as they once appeared in the physical, and now appear in the electronic, patient record.

Sampling/Recruitment

Purposive sampling was used to obtain data. Stake (2005) endorses purposive sampling to “[build] in variety and [acknowledge] opportunities for intensive study” (p. 451). In an attempt to recruit clinical nurses to participate in the study, the unit’s Nurse Educator distributed an email containing a short video describing my research to nurses employed on the case unit. My contact information was provided within the email, and I invited interested nurses to contact me directly to participate in the study. To gain trust with the clinical nurses, I also attended several unit huddles (daily, informal staff meetings) to introduce myself and my study. Ultimately, this strategy was unsuccessful and I recruited no clinical nurses. I discussed with the unit’s Nurse Educator possible reasons for the lack of nurse participation. High patient acuity, staffing challenges within the unit, and nurse burnout were all identified as contributing factors. As nurses were unwilling to participate in this research in their own time, I made myself available in

a private room close to the case unit so nurses could drop in for several minutes during their shift to discuss CPs. This strategy was also unsuccessful in recruiting nurse participants. Another challenge of recruiting clinical nurses was the timing of this research study in the context of the global COVID-19 pandemic. Recruitment took place during the fall of 2021, during which the fourth and fifth waves of COVID-19 were occurring; the fifth wave being the wave in which the Omicron variant was spreading and hospitalizations due to infection peaked (Government of Canada, 2022).

Purposive sampling is also in keeping with Stake (1995) noting that individuals should be chosen based on their ability to provide insight on the case. For this reason, I contacted two nurse leaders working on and in conjunction with the case unit directly to request their participation in the study. Both individuals consented to participate, and I interviewed each nurse leader twice, in one-on-one interviews. Although the sample size was small, Patton (1990) notes that “[t]here are no rules for sample size in qualitative inquiry” (p. 184). As a case study is defined by the depth of its analysis (Merriam & Tisdell, 2016), I sought depth over brief data points collected from many participants.

Data Collection

Stake (1995) stresses the importance of collecting subjective experiences of participants during data collection and describes interviewing as “the main road to multiple realities” (p. 64). Thus, individual interviews were the main method of collecting data within the study. Specifically, semi-structured interviews were conducted, as recommended by Stake (1995), who suggests that several questions be prepared by the researcher before the interview. Polit and Beck (2017) also recommend that a topic guide be prepared before interviews and that the participant be encouraged to discuss all topics in as much or as little detail as possible. Interview questions

proceeded logically from broad to more detailed topics in accordance with the aims of the study, as suggested by Polit and Beck (2017). For example, interviews with the nurse leaders began with collecting data on their professional backgrounds and experiences with CPs, and then became more specific with focus on detailed aspects of CPs, such as their multidisciplinary nature and leaders' perceptions on the layout of CPs within the EHR. The interview guides used for the nurse leader interviews can be found in Appendix A.

While in-person interviews are preferable as they allow for better observation of non-verbal communication cues, close contact with individuals not in one's household was discouraged during the data collection period due to the COVID-19 pandemic. Therefore, interviews were conducted virtually using the Microsoft Teams platform. Each nurse leader was interviewed twice. Virtual interviews with participants were convenient in that participants did not have to travel to an interview location, and allowed for compliance with social distancing guidelines. Interview dates and times were determined at the convenience of individual participants. Interviews lasted from approximately 30 to 60 minutes. All interviews were audio-recorded using Microsoft Teams, and I kept files on the organization's secure SharePoint server. All interviews were transcribed verbatim and verified for accuracy against the recording. To protect participant privacy, I did not transcribe any personally identifying details.

The CPs in hardcopy and as integrated into the EHR also acted as data to inform the study. The purpose of the CP examination was to visually explore how CPs had been integrated into the EHR; in keeping with the aims of the study. Two CPs were chosen. The first examined CP was a complex pathway that currently exists as a CP in the EHR; the radical cystectomy with neobladder CP. The second examined CP, the open radical prostatectomy, was simpler (i.e., shorter length of stay, less teaching expectations) and was turned into an order set—a collection

of physician's orders with no associated patient education topics or care goals—when it was transferred to the EHR. The comparison of the CPs complemented the interviews conducted with the nurse leaders.

Data Analysis

Stake (1995) suggests that data analysis should begin by seeking multiple interpretations of data, followed by examining the data for patterns. Per Stake (1995), triangulation was used to validate patterns within the data. Stake (2005) defines triangulation as “a process of using multiple perceptions to clarify meaning by identifying different ways the case is being seen” (p. 454). Both interviewed nurse leaders were asked similar interview questions to aid in triangulation. Furthermore, the second interviews that took place with the nurse leaders were based on data obtained from the first interviews, so data from the individual nurse leaders could be triangulated. Data patterns were identified and analyzed using Braun and Clarke's (2006) theoretical thematic analysis approach. These authors describe thematic analysis as “a method for identifying, analysing and reporting patterns (themes) within data...describes [the] data set in (rich) detail” (Braun & Clarke, 2006, p. 79). More specifically, a theoretical thematic analysis, which is guided by explicit research aims (Braun & Clarke, 2006), was completed based on the purpose of this study. Furthermore, Braun and Clarke (2006) differentiate between thematic analysis at the semantic versus the latent level. This research analyzed themes at the semantic level, which aims to describe the data and interpret the significance and implications of data (Braun & Clarke, 2006). For example, based on the aims of the current study, identifying barriers and facilitators of CP use among nurses may assist in the creation of strategies to improve proper usage of CPs by nurses. In contrast, thematic analysis at the latent level examines assumptions and ideologies within the data (Braun & Clarke, 2006); such a detailed analysis was not the

purpose of the proposed research. Braun and Clarke (2006) specify six steps in the process of thematic analysis:

- 1) Getting to know the data: transcription of data and reading through data several times.
- 2) Formulating codes: completed based on the data, then data is collected based on these codes.
- 3) Finding themes: codes are grouped into themes.
- 4) Revising themes: assessing whether themes match the defined codes as well as the data set.
- 5) Defining themes: the particulars of the themes are described in detail and named.
- 6) Final report writing: summarizes the themes in relation to the research question, the analysis is described in a scholarly fashion.

Throughout the process of analysis, I used member checking to confirm the correct interpretation of data. Through the creation of second interview guides for the nurse leader participants, I was able to clarify and confirm with the nurse leaders that I correctly interpreted the meaning they conveyed in the first interviews.

Rigour

I used Lincoln and Guba's four criteria for trustworthiness: credibility, dependability, confirmability, and transferability (Polit & Beck, 2017). Nowell et al. (2017) provide a guide for how thematic analyses may meet these criteria. Credibility is defined as trust that the data and the researcher's interpretations of the data are true (Polit & Beck, 2017). This research has used triangulation and member checking to ensure credibility, both of which are endorsed by Stake (1995, 2005). I have previously discussed both triangulation and member checking. Next, dependability refers to whether similar data would be collected if the study were repeated in a

comparable context (Polit & Beck, 2017). Nowell et al. (2017) highlight the importance of detailed documentation of the research process, so that the process can be evaluated and repeated if necessary. Decisions that were made in the research process should be backed by evidence provided by the research methodology (Nowell et al., 2017). In the study, I made research decisions that are congruent with Stake's (1995, 2005) constructivist case study methodology. Furthermore, study data and interview transcripts will be kept for a minimum of five years after study completion. Next, confirmability verifies that research findings are objective, that is, that other researchers would interpret the same meaning from the provided data (Polit & Beck, 2017). As in confirming dependability, transparency in the research process and descriptions of why decisions were made based on the research methodology aid in establishing confirmability (Nowell et al., 2017). Member checking, as recommended by Stake (1995), was used throughout the data analysis process to aid in establishing confirmability. Finally, regarding transferability, Lincoln and Guba note that the researcher must "provide sufficient descriptive data so that consumers can evaluate the applicability of the data to other contexts" (Polit & Beck, 2017, p. 560). Thus, by clearly defining the case and the findings, readers will be able to determine if the research is applicable to other situations.

Ethics

I obtained research ethics board (REB) approval from the University of Ottawa as well as the REB overseeing the organization in which the study took place. Certification of REB approval from the University of Ottawa can be found in Appendix B. Certification of organizational REB approval has not been included to protect organizational privacy. I obtained informed consent from all participants; I attached a copy of the informed consent form to the

email to inform participants on the purpose of the study. The informed consent form is found in Appendix C.

Protection of privacy and confidentiality was upheld to the Tri-Council Policy Statement (TCPS 2) guidelines referred to by the University of Ottawa (Office of Research Ethics and Integrity, n.d.). To protect participants' privacy, my data is on a secure server within a password protected, encrypted device in keeping up with best practice recommendations provided by the University of Ottawa (University of Ottawa Library, n.d.). All electronic files were password protected. We (student and supervisor) stored all electronic data on the case organization's secure SharePoint server. The entire research process strictly adhered to the research ethics board-approved research protocol. Data will be kept for the maximum conservation period and safely destroyed at that time.

Chapter 4: Findings

In this chapter I describe the findings of the current study. Data sources will briefly be defined, as will data analysis techniques. An in-depth description of the case unit will also be provided as described by one of the interviewed nurse leaders. Finally, main themes are reviewed. Within each discussed theme, data from the conducted interviews as well as the CPs themselves are compared and contrasted to enable a comprehensive view of the collected findings.

Data Sources and Data Analysis

Two nurse leaders within the case organization participated in interviews to inform the current study. A total of four interviews were completed; two interviews were performed with each nurse leader². To supplement the data obtained from interviews, CPs themselves, both on paper and within the EHR, also served as data sources. Specifically, the components and information within CPs in both paper and EHR-based formats were compared. The comparison chart can be found in Appendix D. Throughout this chapter, the paper and EHR-based CP comparison provides context for some of the discussed themes. The analyzed CPs assist in illustrating the complexity of the documentation shift, as well as the change in nursing expectations, that occurred with the organization-wide transition to the EHR.

Description of the Case Unit

To provide context into the environment that CPs were examined against in this study, an overview of the case unit is provided. When asked about the unit demographics, Nurse Leader 1 described the case unit as “a catch-all for nursing” (Interview 1) due to the wide variety of

² Throughout this chapter, the interviewed nurse leaders will be referred to as “Nurse Leader 1” and “Nurse Leader 2”.

surgical services that admit patients onto the unit. The case unit contains 36 beds, admitted to services such as Gynecology and Gynecology-Oncology (e.g., spontaneous abortion, ovarian cancer), Urology and Urology-Oncology (e.g., urolithiasis, bladder and prostate cancer, hematuria), Plastic Surgery (e.g., skin/muscle flaps, burns, frostbite), and General Surgery (e.g., cholelithiasis, bowel obstruction, bowel resection). Nurses employed on the case unit care for, on average, four patients per day shift (equalling a total of nine nurses on the unit during a day shift) and six patients per night shift (equalling a total of six nurses on the unit during a night shift). Day shift hours are 0715-1915, while night shift hours are 1915-0715. All scheduled shifts are 12 hours in length.

Many nurses employed on the case unit work full-time; however, there are also many nurses that work in a part-time capacity, especially junior nurses. Although the term *junior nurse* is not defined by either nurse leader throughout the completed interviews, a junior nurse is typically a nurse who is newly registered, or licensed, to practice, and has little experience. Terry et al. (2017) define a junior nurse as a nurse practicing at the level of an advanced beginner within Benner's (1984) Novice to Expert theory. Practicing at the advanced beginner level is typically indicative of a nurse with less than two years of experience (Benner, 1984). Recently, a period of high staff turnover on the case unit represented the loss of "a good number of mentors...a good amount of nursing knowledge and proficiency" (Nurse Leader 1, Interview 2). Staff who left the case unit were experienced nurses, the type to mentor new staff or float nurses, so the loss of these staff "represent[s] a loss of nursing knowledge on the unit" (Nurse Leader 1, Interview 2). Regarding the loss of experienced staff on the unit, Nurse Leader 1 noted that:

[N]ew hires and new grads definitely are trying [to fill in the gaps left by the absence of senior staff], [but] it's a process, they're not going to have that [knowledge and

proficiency]...also, that's really hard to build on now because people still need to be discharged, and discharged safely. (Interview 2)

Main Data Themes

Data themes were identified and extracted from the interviews conducted with nurse leaders. The themes attempt to capture the experience of the case unit during an organizational change in documentation methods and CP format. Although the collected data does not provide a holistic picture of the case unit due to the lack of perspectives from clinical RNs and other health professionals, the views of nurse leaders remain valuable for understanding organizational change. Themes are organized logically, beginning with a general picture of how CPs are created within the organization and the process behind moving CPs into the EHR. Next, challenges associated with EHR-based CPs are discussed, focusing on the three elements of an EHR-based CP: care plans, education, and physician orders. Challenges with each of these aspects of EHR-based CPs became evident during the conducted interviews, and indicate that nurses have struggled to adjust to EHR-based CPs. Once these challenges have been examined, responsibilities of providers and nurse education will be compared pre- and post-EHR implementation. For ease of reference, the themes are outlined in the list below and will be discussed in the order they are listed:

1. Creation, revision, and evaluation of CPs;
2. Moving CPs into the EHR;
3. Challenges of trying to make CPs work in the EHR:
 - a. Subtheme: care plans;
 - b. Subtheme: education;
 - c. Subtheme: physician orders;

- d. Subtheme: overarching challenges;
4. Responsibilities within the CP; and,
5. Educating nurses to use CPs.

Creation, Revision, and Evaluation of Clinical Pathways

The participants shared their experiences regarding the creation, revision, and evaluation of CPs. Nurse Leader 2 explained that originally, CPs were used within the organization to standardize obstetrical care, due to the high-risk nature of the obstetrical environment. CPs ensured that care was the same across the obstetrical departments at each organizational site. Nurse Leader 2 elaborated: “if a patient could prove ‘well, my baby wouldn’t have died if I’d gone to [other hospital] because [other hospital] does it this way’, it becomes a huge liability” (Interview 1).

Before the EHR launched in 2019, there were over 90 pathways in use across the organization. Nurse Leader 2 noted that most CPs were created for surgical procedures, as goals and outcomes are more predictable than for medical conditions, for example, diabetes. Essentially, “[i]t’s hard to make a pathway for a medical condition to say what they’re going to do on day 4” (Nurse Leader 2, Interview 2). Nurse Leader 2 acted as a point of contact for CPs throughout the organization. They described their role as such:

I was not a content expert of the content of the pathway, just the build of the document and so my role was to get the teams together. They would pitch their ideas to me, what they wanted to do. I had a ton of templates so I would direct them to the most appropriate template. Maybe do a skeleton of some of the stuff that they were talking to me about so that they would understand what I'm trying to describe and then they would meet, sometimes I would meet with them, depending on the teams... And basically I would

coordinate through printing the creation of these things and would help monitor.

(Interview 1)

When CPs were paper-based, they were revised every three years. Revisions were completed by a collaborative and multidisciplinary team; each discipline included in the CP (e.g., Registered Dietitian, Laboratory Medicine) had to agree to CP creation and revisions. The revision process involved looking at “what’s the best standard of practice for [CP] patients so that we can try to... be more efficient... I also would look at what other centres were doing” (Nurse Leader 1, Interview 1). Once revisions were complete, CPs received final approval from department heads and staff physicians. It became standard practice to have these CPs ordered for their patients.

Nurse Leader 2 described that when CPs were paper-based, use was evaluated quarterly. Evaluation of use consisted of determining whether a CP was ordered for a patient whose diagnosis, via international diagnostic code (ICD-10), corresponded to a CP (i.e., identifying if a patient who should have been ordered onto a CP, was actually ordered onto a CP). This form of evaluation only identified rates of CP usage; it did not determine whether the CP was documented on properly, or if the patient progressed according to the CP. Evaluating documentation within CPs was done by audits, and historically, the organizational health records department monitored documented variances, a variance being a reason for a patient’s lack of progression through a CP (e.g., nausea and vomiting preventing diet and ambulation tolerance). Currently, CP use is not being formally evaluated within the EHR. It was suggested by Nurse Leader 2 that formal evaluation of CPs has not been completed since their integration into the EHR. Reasons for a lack of recent evaluation were not discussed. However, some manual audits of CP use within the EHR have been completed, and Nurse Leader 2 has expressed that the care

plan³ and education portions of the CPs are not currently being used in an ideal manner.

However, Nurse Leader 2 also noted that CP care plans are more effectively utilized than non-CP care plans. Nurse Leader 2 elaborated:

[Care plans within CPs were] just better used in the sense that there was more interventions clicked off... because that's the group that used them more in the past. So when we looked at like, the delirium [care plan] and you would just see either nothing or just progressing, not progressing whereas the ones that were pathway related you could see that they would click some of the interventions and sometimes there'd be more notes, sometimes not, but they certainly are better used because people are more used to the concept of a pathway. (Interview 2)

Moving Clinical Pathways into the Electronic Health Record

When CPs were translated into the EHR, there were two possible scenarios that occurred: a) the paper CP continued to be a CP in the EHR; or b) the paper CP became an order set in the EHR⁴. Nurse Leader 2 noted that “it was always understood that the pathways were going to be there [in the EHR]” (Interview 2). Not all paper CPs were transitioned into an electronic CP because the CPs essentially had to be built from scratch within the EHR. When the organization was in the process of choosing an EHR that would best suit its needs, Nurse Leader 2 described part of the selection process as such:

³ Nurses would document on paper CPs each shift, noting whether or not the patient was meeting specific goals. If the patient was not meeting prescribed goals, a variance code would be documented. Documenting patient progression towards goals is the essence of the care plan within the EHR.

⁴ An order set is a group of physician's orders that guides care for a certain diagnosis or condition. An order set differs from a CP in that it does not include education topics or a care plan tailored to the condition/diagnosis.

[T]here were two vendors in the end. We did pose a lot of question to both vendors around the pathway functionality and if [chosen EHR] had that and the other vendor didn't actually have any built-in solution in their system... [chosen EHR] does have a pathway solution that they feel works reasonably well in the U.S....it does not function at all here...it doesn't flow well with the patient. (Interview 2)

The main reason why the EHR's built-in CP activity could not function well within the organization, or within the broader context of the Canadian health care system, is because the CP-associated physician workload was high. "In the U.S., everything is physician driven...because [it's] all based on billing, right? So the orders and all of that- like physicians in the U.S. do modify their orders every day. That does not happen here..." (Nurse Leader 2, Interview 1). As CPs would not be contained within the existing CP activity of the EHR, it was decided that EHR-based CPs would consist of a set of physician orders, a care plan, and an education activity. Regarding this decision on EHR-based CP format, Nurse Leader 2 expressed that "[i]t's not a perfect fix, it's probably not even a great fix, but it really was sort of the only option with the time we had left" (Interview 1). The difference in appearance and function of the EHR-based CPs has been noticed by nurses and nurse leaders alike. For example, Nurse Leader 1 noted that the "lovely clinical pathways we had before don't necessarily exist [in the EHR]" (Interview 1). Although content-wise, paper and EHR-based CPs remain similar (see Appendix D for comparison of CP content), Nurse Leader 1 was referring to the fact that EHR-based CPs are not a succinct booklet like their paper-based counterparts were, as well as to the fact that not all paper CPs were transferred as such into the EHR.

Due to the high workload associated with the rebuild process (as previously noted, the CPs had to be built from scratch in the EHR), only 25 of over 90 former CPs were moved into

the EHR. The 25 CPs were chosen partly based on the volume of patients on the CP, the acuity of the CP, and the percentage used (i.e., how often patients with diagnosis x were placed on pathway x). The medical Chiefs of Staff were also included in the discussion of what was translated into the EHR as a CP versus as an order set. The rebuild consisted of creating physician's orders, patient education, and care plans from the existing paper CP documents. Although some front-line staff and Nurse Educators did have input on the build of CPs, "[i]t was hard, prebuild, to get feedback because [the builders] couldn't even know what it was gonna look like" (Nurse Leader 2, Interview 2).

The CPs that were not transferred into the EHR as CPs became order sets instead. An order set is, as the name suggests, a group of physician orders to prescribe specific care for patients with a certain medical condition, or who had undergone a specific surgery. Only the physician's orders from paper CPs were added to order sets; no associated care plans or patient education components exist within order sets. However, the nurse does have the ability to manually build care plan or education components into the patient's chart. Unfortunately, building these components does not seem to be common practice among nurses. Nurse Leader 1 noted, "[d]o I think they build a lot of those [education topics]? No... I've shown people how to, but...[i]t takes a lot of up front, kind of like effort to go in and build" (Interview 2). When comparing a paper CP to its order set equivalent, there is also the loss of a pre-operative care component as well as the patient's expected trajectory as a whole; Nurse Leader 1 explained, "that lovely...nice component for like the discharge info and education and the ideas of like, and the expectations for the patient's admission also kind of got lost" (Interview 1). For example, the paper prostatectomy CP used within the organization outlined pre-operative teaching goals in the pre-admission unit as the patient understanding plans for post-operative pain management, the

post-operative course, and self care measures to prevent complications. A nurse would sign the CP to confirm that this teaching had been completed. In the EHR, although the patient may have had a pre-admission appointment, it is not linked to the post-operative hospital admission, so it is difficult to search through the chart to see if the patient did have a pre-operative appointment and what teaching was completed.

Nurse Leader 2 noted that it has always been in the EHR optimization plan to incorporate more CPs into the EHR. Although the EHR optimization plan was not discussed in great detail with Nurse Leader 2, Johnson and Ehrenfeld (2017) describe optimization as the final step in the transition to an EHR, in which workflows and functionality are enhanced to better meet users' needs. Currently, the COVID-19 pandemic has disrupted EHR optimization plans within the case organization:

[W]ith COVID we have never started the optimization plan, so there are a lot of things that we just never got to. So as far as I know, [CPs are] still not off of the optimization plan, but when they will be prioritized or optimized, I don't know. (Nurse Leader 2, Interview 1)

Nurse Leader 2 has also noted that physician teams have expressed eagerness at having more CPs transferred into the EHR. However, before the uploading of more CPs occurs, CPs need to be updated. No updating has occurred since before EHR launch, which occurred in 2019, so many CPs that existed on paper are considered out of date at this time if they are not yet integrated into the EHR. Furthermore, the CPs that have been integrated into the EHR are coming near the requirement of a complete review.

Challenges of Trying to Make Clinical Pathways Work in the Electronic Health Record: Care Plans

Prior to the EHR, a paper *Kardex* would outline the plan of care for a patient; i.e., the patient's diet, tubes and drains, level of assistance required for activities of daily living, and laboratory tests ordered. Nurses would then document care provided on paper flowsheets and handwritten nursing notes. For patients on CPs, the nurse would document each shift on whether or not the patient was following the path laid out by the CP. If the patient was not progressing through the CP, the nurse would note the reason through a variance code. Variance codes were pathway-specific, simple phrases and not intended to provide an in-depth description of the patient's clinical status. For example, a variance code may have indicated that a patient did not tolerate their ordered diet. Each CP contained approximately six formal variance codes; if the patient's failure to progress was not due to one of these six codes, the nurse would circle on the CP document where the failure occurred. Nurse Leader 2 described recommending "that people keep less than six [variances] on any pathway... we wanted something very specific" (Interview 2). All variances were elaborated on in the handwritten nursing notes as needed.

In the EHR, care plans are part of the required shift documentation for nurses, whether the patient is on a CP or not. Surgery-specific and/or patient-specific care plans can be added by the nurse or interdisciplinary team, ordered by the physician, or activated via certain actions within the chart (e.g., a fall risk care plan is activated when the fall risk scale identifies the patient as at risk for falling). A patient may have multiple care plans activated. Documenting on the care plan provides a snapshot of how the patient is progressing towards discharge, or what is preventing a patient from progressing towards discharge. The nurse can document how the patient is progressing towards the described goal for each care plan item. There is also a text box

where the nurse can document how they addressed aspects of the care plan/state barriers to progression. While some similarities exist (i.e., the nurse being able to document progression) the variance codes are remarkably different.

From my observations of the paper and EHR-based CPs, in the paper CP, all variances were patient-specific or procedure-specific factors. In contrast, the EHR provides an extensive list of variance codes that are the same for all CPs. They are no longer patient and/or procedure specific, but also consider larger system challenges. For example, variance codes include “Department Overbooked” and “Transportation Delay”. While having a larger systems perspective of challenges affecting progression is helpful, the context provided in the paper CP related to the surgical intervention and procedure related trajectory or expected outcomes are either diluted or lost.

Furthermore, compared to the paper CP, the EHR-based CP’s care plan goals are less specific. For example, “tolerates activity” is listed as a goal in the EHR, whereas on paper, activity goals were more explicit and defined as “up to chair TID (three times daily)”. Where this detail related to patient outcomes was consolidated within the former paper CPs, to know that ambulating to a chair three times a day is the expectation within the EHR, the nurse would have to know to toggle between the Care Plan and Orders sections of the patient’s record. This observation is echoed by Nurse Leader 1, who notes that patient goals in the EHR care plan are “phrased differently than they were in the actual paper document” (Interview 1). Specifically, Nurse Leader 1 elaborated that:

[Within the EHR] [t]hey’re more nursing kind of goals... whereas [on paper] it was a lot more surgery specific... and it was worded just easier I think, and easier to understand, easier to address. Whereas sometimes with the care planning components [in the EHR]

it's, not to say fluffy, but a little bit more, how do I put it, like less clinical, I guess, or...worded in a way we don't normally use. (Interview 1)

Nurse Leader 2 has also received feedback from clinical nurses that parts of the EHR-based CPs are "too vague" (Interview 2).

Another challenge of care planning within the EHR, noted by both interviewed nurse leaders, is that the care planning activity is not being utilized in a useful way by nurses. The care plan within the EHR allows nurses to document the same stage of progression for each goal, allowing nurses to complete their care plans with a single click. However, because of the option to document on all care plan goals at once, Nurse Leader 1 stated that "the care plan documentation as you've kind of noticed, a lot of people put like progressing, progressing, progressing, progressing... and that's it. And of course, as you can imagine like that's not super useful" (Interview 1). Documenting in this way is "not useful for nursing time, and it's not useful for the patient or the health care team" (Nurse Leader 1, Interview 1). The intention with care plans was to have the nurse document against them, or in other words, to focus on the goals that the patient is not progressing towards and on the actions taken to assist the patient in meeting these goals. Nurse Leader 2 stated that care plan optimization needs to occur, as "[p]eople are not using the care plan like we thought it might get used...[nurses] are not really documenting against it" (Interview 1). Speaking about the need for optimization within both the care plan and education activities within the EHR, Nurse Leader 2 stated:

We need to figure out what the barriers are to use. We need to figure out a better way that they're not, for lack of a better word, a waste of time for the nurses, like what? What is the best way to use them? What is the most efficient way to document without

duplicating documentation? And what's the easiest for everybody to see the information?

(Interview 2)

Before optimization can occur, an assessment needs to be completed, defining how care plans actually need to change; “because to spend a ton of time to create things that people are not going to document on is not a good bang for your buck” (Nurse Leader 2, Interview 2). In other words, a formal evaluation of CP usefulness is required to understand what type of changes within EHR-based CPs would complement nurses’ workflows.

Challenges of Trying to Make Clinical Pathways Work in the Electronic Health Record: Education

Within paper CPs, expectations for patient teaching were explicit, specific to each day and documented in a patient teaching record separate from the CP. The paper patient teaching record enabled the tracking of learning tasks (e.g., emptying a urostomy bag), along with who performed the task and the level at which they performed the task (e.g., performs task with assistance or independently). Patients also received a detailed teaching booklet (e.g., many of the organization’s patient teaching booklets were over 30 pages long) during their pre-operative appointment, which they were expected to review and bring to the hospital with them on their day of surgery.

In the EHR, like with care plans, education documentation is part of nursing required shift documentation, whether the patient is on a CP or not. All patient charts include general education topics, such as pain management and self-care. If a patient is on a CP, CP-specific education will also populate within the education section of the EHR. However, procedures or surgeries that were transferred into the EHR as order sets do not contain specific education topics. Similar to the paper patient teaching record, when documenting education, the nurse must

specify the learner, teaching method, and response (e.g., patient verbalizes understanding). The nurse is also able to provide a more detailed description of the provided education using a comment box function.

Three main challenges were identified surrounding CP education in the EHR. First, because the education topics are built into the EHR for CPs, but not for order sets (which were previously CPs when on paper), consequences exist for both patient safety as well as nursing workload. For patients whose care is governed by an order set instead of a CP, teaching topics and subtopics can be built into the Education section of the EHR by nursing staff, although adding these topics takes up much time and effort. Due to the time and effort required, nurses are finding shortcuts to document provided education. Nurse Leader 1 noted:

We have to build [education topics] out because it's not built into [EHR] right now, so you have to basically create your own little...education topic and then say like 'catheter care teaching' and...how to change day bag to night bag; patient education booklet given; how to clean the bags... it ends up being a lot more nursing workload to put that into [EHR]...I've shown people...but honestly, I think they're just putting [education] into the Notes section. (Interview 1)

One issue with documenting education in the Notes section is that “then the nurse has to track back and see what's already been discussed, et cetera, et cetera, et cetera... it's not ideal” (Nurse Leader 1, Interview 1). Furthermore, when education components are not built into the EHR, it is difficult for junior nurses, float nurses, or nurses that do not specialize in the case unit population to know what teaching is expected. For example:

[H]opefully somebody will tell a nurse who is floating that [patients] need to see the patient education videos we have...Hopefully somebody will tell them like that's

required. But [some surgeries] don't...have the education component built, right? [Case unit nurses] just know to do it, so it's more of an issue of the ones that had the clinical pathway that was built really beautiful. And now we just don't. And we have to build in, kind of, safe unit practices to make sure that our patients get that stuff. (Nurse Leader 1, Interview 1)

Safety incidents have been reported in some instances, as “patients can slip through the cracks” (Nurse Leader 1, Interview 1) when nurses are unfamiliar with patient needs that are outlined in the Education section of the EHR. A safety incident was described by Nurse Leader 1:

[A patient] went home without [medication], and they should have gone home with it [but] the physician forgot, and then the nurse was like, ‘well, how was I supposed to know?’ I’m like, well, it’s in the Education component, but it would have been clearly laid out and in the clinical pathway if it was paper. (Interview 2)

Nurse Leader 1 also emphasized that when education topics are not present in the EHR, a nurse may not teach something to the patient if they do not understand the theory behind it and why it is important to teach. The following example was provided:

[Patients] get catheter teaching, but yet my, I don't have an education topic prebuilt [in the TURP order set] that [nurses] can just add in, so, which leaves that then kind of open, right? So whoever kind of picks that up, well, maybe [the nurse doesn't] feel the need to have a leg bag. Maybe [they] think that they can just leave the night bag on forever, but what's the issue with that? Well, if they're carrying [it] around attached to their abdomen, they're higher risk of UTI's because the back flow of urine. Number two it's too heavy. It's high risk of UTIs 'cause it creates microtears... So if you leave that open...Patient

education, patient care can kind of deviate depending on nursing practice, right?

(Interview 2)

Nurse Leader 2 also elaborated on the importance of CPs as a reliable source of knowledge, noting that by reading the paper CP, one can “get an idea [of the care to be provided] without having to be digging into your, your Google or whatever” (Interview 1). Essentially, when standardized expectations were not amalgamated into EHR-based CPs, nurses are forced to turn to other sources of knowledge, which may be outdated or poor practice. RNs in Ontario are bound by their code of conduct to base their practice on reliable information sources (CNO, 2019b), however with limited time and access to current research findings, CPs represent an important connection of evidence with practice (Rotter et al., 2010).

The second challenge surrounding CP education in the EHR is that CP-related education booklets are now less accessible than they were when CPs were paper-based. Nurse Leader 1 described that both COVID-19 as well as the switch to the EHR have contributed to difficulties in disseminating patient education. When CPs were paper-based, patients would receive a teaching booklet regarding what to expect from their hospital stay during their appointment at the pre-admission unit (PAU). Furthermore, the PAU nurse would sign off on the paper CP that the patient had received this teaching booklet and that teaching regarding expectations for the hospital stay had begun. In the EHR, CPs do not officially start in the pre-operative phase, so CP-related pre-operative teaching is difficult to find. To compound this issue, patients are now attending virtual PAU appointments due to the ongoing COVID-19 pandemic, meaning they do not receive a copy of the patient teaching booklet. Although teaching booklets are available in the hospital, they are described as “painful” (Nurse Leader 1, Interview 2) to find. Furthermore, Nurse Leader 1 explained that when teaching is not started pre-operatively, continuity of care

and reinforcement of education is lost, which can lead to negative patient outcomes. The following anecdote was provided by Nurse Leader 1:

We've had even our, our breast reconstruction patients. 'Why are you like, checking my flap every hour?' Well, we have to, it's at risk of failure and we've had people sign themselves out [against medical advice] and you're like, well, you should have been told like we're going to have to do hourly checks, whereas if they had an in person pre-op they would have given them their booklets, they'd have given them a heads up like, and I do find those things definitely got kind of like, lost in the shuffle. Uh, whether it's [EHR] related, whether it's, whether it's pandemic related, I think it's a little bit of both.

(Interview 2)

The third challenge regarding documenting CP education within the EHR is that once education is documented as complete, it cannot easily be revisited. For example:

We've had, like, [education documented as] completed or adequate for discharge. But let's say a nurse comes by on another day or another shift. And she's re-evaluated with the patient for whatever reason, maybe they've had a fluctuating confusion or something has happened that they've re-evaluated. They're like, no, no, this is not adequate for discharge, they're like 'how do I undo this?' I'm like, well you can't really, all you can do is re add in those particular care plan and/or education components. (Nurse Leader 1,

Interview 2)

Essentially, the EHR does not account for that the patient may regress in their knowledge. Although education components can be re-added, re-adding topics circles back to the first challenge identified in this section: that it is time consuming to add in new education topics.

Overall, participants expressed that the education portion of CPs needs to be altered to be more user-friendly and efficient.

Challenges of Trying to Make Clinical Pathways Work in the Electronic Health Record:

Physician Orders

When CPs were paper-based, orders that would continue throughout the patient's hospital stay (i.e., for medications and/or laboratory tests) would not be included in the CP booklet, but appeared on a separate pre-printed order sheet. The pre-printed order sheet listed all relevant orders for a post-operative patient on a specified clinical pathway. The pre-printed orders were divided under "Medication" and "Non-Medication" subheadings, and the physician would initial all the orders that the nurse was to enact for the patient. Orders from the pre-printed sheet would be transcribed into the patient's Medication Administration Record (MAR) and Kardex. Within the paper CP, orders that changed day to day would be present. These orders would include, for example, activity restrictions, diet, laboratory test requirements, and frequencies for nursing assessments.

Within the EHR, the Active Orders section contains *all* active physician's orders. Orders can be organized by order type (e.g., diet orders, medication orders, nursing tasks.) or order set (groups of related orders, e.g., CP orders). There is also an additional section for Held Orders. Held Orders have been enacted by a physician but may not be relevant for the current care setting. For example, post-operative patients have a post anesthesia care unit (PACU) order set and then an inpatient unit order set. When the patient arrives on the inpatient unit, the nurse must "release" the unit orders from the Held Orders section so they appear in the Active Orders section. For example, orders for post-operative analgesia differ between the PACU and the inpatient unit. The PACU has more options for analgesia, including intravenous analgesia, to

quickly control pain in the immediate post-operative period. Once the patient reaches the inpatient unit, the nurse would release orders for analgesia that is administered orally and subcutaneously instead of intravenously. Figure 1 (below) provides a mock-up of the appearance of the physician's orders section of the EHR in use at the case organization.

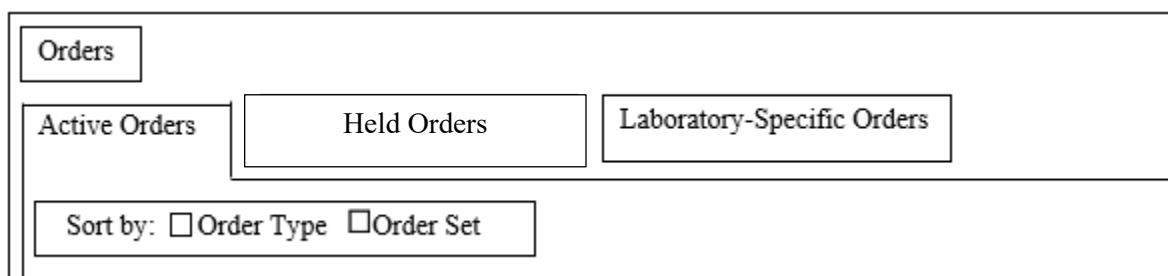


Figure 1: Sketch of the Orders Section of the EHR.

Two main challenges affect the physician's orders section of the chart. The first challenge surrounds the previously discussed issue that some paper CPs were translated into only a physician's order set when the EHR was launched. Essentially:

All that lovely pre-op portion we had, um, kind of got lost in the shuffle. Or doesn't get done at all, truth be told...also that lovely, like nice component for the discharge info and education and the ideas and the expectations for the patient's admission also kind of got lost because now [what was a CP is now] just a physician order set. (Nurse Leader 1, Interview 1).

As Nurse Leader 1 has illustrated, pre-operative care, relevant patient education points, discharge planning details, as well as the patient trajectory as a whole lacks clarity when a CP is altered to be only a physician's order set. For example, the patient teaching points for a single post-operative day within the paper open radical prostatectomy CP are well defined, and include care of a urinary catheter, care of a closed surgical drainage system (i.e., Jackson Pratt drain), signs and symptoms of infection, and when to return to hospital and/or call the physician. The teaching

points echo the topics present in the patient teaching booklet that used to be given at the pre-operative appointment.

By contrast, in the EHR, the open radical prostatectomy is now an order set. As a result, there are no tailored care plans or education topics, there are only orders to provide education on catheter care and drain care, if applicable. As previously mentioned, when teaching points are not clearly defined, such as in the education section for EHR-based CPs-turned-order sets, all nurses may not provide an equal quality of relevant teaching on these topics, or provide teaching on all of the required topics at all. In my experience, novice nurses especially are unaware of community and clinic aftercare. It is unclear what the patient and family are responsible for knowing and what needs to be explicitly taught.

The second challenge surrounding physician's orders within CPs is that there are a large quantity of orders not separated by post-operative day. On paper, each page of the CP was dedicated to a post-operative day; for example, the title of the page is "Post-operative Day 1", and the nurse has space to document the date in yyyy/mm/dd format. Aside from standing orders within the Kardex and MAR, only orders for that specific day are included on the page.

In the EHR, there continues to be orders related to specific post-operative days. However, these dates are dependent on when the orders were released from the Held Orders section of the chart. This means that if a patient spent the night of post-operative day (POD) zero in the PACU, and was transferred to the inpatient unit on POD one, the inpatient CP orders would be released on POD one, even though they are meant to be released on POD zero. Thus, the dates that orders are said to be "due" may not be accurate. Due dates are now very process and human dependent, they are not as clear cut as they used to be.

Now that orders are not separated by post-operative day, there are a large quantity of active orders within the patient's chart at any given time. Nurse Leader 1 described the vast number of orders in the EHR as such:

They just show up as a giant clump of like orders down the patient's chart...and often things can get missed... So it's the way, it's just the info is presented. It's not that my staff don't know [what to do], it's just that the amount of info is overwhelming when they're looking through their orders- what's required for that day, because it's everything under the sun. There's PACU orders thrown in there. There's other orders that are in the signed and held section... It's just a lot...that seems to be more of the concern. (Interview 1)

Nurse Leader 1 elaborated with the following statement in Interview 2:

Now [in the EHR] all those orders just kind of flow in like, a bucket, sense of the word like they're not staggered.... So, you've lost that, that nice separation of like OK, this is what they need to do for today.... it's all just, all of it is there as soon as you release your orders.

The notion that the post-operative day of the patient in the EHR is not as clearly displayed as it once was on paper is also reiterated by Nurse Leader 2, who similarly noted issues with not being able to accurately find the post-operative day of a patient:

[E]ven to figure out where it says in the interventions on day one they're going to be up once, on day two they're gonna be up four times. The fact that [EHR] doesn't say my patient's post op one or post-op two anywhere clearly. It says they had, you know, they have a bad knee is their diagnosis and then somewhere it says they had knee surgery and somewhere you can kind of find the day it was done. But there's nowhere like, 'am I accurate or what?' (Interview 2)

However, this problem extends beyond the reach of the CP: no part of the EHR-based CP actually tracks the post-operative day of the patient, as this information is located in another area of the chart. Fixing the CPs so there is more of a separation of post-operative days poses its own set of challenges. With the launch of the EHR, Nurse Leader 2 noted that the EHR build team “wanted to give [CPs] some time to see if people’s mindset could change into seeing it this way [without defined post-operative days as part of the CP]” (Interview 2). However, so far, Nurse Leader 2 states that nurses have indicated that “[t]he consensus is it’s not as good as it used to be. The consensus is the day one, day two, day three was much more useful clinically” (Interview 2). It has been reported that nurses have trouble finding within the chart the relevant surgical information to initiate proper CP-based care; now progressing through a CP is more difficult than just “flipping the page” (Nurse Leader 2, Interview 2). However, as Nurse Leader 2 further described, “There’s a whole pack of nurses that have never seen a pathway day one, two, three, ...[w]ho’s going to benefit from [changing the builds], and is it going to be clearer?” (Interview 2). Changing the build, or appearance of CPs within the EHR creates the risk of disturbing the understanding that nurses have regarding navigation of the current EHR-based CPs, as well as the risk of the problem of unclear post-operative days not being solved. In the current view of the EHR, although active orders can be sorted by order set (see *Figure 1*) to see all CP-specific orders together, this is human and process dependent and may change how the nurse views non-CP specific orders within the chart.

Overarching Challenges of Trying to Make Clinical Pathways Work in the Electronic Health Record

Underlying the challenges described regarding the care plans, education, and physician’s orders is the consensus by the interviewed nurse leaders that the EHR-based CPs lack clarity and

are not as well organized when compared to paper-based CPs. For example, Nurse Leader 1 described that CPs in the EHR are now “disjointed” (Interview 1). They elaborated:

[CPs] used to be really smooth and nice like you would have everything there, all the information you required on the paper, it's not the way [CPs are] presented in [EHR]. It's not the way [CPs] function in [EHR]. You have to toggle between those three areas in the patient's chart. So, yeah, things get missed a bit more easily. No, it's not as smooth by any stretch of the imagination. (Interview 1)

An analogy was made by Nurse Leader 1 that the EHR-based CPs are similar to “Swiss cheese” (Interview 2) due to the number of holes present. Nurse Leader 1 has also noted the loss of the term clinical pathway by nurses, stating that “[CPs are] not the historic paper documents...[s]o they kind of don't refer to them like that particularly” (Interview 2).

Nurse Leader 2 also noted that EHR-based CPs are less delineated and less clear than how these CPs existed on paper. As previously discussed, the organization was unable to use the CP function that existed within the chosen EHR, and so CPs had to be built into the EHR from scratch. Nurse Leader 2 noted the following about the build experience:

[Y]ou don't know what you don't know. Like we only, when we started building [EHR] we knew nothing about [EHR]...now we, we like to say we're smarter. We've used [EHR]. We know a bit more what it does do or how we use it. So we've got a sense of what's not working. (Interview 2)

During the CP build into the EHR, Nurse Leader 2 described the process as “building blind” (Interview 2) and noted that the current workflow for CPs is “not a perfect fix, it's probably not even a great fix...[but it's] the only option with the time we had left” (Interview 1).

Throughout the approximately two years since EHR implementation at the case organization, the challenging format of CPs within the EHR has highlighted how much nurses at the case organization rely on CPs to provide care. This reliance can have positive and negative consequences. On a positive note, the provision of care through CPs helps to standardize care according to best practices and acts as a reliable source of knowledge (Nurse Leader 2, Interviews 1 & 2). However, one negative evaluation that Nurse Leader 2 noted has been made globally as well as within the organization, is that CPs “spoon fed” (Interview 2) nurses by providing all the necessary information; “it was like having your textbook beside you all the time” (Interview 2). Although CPs did act as a wealth of information, the issue that arose with their transition into the EHR was that with a different function and appearance, “we don’t have a mechanism to fill the gap” (Nurse Leader 2, Interview 2). To elaborate, paper CPs gave great guidance to patient care, and now that the format of CPs has changed and their components spread out within the chart, nurses are unable to provide care according to the standard that paper CPs set, leaving a gap between the care that should be delivered and the care that is delivered. The existence of such a gap is troublesome in that it indicates further education is required to bridge the gap. It also illustrates that more formal education is needed on how and where to find reliable sources of information to guide care.

Responsibilities Within the Clinical Pathway

CPs are meant to be multidisciplinary documents, and the expectations of each involved discipline vary. During CP creation or revision, the profession leader of each involved discipline would approve the CP. For example, Laboratory Medicine would approve the inclusion of any laboratory tests within the CP. Despite the fact that CPs are multidisciplinary documents in their creation and intention, they are not so from a written documentation perspective. As was the case

with paper CPs, in the EHR, nurses are the only discipline who must complete required documentation as part of the pathway. Specifically, this means that care plans and education, as they exist within their respective sections in the EHR, are primarily documented on by nurses. This is not to say that other disciplines do not have responsibilities to provide patient education, however other disciplines document education through progress notes, not through the education section of the chart.

Although both interviewed nurse leaders agreed that nurses are expected to document nursing care, there is considerably more documentation associated with EHR-based CPs compared to paper-based CPs. For example, what used to be a once per shift signature on paper-based CPs indicating whether a patient was or was not progressing according to pathway goals, is now an extensive care plan within EHR-based CPs. In this, the nurse must document progression of each surgery-specific goal and how the nurse has addressed the goal. Due to the higher burden associated with documentation in EHR-based CPs, Nurse Leader 2 described that some random audits have shown that nurses do not complete all required documentation. Specifically, Nurse Leader 2 described that during the EHR building phase,

[We were] more hopeful that pathways and education would be more part of the nurses' workload, but given the amount of documentation required with [EHR] in different places, when people start to cut down, those are the first two they choose not to do.

(Interview 1)

The reasons why pathways and education would be the first documentation components to be disregarded by nurses was not speculated on by the interviewed nurse leaders. It is possible that nurses believe this information is the least important to document on when time is constrained. Nurse Leader 2 noted that feedback they have received from clinical nurses is that there is a lot

of duplicate documentation within EHR-based CPs, with nurses remarking that “[i]f I’m going to document some of this, I’m going to do in the flowsheet, not in the care plan” (Interview 2).

A notable responsibility change that occurred when CPs were integrated into the EHR was the profession taking main responsibility for CPs. In the United States, where the EHR software originated, CPs are physician driven. However, at the case organization, paper CPs were nurse driven. Nurse Leader 2 described how the appearance of orders within paper CPs made them nurse led:

[Orders for care such as dressing changes were] just embedded into the pathway document, the paper book. And so [CPs were] very nurse led. The physician group that approved the pathway usually knew all the content, but I would risk to say that the Joe physician or Joe resident who was ordering the pathway, had no idea what was on page four of the pathway, that the nurse was going to be changing the dressing on day four or something like that, you know?” (Interview 2).

Essentially, nurses followed the path laid out for the patient in the paper CP until the CP was completed, “unless the patient got sick, and the physician purposely wrote an order to override something in the pathway” (Nurse Leader 2, Interview 2).

Now that the CP is within the EHR, Nurse Leader 2 described that “the orders now drive [CPs], which means physicians might change [CPs]” (Interview 2). Basically, because EHR-based CPs depend on physician orders to guide care, the switch to the EHR meant “flipping the responsibility” (Nurse Leader 2, Interview 1) for CPs from nurses to physicians. This represented a difficult switch because “physicians are never going to take out the amount of work that nurses had put into [CPs]” (Nurse Leader 2, Interview 1). To elaborate, Nurse Leader 2 is noting that the knowledge and expertise that nurses had on the paper CPs differed from that of physicians.

Furthermore, when physicians are able to modify CP-specific orders, “the thing we’ve lost the most is the standardization. Because with the flick of a, the click of a button you lose the order or the whatever that was standardized” (Nurse Leader 2, Interview 2). Although altering CP-specific orders can be necessary based on the status of the patient, an overall loss of standardization becomes a concern because standardization of care across hospitals was the original reason for development of CPs.

Educating Nurses to Use Clinical Pathways

Nursing orientation at the case organization consists of several days of corporate orientation to the organization, followed by four hours of EHR training, several days of area-specific in-class training (e.g., inpatient medical/surgical care), and one day of unit-specific in-class training. Following the in-class portions, the newly hired nurse receives a few weeks of shifts where they are paired with a nurse on the unit to consolidate knowledge and skills before working independently. Nurse Leader 1 described this orientation period as short, with lots of information for the newly hired nurses to absorb, described as “information overload” (Interview 2). Nurse Leader 1 elaborated by stating that because of the large amounts of orientation content newly hired nurses are required to process, “I know when I’m doing my orientation... overall they’re only gonna absorb about 10% of that” (Interview 1). Nurse Leader 1 noted that it is specifically challenging for nurses to gain competence in using the EHR with only four hours of EHR training. Regarding CPs within the EHR, Nurse Leader 1 stated:

The issue ends up being where to locate stuff. So, like I don't think they always realize like, oh OK, like there's a pathway. Then you have to also look for education and in your care planning activity. I think sometimes like that gets a little lost in the shuffle (Interview 1).

Extra unit-specific training is provided by Nurse Leader 1 to reinforce important aspects of the EHR:

I basically have, like, a patient education document I can provide them with. I go through like where to like, how to build it in [EHR]. I have like a little [EHR] session I put in my unit specific orientation, like this is how you add an education point. Like if you have this patient, you might have to add like [teaching points] and then I kind of show them how to do it. We also have like a little [EHR] checklist that they can go ahead and go through and be like, OK, have I added a task or have I added like, a point for like care planning? Have I added like, a point for education? Now that's if they have like, capability of doing that. Right, so I've done the initial intro of like showing them in [EHR] where to put that stuff and where to find it, um, and what the expectations are for patient education, um. But, I gotta be honest. That's pretty much the extent of [EHR teaching] ... it's really tight, the amount of time you have to actually like teach those, those new hires, and to actually like, and for them to consolidate that information within like, 8 buddy shifts (Interview 1).

Nurse Leader 1 noted that defining expectations is a large part of unit-specific orientation now that paper CPs no longer exist. During orientation, newly hired nurses receive “nothing specifically related to clinical pathways in and of themselves. [Training is] more specifically related to like the surgery I’m teaching them about” (Nurse Leader 1, Interview 1). They elaborated as such:

[T]he way [CPs are] communicated has gotten more complicated. Which means it's that much more important to reinforce with your orientation what the expectations are... I definitely focus on my [complex surgeries] and the care that's associated with them, and

what some of the standards and outcomes would be; what the patient education required would be” (Nurse Leader 1, Interview 2).

Compared to paper CPs, in the EHR “there’s a higher risk of something being missed, whereas before everybody was on even keel, even if they didn’t get that initial education” (Nurse Leader 1, Interview 2). Paper CPs put all nurses on even keel because they detailed the expectations for care and education. Now that CPs are spread out in the chart and may not have education or care planning components built in (as is the case with order sets), all nurses regardless of their area of expertise do not have the same level of knowledge; they are no longer on even keel.

Although CPs as a whole are no longer taught as part of orientation, Nurse Leader 1 stated that they do provide some teaching during orientation on the care plans. Care plans are applicable to all patients, and it is important for newly hired nurses to know how to properly fill them out so they are useful, i.e., focusing on goals that the patient is not progressing towards. It has been previously noted in this chapter that care plans are not well used by nurses and are not useful to other disciplines, so reinforcing their proper use hopefully assists in developing more meaningful use of the care plans. Overall, with the switch to the EHR, Nurse Leader 1 noted that they do “change orientation content to try to fill in the gaps” (Interview 2) left by the absence of paper CPs.

Summary of Findings

The process of transferring paper CPs into the EHR was difficult due to the incompatibility between how CPs operated in the United States-based EHR and how they needed to operate within the case organization. In the rebuild process, a cohesive paper CP document became a care plan, a patient education component, and a set of orders within the EHR. Each of the three components of the new EHR-based CP experienced challenges. Care plans are critiqued

as being too vague when compared to the expectations set out by the paper CPs, and they are not being used in a useful way by nurses. Next, patient education is not built into all CPs that were transferred into the EHR, as some CPs were reduced to just a physician's order set. With unclear expectations for patient education, the quality and amount of education that patients receive can differ depending on the individual delivering the education. Finally, there are many orders that, in the EHR, are no longer separated into post-operative day as they were on paper. Anecdotal nursing input indicates that separating the orders by post-operative day was easier to follow than how in the EHR, all active orders appear together. Overall, EHR-based CPs are not as clear as their paper-based counterparts, and represent a larger documentation burden for nursing staff, despite the fact that EHR-based CPs now seem to be more physician-led than the paper CPs were. To adequately educate newly hired nurses on CP use, changes have been made to orientation content, and surgery-specific teaching has become the norm over pathway-specific teaching. The implications of these findings will be discussed in the next chapter.

Chapter 5: Discussion

This chapter begins with a synopsis of the previous chapters. I will then discuss my own position in working with CPs to practice reflexivity. Next, I will discuss the role of nursing leaders in relation to CPs; specifically, the development of CPs and the transition of CPs from paper to the EHR. Implications of the findings of the current study will then be discussed. Implications include the impact of CPs on agency, as well as the cultural appropriateness of tools- in this case, the EHR. Finally, limitations and directions for future research will be explored.

Summary of Previous Chapters

CPs and EHRs have both been shown to increase the quality and efficiency of health care. CPs are complex, multidisciplinary care plans that outline the trajectory for specific patients receiving health care. As the transition from paper to electronic documentation occurs, with EHR implementation taking place across health care settings, CPs are also transitioned into EHRs, representing a substantial and often stressful change to the way care provision is communicated and actualized. Nurse leaders are in an ideal position to facilitate organizational change as they act as a link between individuals and organizations, and can motivate nurses to engage with new charting methods. This current study has investigated how nurse leaders perceive the transition from paper-based to EHR-based CPs.

The themes uncovered in this study have been described in detail in the previous chapter. Based on the identified themes, as well as the study as a whole, implications of this research will now be discussed, as well as directions for future research. However, first I will describe my own position in relation to the findings of the research.

Personal Experience in Working with Clinical Pathways and Reflection on the Research Study

I have worked as an RN for over four years, and have recently spent time in a nursing leadership role. In my experience, paper CPs were easy to use and follow. After transitioning to the EHR, CPs appear scattered and unclear. Completing interviews with nurse leaders was interesting in that it allowed me to learn about how complicated the CPs had been to integrate into the EHR and how they had to be completely rebuilt. I was personally unaware of the challenges that the EHR build team faced when trying to integrate CPs into the EHR.

In my own experience of EHR implementation, I can recall that my focus was on learning how to operate the EHR as a whole. I can clearly remember the EHR implementation process described by Johnson and Ehrenfeld (2017): several months of supported care provision as the system was first navigated by health care providers in the go-live phase, followed by the stabilization phase as the EHR became the new normal. Currently, the priority regarding the EHR is workflow optimization. During EHR implementation, as I was comfortable providing CP-based care, and knowledgeable in the trajectory of CPs seen on my unit, they had become almost second nature: I did not have to look at a pathway's content to see what was expected of myself or my patient on specific days. In my own practice, I wondered how nurses with less experience than myself were coping with the change in format of CPs, and if nurses with less experience could gain the same amount of knowledge regarding specific patient trajectories from EHR-based CPs as I had gained from paper-based CPs.

Personally, the challenges I faced in the transition to the EHR revolved around having to perform tasks that I had not previously had to perform. For example, whereas medications used to be verified visually by the administering nurse, in the EHR all medications are barcode

scanned in addition to verified visually. Similarly, a daily assessment flowsheet that used to span two double-sided sheets of paper, in the EHR is a much more in-depth flowsheet with multiple sections and pages that must be completed to keep an accurate record of care. These seemingly minor changes in documentation were difficult to adjust to.

Overall, information shared with both nursing leaders resonates with my experience as a clinical nurse. Although no clinical nurses participated in this research, the nurse leaders' perceptions on the transition of CPs into the EHR were similar to my own perceptions. Throughout the literature review and data collection procedures of this study, my perceptions have not changed, although I have learned more about how pathways ended up as they are. It is helpful to know that nurse leaders recognize the trouble that nurses have navigating CPs within the EHR, and that there are plans to optimize these workflows.

The Role of Nursing Leaders in Relation to Clinical Pathways

The role of nursing leaders in the context of CPs was identified as a literature gap in Chapter 2. The interviewed nurse leaders held different roles within the organization, and thus interacted with pathways in different ways. Both nurse leaders had a part in CP creation and/or revision, as well as in trying to make CPs work in the EHR. Nurse Leader 1 had a prominent role in teaching front line nurses about CPs, both pre- and post-EHR implementation. Nurse Leader 2 had a key role in the build and transition of CPs into the EHR. These roles will now be discussed in further detail.

Nurse Leader 2 assisted in the coordination and facilitation of CP creation and revision. Nurse Leader 2's role in CP creation echoes the process that Flores et al. (2019) outline when implementing evidence based CPs. Once a need has been identified, a model is created, which Nurse Leader 2 described as a "skeleton" (Interview 1). Nurse Leader 2, like Flores et al. (2019),

also describes stakeholders within the CP team: “[t]he pathways are interprofessional so the team had to include any interprofessional that was being described. So if it said that you were going to consult PT (physiotherapy), then PT had to be there [during pathway development]” (Interview 1). Nurse Leader 2’s role description surrounding CP development also closely matches the beginning steps of Graham et al.’s (2006) Knowledge to Action Framework. In this framework, a problem is identified and knowledge reviewed and adapted to the context of the problem, barriers to knowledge use are identified, and then the intervention is implemented (Graham et al., 2006).

As Graham et al.’s (2006) Knowledge to Action cycle continues, Nurse Leader 1’s role in relation to CPs becomes apparent. Nurse Leader 1 played an important role in knowledge review and adaptation. At the case organization, knowledge review included research into how similar centres cared for equivalent patient populations as well as into best practices. This review occurred every three years as part of CP revision when CPs were paper-based (Nurse Leader 1, Interview 1). Next, adaptation involved examining feasibility of the desired interventions based on nursing workload and unit flow (Nurse Leader 1, Interview 1). Once an intervention has been implemented, its use needs to be monitored, evaluated, and sustained (Graham et al., 2006). As a clinical workflow expert (C. Edwards, 2012) and a clinical champion on CPs relevant to their area, Nurse Leader 1 has an active role in monitoring CP use. Monitoring is completed in several ways. First, Nurse Leader 1 acts as a point of contact if nurses are unsure about CP-based care. Nurse Leader 1 has noted that since the EHR was launched, some knowledge gaps remain. For example, when patient teaching is completed, although the nurse may understand which items to teach, documentation in the EHR becomes the issue: “the actual action in [EHR] of how to [add a teaching point]? No, they don’t really know, and so they’ll come and see me” (Nurse Leader 1,

Interview 1). In this example, Nurse Leader 1 has described that a barrier to proper EHR use is that the EHR is not intuitive, not necessarily that nurses lack knowledge. By acting as a trusted point of contact and EHR expert, Nurse Leader 1 helps to uphold standards of documentation, which C. Edwards (2012) and Søndergaard et al. (2017) have noted as an important role for leaders in general EHR implementation. Nurse Leader 1 also monitors CP use by teaching new nurses how to use CPs. In this way, they are monitoring the type of knowledge new nurses receive on CPs, to ensure it is correct and appropriate. Socialization to CPs helps to break down barriers that would prevent CP use, such as a lack of knowledge of what a CP is or how to use it. Adequate training on CPs has been noted by several authors to be crucial to effective CP use (Cohen & Gooberman-Hill, 2019; K. Collins et al., 2016; MacLean et al., 2008). Nurse Leader 1 is also able to promote the sustaining of CP-related knowledge through monitoring nurses' use of CPs within the case unit; Nurse Leader 2 noted that individuals such as Nurse Leader 1 have completed audits of CP use since CPs launched in the EHR.

Overall, through the conducted interviews with both nurse leaders, it is evident that they have both worked with CPs in ways that should benefit nurses. However, there is still room for increased support surrounding CP use. In Chapter 2, the completed literature review indicated that nurses' needs surrounding CP use are adequate training (Cohen & Gooberman-Hill, 2019; K. Collins et al., 2016; Dahm & Wadensten, 2008; MacLean et al., 2008) and evaluation of CPs (Jakobsson & Wann-Hansson, 2013; Sleeman et al., 2015). Nurse Leader 1 has demonstrated that they maximize the short nursing orientation period to train nurses on relevant aspects of CP use. With EHR implementation, CP training has changed to be more disease/surgery-specific instead of pathway-specific (Nurse Leader 1, Interview 1). Changing the orientation content allows for teaching of order sets as well as CPs, as it does not rely on the CP as the only source

of knowledge. It is unknown how nurses who have participated in orientation at the organization feel about their competence in providing CP-specific care when orientation is not tailored towards CPs. Authors such as Curran (1994) and Jakobsson and Wann-Hansson (2013) have noted the importance of evaluating CPs throughout the implementation process. Although this study did not focus on the implementation of a single CP, a change in format should also require evaluation. Despite the informal evaluations of CP use by both nurse leaders, little input from clinical nurses was sought during the building of CPs into the EHR. This is addressed by Nurse Leader 2, who noted that it was difficult to obtain feedback on the appearance and function of EHR-based CPs when they were being built because no one knew how they would appear in the EHR (Interview 2). Although the COVID-19 pandemic has put EHR optimization on hold, at the end of the data collection period for this study, the organization was in the process of conducting nurse focus groups to discuss needs regarding EHR use as a means of evaluation. This evaluation would include CPs. Several authors have described nurse leaders as being in an ideal position to empower nurses to share their views (Smith, 2015; Stonham et al., 2012; Waneka & Spetz, 2010). By nurses sharing their perspectives on the EHR, through participation in focus groups, improved EHR usability is promoted.

Implications of the Research

Clinical Pathways and Agency

Throughout the findings of this study, the concept of agency emerged as a common thread, weaving through the major themes previously discussed. Briefly, agency is the control that an individual has over their actions and the outcomes of those actions (Moore, 2016). CPs have agency; they provide context and direction to care and therefore hold power. As nurses are the primary navigators of CPs, changes to the format of CPs also affected nursing agency.

Nurses who were familiar with paper pathways can, based on memory, utilize the agency they developed based on use of the paper CPs. It would be logical to assume that, as CPs still technically exist within the organization (although in a different format), nurses with paper CP experience would hold nurses with EHR-based CP experience to the same standard of care. However, as reported in the findings, the challenges encountered with CPs within the EHR would make the previous standard of care difficult to meet.

The discrepancies in nursing agency as a result of the change in CP format are multifaceted. Although nurses experienced with paper CPs are able to draw on that agency even when care expectations in the EHR do not seem as clear cut, the EHR presents other challenges. For example, not knowing the post operative day of a patient affects all nurses' agency in implementing appropriate interventions. Where paper CPs put nurses on "even keel" (Nurse Leader 1, Interview 2) with regards to knowledge and patient expectations, the scattered nature of CP-related data within the EHR undermines agency as it sometimes prevents nurses from seeing the whole picture of a patient. Looking at the various generations that work in clinical nursing roles, novice nurses may be more technologically savvy and have no issue navigating three areas of a chart as a CP. However, these novice nurses may struggle to see the patient trajectory. It is even more difficult to analyze intergenerational differences in agency because it would be unfair to expect the same level of agency from an experienced nurse as from a novice nurse.

Dorothy Orem (2001) thoroughly defines nursing agency within her self care deficit theory. Orem (2001) defines nursing agency as power that is established and grows through various means, including specialized training and exposure to various types of nursing through

supervised clinical practice. Orem (2001) also defines power components of nursing agency; these power components are what enable nurses to have agency. They are listed as follows:

[V]alid and reliable knowledge of all three areas of nursing operation (social, interpersonal, and professional-technologic), intellectual and practical skills specific to the three areas, sustaining motives, willingness to provide nursing, ability to unify different action sequences toward result achievement, consistency in performance of nursing operations, making adjustments in them because of prevailing or emerging conditions, and ability to manage self as the essential professional operative element in nursing practice situations. (Orem, 2001, p. 290)

Based on the definition that Orem (2001) provides for nursing agency, this section will further examine the findings of the study through some of the listed power components of nursing agency.

Valid and Reliable Knowledge, Intellectual, and Practical Skills Specific to all Three Areas of Nursing Operation

Orem (2001) lists the three areas of nursing operation as social, interpersonal, and professional-technologic. Social knowledge encompasses, for example, understanding of cultural and social class norms, and the ability to develop a professional relationship with different groups of individuals (Orem, 2001). Interpersonal knowledge involves the ability to effectively communicate with those young and old; sick and well (Orem, 2001). Finally, professional-technologic knowledge includes knowledge of the nursing process, the effective provision of care, and the confidence to act to preserve a patient's health and wellbeing (Orem, 2001).

Although CPs do not aim to increase social or interpersonal knowledge, both of the interviewed nurse leaders voiced support for the clinical, or technologic knowledge that CPs

provide to clinical nurses. Nurse Leader 2 noted that CPs are particularly helpful for novice/junior nurses, and provide a standardized, reliable knowledge source, so nurses are not using Google, or “doing whatever” (Interview 2). By providing a reliable knowledge source, CPs allow nurses to develop the technological knowledge that is described as an essential component of agency. When CPs existed on paper, nurses were able to develop agency by using the CP to increase their knowledge of the common trajectories of patients on CPs. Now that CPs exist within the EHR, being spread throughout different areas of the chart (i.e., orders, education, care plan sections) makes it difficult to see them as cohesive- this was a criticism noted by Nurse Leader 1. Furthermore, it may then be argued that EHR-based CPs make it more difficult for nurses to familiarize themselves with the care of patients on CPs, and thus more difficult to develop the technologic knowledge component of agency.

Contrarily, the criticism by Nurse Leader 2 that CPs “spoon fed” (Interview 2) nurses takes the opposite position to CPs enabling agency. This comment infers that relying on the CP as the primary knowledge source for the patient’s care can lead to a lack of critical thinking skills, which could also be recognized as a form of technologic knowledge. As EHR-based CPs lack cohesion between their parts, Nurse Leader 1 noted that nursing orientation has been altered to focus more on the surgery, rather than the CP, to fill in some of the holes left by the CP. Knowledge of the patient trajectory allows the nurse to critically think about why some tasks and orders are present for a patient, instead of blindly following a CP.

Ability to Unify Different Action Sequences toward Result Achievement

Paper CPs clearly defined the actions that should lead a patient to their goals. For example, the actions of providing the patient with a clear fluid diet, encouraging small, frequent sips of juice, and enforcing gum chewing three times a day has an ideal outcome of the patient

tolerating a clear fluid diet. Thus, the nurse is able to link the three actions that they are ordered to perform, or encourage the patient to perform, with an end result. In the CP care plan within the EHR, patient goals are listed without defining what it means to meet the goal. Put differently, documenting on the meeting of goals within the EHR-based CP may be more subjective. Also, in the EHR, the orders for a clear fluid diet with frequent sips, as well as for gum chewing, would appear in the Orders section of the chart. A novice nurse may not make the connection that a physician's order for gum chewing is related to the patient's goal of diet tolerance. As the Nurse Leader 1 noted, when CP care is not standardized, "patient care can kind of deviate depending on nursing practice" (Interview 2).

From another perspective, CPs may be seen to hinder a nurse's ability to connect actions with results, as it only presents one trajectory with a defined set of goals. Nursing agency, or power, as described above, results from many different components. A nurse must display different types of knowledge, engage with the nursing process, and continually re-assess their patients to determine if an intervention was successful. If unsuccessful, the nurse then must re-evaluate and try implementing a different intervention. Thus, agency is a multidimensional concept. Although CPs are also multidimensional, managing different symptoms and anatomical systems, they describe a single trajectory that the patient is expected to adhere to. It could be argued that this single trajectory could hinder the nursing process by, once again, reducing opportunities for critical thinking.

Consistency in Performance of Nursing Operations

Standardization of care is described by Nurse Leader 2 as the reason that CPs were originally developed at the case organization. Thus, through CPs, all nurses are, theoretically, able to provide the same level of care to patients. Nurse Leader 1 described the paper CPs as able

to put all nurses “on even keel” (Interview 2) with regards to knowledge and practice. However, in the EHR, with the issues identified earlier in the chapter, nurses can no longer be described as “on even keel” due to the myriad combination of CP-specific and patient-specific orders, unclear care plans, and difficult to document education points. Thus, nurses used to have the same level of agency, or power, to engage in CP-based care. Now, there is a discrepancy in agency between what nurses who worked with paper CPs have, and what nurses who have only worked with the EHR have.

For example, Nurse Leader 1 noted that in the EHR, CP care plans are worded differently than they were on paper, and now appear “less clinical... worded in a way we don’t normally use” (Interview 1). With different care plan wording between the paper and EHR-based CPs, nurses with knowledge of the more in-depth paper CPs will continue to practice by those standards, while nurses who only have knowledge of the EHR-based CPs may not know the exact standards they are being held to at all. Similarly, Nurse Leader 2 stated that nurses had asked for EHR-based CPs to once again be sorted by post-operative day, as the paper-based CPs were. However, nursing leadership has questioned who this would help, as now a few years worth of nursing graduates had never seen a CP laid out according to post-operative day before. It could be argued that changing the format of CPs within the EHR to accommodate more experienced nurses, who have already developed agency related to CP-based care, could potentially widen the agency gap, as it forces novice nurses to learn a new format of the CP that they have struggled to see as a cohesive entity since its introduction to the EHR.

Ability to Manage Self

To have agency, a nurse must be able to manage oneself as a care provider. With paper CPs, this was simple to do, as tasks and goals of care were well-laid out according to post-

operative day. However, in the layout of the EHR-based CPs, elements mentioned by the interviewed nurse leaders, such as long, jumbled lists of orders and absent education topics make it difficult for nurses to manage themselves in the provision of appropriate care. Furthermore, Nurse Leader 2 noted that within the EHR, physicians now take the primary responsibility for CPs, whereas when CPs were on paper, the nurse was responsible for them. A shift in the responsibility for CPs away from the nurse therefore makes it difficult for nurses to manage themselves as the care provider who is still responsible for all documentation within the CP.

The Role of Nursing Leaders in Developing Agency Within EHR-Based Clinical Pathways

A paucity of literature on the intersection of nurse leaders and CPs was identified as a literature gap in Chapter 2. The literature that does exist on these two topics illustrates CPs as governance that cannot be ignored by nurses because they are evidence based (Dent & Tutt, 2014). For example, in Dent and Tutt's (2014) study, CPs are described as a form of control by those in management positions; CPs and nursing managers are both described as having a major focus on efficient care provision. Similarly, Georges and McGuire (2004) suggested that CPs act like a manufacturing assembly line, where the maximum number of products have to be completed with the smallest number of variances. From my own experience, some nursing leadership roles face tremendous pressure each day to discharge patients to free beds for new admissions. The nurse leaders chosen to participate in this study are distanced from evaluations of nursing efficiency and instead play a supportive role in relation to clinical nurses. Thus, the findings from this study may differ from other studies that have examined the intersection of CPs and formal nursing management roles. As the concept of agency became prevalent in the data analysis, nursing leaders' roles in supporting nursing agency related to CPs will now be examined.

From the conducted interviews, nurse leaders have acted in different ways to assist nurses to develop, or maintain, their agency in relation to CPs. Although agency development was not formally discussed in the conducted interviews with the nurse leaders, my engagement with the data brought forward this connection. For example, Nurse Leader 1 noted that they have altered nursing orientation content surrounding CPs since the implementation of the EHR. Specifically, Nurse Leader 1 noted teaching “nothing specifically related to clinical pathways” (Interview 1), but rather teaching expectations for education and care for specific surgeries. In this instance, by not restricting teaching to a single pathway document, nurses are better able to develop knowledge and skills that are essential for agency formation. Furthermore, by teaching what is expected of nurses, nurses can provide consistent care, a necessary component for agency, to a wider variety of populations. For example, instead of teaching that for patients going home on the ileoconduit pathway, you need to teach x, y, and z about the catheter bag, it can be taught that for *any* patient going home with a catheter, you need to teach x, y, and z. This method of teaching according to the surgery and not the CP is in contrast to Clarke's (2005) study, in which it was noted that adequate user education was essential for CP implementation. However, Clarke's (2005) study examined integration of new CPs to an organization, and not a change in format of CPs that already exist within an organization.

Another way in which nurse leaders in this study have assisted in developing agency is by being receptive to nurse feedback. Nurse Leader 2 described that when CPs were being built within the EHR, it was difficult to obtain feedback because the build team did not know how CPs would appear in the EHR (Interview 2). However, to optimize CPs to meet nurses' needs, Nurse Leader 2 noted that it is necessary to find out why nurses are not using the care plans and education portions of CPs optimally (i.e., determining the barriers to use), so that these aspects

can be altered in meaningful ways. By using nurse feedback to guide CP changes, nurses can better document care, and are thus better able to manage themselves, a key component of agency.

The Cultural Appropriateness of Tools

The EHR is, simply put, a tool to aid in the accurate documentation of care. Nurse Leader 1 recalled having to remind case unit staff of this: “remember guys, this is a tool, right? It doesn't replace our brain. It doesn't replace our nursing skill or practice. It's merely a way for us to document effectively for our patients” (Interview 1). As a tool, it can be argued that the EHR itself should be value-neutral, to avoid biasing the type of information documented within it. However, based on the conducted interviews, as well as other research, the EHR does not appear to be neutral.

Nurse Leader 2 described trouble adapting CPs to an American-based EHR while situated within the Canadian health care context. Very briefly, the Canadian health care system is publicly funded; patients are not billed for medically necessary services, rather, provincial or territorial health insurance plans cover such costs (Government of Canada, 2019). Alternately, the United States does not have a national health insurance program (Ridic et al., 2012). Instead, most Americans hold private health insurance through their employers; public health insurance is only available to those in poverty, with disabilities, or who are elderly (Ridic et al., 2012). In both countries, most physicians are reimbursed based on a fee-for-service model (Katz et al., 1992). However, in Canada, the physician bills the province providing the health insurance (Katz et al., 1992), whereas in the United States the physician or hospital may have to liaise with one or more of over a thousand insurance providers, each with different regulations (American Hospital Association, 2019; Katz et al., 1992). Nurse Leader 2 had remarked that differences in billing between Canada and the United States affects EHR functionality:

In the US, everything is physician driven when it comes because [it's] all based on billing, right? So the orders and all of that- like physicians in the US do modify their orders every day. That does not happen here. (Interview 1)

Nurse Leader 2 also noted that “based on the American system like we couldn't make [CPs] work the way that we wanted [CPs] to work” (Interview 1), and that CPs as they appear in the EHR are “not a perfect fix, it's probably not even a great fix, but it really was sort of the only option with the time we had left” (Interview 1). It is evident through Nurse Leader 2's remarks that bringing an American-based EHR to a Canadian health care organization has changed the function of CPs.

Other authors have noted the non-neutrality of the EHR as well. For example, Rozier et al. (2022), in their study on systemic racism in the EHR, noted the following:

EHRs are an example of how values are reproduced, often unknowingly, through sociotechnical structures. EHRs serve many administrative and clinical needs, including capturing data for compliance needs and patient billing. The question is how to balance and prioritize the many goals that EHRs are meant to help achieve. If one goal, such as billing, is predominant, then revenue generation will drive the structure, use, and outcomes associated with the EHR. The system itself indicates to its users what its highest value is; the users are thus habituated to adopt that value as their own. When enough users are habituated to that value, decisions are made to further embed that value in the system. (pp. 136-137)

Thus, an American EHR designed to facilitate billing within the complex American health care setting may have prioritized different needs than those that are relevant in the Canadian health care system. It is evident through Nurse Leader 2's remarks that the context of the EHR has

affected CP functionality. The downstream effects of this choice of EHR, according to Rozier et al. (2022), may be health care providers with undesirable values in the Canadian health care context.

Despite the seemingly problematic use of an American EHR in the Canadian health care system, the case organization's EHR choice is not an isolated incidence. Lougheed (2019) provides reasoning for why Canadian-built EHRs are not common: because American EHRs have controlled the EHR market for many years, they are frequently updated and provide technical support due to high usage rates. Canadian-based EHRs "lack the financial resources to carry out ongoing research and development for their products on the same scale [as American vendors]" (Lougheed, 2019, p. E750). It can be inferred from Lougheed (2019) that it would be difficult for Canadian-based EHRs to catch up and become the norm within Canada.

Limitations and Directions for Future Research

This study took place in 2021, during the COVID-19 pandemic. The main challenge of this study was that no clinical nurses volunteered to participate. Discussion with one of the interviewed nurse leaders assisted in determining reasons for a lack of nurse participants. Nurses have shown increased levels of burnout throughout the duration of the pandemic (Chen et al., 2021; Galanis et al., 2021), which likely led to an unwillingness among case unit nurses to engage in work-related discussions when they were not at work. Furthermore, an interviewed nurse leader noted that the case unit has been experiencing staffing challenges lately. This observation is not isolated and has been noticed worldwide (International Council of Nurses, 2021). Staffing challenges have also been shown to exacerbate burnout (Nantsupawat et al., 2017). Furthermore, patients that have presented to hospital during the pandemic are of higher

acuity- this has been demonstrated by some authors (Lyall & Lone, 2021) and has been noticed in my personal clinical experience as well.

As no clinical nurses participated in this study, future research could focus on nurses' perceptions of CPs within the EHR. Examining the integration of CPs within the EHR during an organizational shift to an EHR was defined as a research gap during the literature review that informed this study (Chapter 2). On the topic of agency, it would be interesting to look at how nurses with different levels of experience perceive CPs and if the switch from paper documentation to an EHR has affected nurses' perceptions of their ability to provide appropriate CP-based care. To objectify nursing experience, a theoretical framework such as Benner's (1984) Novice to Expert theory may be useful. Benner (1984) describes how nurses possess both practical "knowing how" (p. 2) and theoretical "knowing that" (p. 2) knowledge. Benner (1984) acknowledges that some nursing skills, that is, practical knowledge, is gained without knowledge of the theory underlying such practice. It is experience that enables a nurse to gain practical knowledge; thus, experience precedes expertise (Benner, 1984). Benner's (1984) theory is based on the Dreyfus model of skill acquisition, which states that in the attainment of a skill, an individual will progress through five levels of competence: "novice, advanced beginner, competent, proficient, and expert" (p. 13). Each level of competence is associated with different ways in which nurses' practice is guided (e.g., a novice nurse practices according to rigid rules, while proficient and expert nurses practice according to intuition). Benner's theory has been applied in a wide variety of contexts, from nursing student simulation (Thomas & Kellgren, 2017), to new graduate nurse transitions to practice (Murray et al., 2019), to the implementation of practice changes within home care (Larrabee, 1999). By identifying where study participants are situated within the spectrum of novice to expert nurses, their experiences could be studied

based on how Benner (1984) defines nursing practice for an individual with a certain amount of experience.

Another limitation of this study is the small sample size of two nurse leaders situated in the same organizational campus, which puts the study at risk of bias. Although triangulation between interviewees and with the CP documents reduces the risk of bias, it is possible that the nurse leaders had similar views that corroborated each other. To look at nursing leadership's interactions with CPs in a broader fashion, a wider variety of nursing leaders from different clinical contexts could help to inform a similar study. Due to the case study design of the current study, this type of broad sampling would not have been appropriate. As CPs are multidisciplinary, future research could also collect data from disciplines other than nursing; for example, physicians, physiotherapists and occupational therapists, pharmacists, and nutritionists.

It has been noted by Jakobsson and Wann-Hansson (2013) and Sleeman et al. (2015) that CP evaluation is critical. When EHRs were paper-based, Nurse Leader 2 noted that they were mostly evaluated based on if CPs were being initiated for CP-appropriate patients. At the case organization, no known instances of CP evaluation within the EHR have taken place. Nurse Leader 2 had noted some informal CP audits within the EHR occurred to alert leaders that care plans and education components were not well used. However, it is unknown if CPs are providing the same level of patient care that they did on paper. An avenue for quality improvement within the organization would be to formally audit CP-specific nursing documentation and patient outcomes to determine if, or how they differ from those of paper-based CPs. Nursing perceptions on quality of care could also be gathered on this subject; such data could help to inform the CP optimization process.

Finally, this study represented a cross-sectional overview of nurse leaders' perspectives approximately three years after EHR implementation. Other studies have shown that attitudes towards EHRs change over time. For example, Brunt et al. (2000) noted that after a change in documentation style, it took almost a year for the new charting to become accepted by health care professionals. Nurse Leader 2 also noted, on the topic of accepting the layout of CPs within the EHR, "[w]e...wanted to give it some time to see if people's mindset could change into seeing it this way" (Interview 2). Thus, it would be interesting to look at nurses' and nurse leaders' perceptions on EHR implementation in a more longitudinal fashion: pre-EHR, immediately post-EHR launch, and then at one, five and ten years post-implementation.

Conclusion

This research has shed light on nurse leaders' perceptions of the transition of CPs from a paper-based format to an EHR-based format. Overall, this study has realized its aims of understanding the process of CP development and integration into the EHR, as well as how this change has affected the nursing role. Specifically, nursing agency was a common feature throughout the conducted interviews. CPs hold agency, as do nurses, and a change in CP format has consequently changed nursing agency, and thus nursing roles and responsibilities, related to CPs. Orem's (2001) self care deficit theory provides a concrete definition of agency, which was used to examine the findings. Although paper CPs helped nurses gain agency through self-management of care, EHR-based CPs are spread throughout the chart, making CP-based care more difficult to manage as well as to differentiate from other ordered aspects of care. Alternately, it could be argued that by offering a single trajectory for all patients, both paper and EHR-based CPs reduce nursing agency by dampening opportunities for critical thinking and

knowledge growth. This research also adds to the knowledge base of the role of nurse leaders in the development and maintenance of agency.

The final aim of this study was to identify facilitators and barriers to CP use in nursing practice. Facilitators include, for example, adequate training on CP use. Nurse Leader 1 described how when the format of CPs was changed, training related to their use also changed. Barriers included the layout of the CP within the EHR, as well as the contextual background of the EHR. Specifically, the development of the EHR in the United States of America, which has a different health care system than Canada, acts as a barrier to adequate CP use. Difficulties in altering this EHR to suit Canadian providers' needs were evident from interviews with Nurse Leader 2. Although few Canadian EHRs exist, Canadian organizations using American EHRs should be wary of underlying biases and values of such EHRs to ensure that they do not affect quality of care.

Future research is merited to explore frontline nurses' perceptions on CPs within the EHR, gathering perceptions from a wider group of health care leaders, and gathering data on EHR implementation in a more longitudinal fashion.

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Appendix A: Interview Guides for Nurse Leaders⁵

Part I: Interview Topic Guide for Nurse Leader 1, Interview 1

A) Demographic Data

1. How many years have you worked in your current role?
2. What was your area of practice prior to working in your current role?
3. What is your highest level of nursing education?
4. Have you obtained CNA or other certification? Is it currently valid?
5. Were you working on (case unit) when the EHR was launched at this hospital?
6. How long have you worked at this organization?
7. Have you worked at other hospitals?
8. What is the registered nurse demographic on your unit? (Total RN staff; number of staff who are full-time/part-time)

B) Subjective Data

1. What type of training do newly hired nurses receive on CPs before starting work on the unit?
2. Are CPs something that nurses often come to you for assistance with?
3. What type of questions or concerns are you usually asked about CPs? Which CPs spark the most questions?
4. Do you feel that, based on your observations of the unit as a whole, care is adequately provided according to the guidelines from CPs? For example, if you are present on discharge rounds and you are hearing a report on the progress of a patient on a CP, is care

⁵ Some aspects of the interview guides have been edited to maintain participant confidentiality.

adequately based on the CP? Such as, are the appropriate allied health professionals consulted in a timely manner? Does pathway compliance seem to be at all related to the amount of experience a nurse has?

5. Do you feel that the CPs in use on your unit are representative of a multidisciplinary approach?
6. How do you perceive the layout of CPs within the EHR? Are there any specific positive or negative aspects of this layout that you can describe?
7. Do you feel that, since initiation of the EHR, concerns regarding CPs have increased or decreased? This could include orders specific to CPs or the trajectory of the pathway in general.
8. Have you worked with CPs in other organizations?
9. Were you involved in the creation of the CPs in use on your unit?
10. Do you have any other concerns or remarks regarding your perceptions of nurses' use of CPs within the EHR that I have not covered?

Part II: Interview Topic Guide for Nurse Leader 1, Interview 2

1. Some of the challenges you voiced previously include the challenges of education components not being built properly into the EHR, as well as the lack of value in the care plan. Are there any other challenges that you see, clinical pathway-wise, as [job title]?
 - a) Do these challenges prevent nurses from providing care according to CPs? Or is it possible that nurses may not realize they are not providing CP-specific care because of how spread out across the chart all the components are?
 - b) Are there any other challenges that may prevent nurses from providing CP-based care?

- c) Can you think of, or have nurses suggested to you, any ways to improve, or facilitate CP use on the unit?
 - d) Have nurses ever provided you feedback or vented frustrations to you about EHR-based CPs?
2. Since the EHR was launched, do you see any difference in the outcomes of patients on CPs?
 3. Overall, are there any practice issues that have arisen since the transition to the EHR that may not have existed when the paper chart was in use?
 4. Do you think that the responsibilities of the nurse in terms of caring for a patient on a CP have increased, decreased, or remained stagnant in the switch to the EHR? What leads you to think this?
 5. In our last meeting you mentioned that new nurses to the unit do not get CP-specific teaching, rather they get teaching specific to the unit's surgeries. Was this always the case? Have there been changes in the way surgery and pathway education have been delivered since the switch to the EHR?
 6. As nurse turnover occurs, and new nurses are brought onto the unit while more experienced nurses leave, do you think the expertise of the unit decreases? Or are competent nurses willing and able to step up into the role of expert, to act as a guide and mentor when helping new staff to navigate complex surgeries and teaching expectations?

Part III: Interview Topic Guide for Nurse Leader 2, Interview 1

A) Demographic Data

1. How many years have you worked in your current role?
2. Can you describe your nursing background before you came into your current role?

B) Subjective Data

1. What drew you towards working with CPs?
2. Can you describe your role?
3. Can you describe the biggest concerns that were brought to your attention regarding clinical pathway use when CPs were paper-based?
4. One defining factor of CPs is that they are multidisciplinary. Do you feel that the organization's CPs reflect this pre- and post-EHR implementation?
5. What are the biggest concerns now that CPs are incorporated within the EHR?
6. Did you have a part in designing how CPs would appear on the EHR? Do you feel like the pathways are adequately integrated or is there room for improvement?
7. What were some of the challenges of incorporating CPs within the EHR?
8. How has the creation of new/revised CPs changed since they have been integrated into the EHR? Who monitors their use?

Part IV: Interview Topic Guide for Nurse Leader 2, Interview 2

1. In our previous interview you discussed that the way CPs appear in the EHR was a "best we could do" or a "best of the worst" scenario. When the decision was made to switch to an EHR, were options other than the current EHR tested? Did any of these other possible options have a better CP "function"? If so, what made it better?
2. Do we have any formal ways to evaluate CP use, ease of use, compliance, any data on this? What data might be useful to look at?

3. Can you explain a little bit around the process of transitioning these CPs to an online format? What were the processes like, the timeframes? What type of a team (i.e., disciplines) helped to put these CPs online?
4. When the decision to transition to the current EHR was made, who decided what stayed a CP versus what became an order set? Is it part of optimization that order sets could possibly transition back to CPs, so those education and care plan components are more surgery specific?
5. Do you think that the responsibilities of the nurse in terms of caring for a patient on a CP have increased, decreased, or remained stagnant in the switch to the EHR? What leads you to think this?
 - a) Were there any nursing related challenges anticipated? How were frontline nurses involved in the planning?
6. In our last interview we talked a little bit about the optimization process. Can you tell me what this might entail and how it might help to facilitate CP-specific nursing practice? What about the workflow right now could act as a barrier to nursing practice?

Appendix B: University of Ottawa Research Ethics Board Approval Certificate

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

11/08/2021

Lettre d'approbation administrative | Letter of administrative approval

Numéro de dossier / Ethics File Number	H-08-21-7317
Titre du projet / Project Title	Nurse Perceptions of Clinical Pathway Use Pre and Post Transition to an Electronic Health Record
Type de projet / Project Type	Thèse de maîtrise / Master's thesis
CÉR primaire / Primary REB	<div style="border: 1px solid black; width: 100%; height: 20px;"></div>
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	11/08/2021
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	05/08/2022

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Alison HARPER	École des sciences infirmières / School of Nursing	Chercheur Principal / Principal Investigator
Brandi VANDERSPANK	École des sciences infirmières / School of Nursing	Superviseur / Supervisor

Conditions spéciales ou commentaires / Special conditions or comments:

REB Protocol ID: 20210438-01H

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11/08/2021

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

University of Ottawa

Office of Research Ethics and Integrity

L'Université d'Ottawa a signé une Entente, conforme aux exigences de la plus récente version de l'EPTC et tout autre règlement ou législation applicable, permettant au CÉR ci-haut nommé d'être désigné comme CÉR primaire pour les projets de recherche où

1) les activités principales de recherche sont menées sous l'autorité ou sous les auspices de l'établissement lié au CÉR primaire et

2) Une partie du projet est également réalisé sous l'autorité ou sous les auspices de l'Université d'Ottawa.

Cette lettre confirme que l'Université d'Ottawa a autorisé que le CÉR primaire soit le CÉR officiel pour l'évaluation et la supervision de ce projet de recherche. Ceci n'est pas une approbation éthique.

Afin de nous aider à garder votre dossier à jour, veuillez soumettre une copie de toutes demandes de modification, renouvellement d'approbation éthique etc. soumis à et approuvé par le CÉR primaire dès qu'elles sont disponibles.

Cette approbation administrative est valide pour la durée indiquée ci-haut et est sujette aux conditions énumérées dans la section intitulée « Conditions spéciales ou commentaires ».

The University of Ottawa has signed an Agreement, compliant with current TCPS guidelines and any other applicable guidelines or legislation regarding multisite review, allowing the REB named above to serve as Board of Record (BoR) for research projects where

1) the main research activities are conducted within the auspices or jurisdiction of the BoR's institution and

2) parts of the project are also conducted under the jurisdiction or auspices of the University of Ottawa.

This letter confirms that the University of Ottawa has authorized the REB named above to serve as Board of Record for the review and oversight of this research project. This is not an REB approval.

In order to help us keep your file up to date, please submit a copy of all amendment requests, project renewals or any other changes submitted to and approved by the BoR, as they become available.

Administrative approval is valid for the period indicated above and is subject to the conditions listed in the section entitled «Special conditions or comments».

Catherine PAQUET

Directeur / Director

Pour/For **Daniel LAGAREC** Président(e) du/ Chair of the **Comité d'éthique de la recherche en sciences de la santé et sciences / Health Sciences and Sciences Research Ethics Board**

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Appendix C: Informed Consent Form for Participation in a Research Study*

Study Title: Nurse Perceptions of Clinical Pathway Use Pre and Post Transition to an Electronic Health Record

******-REB Number:** #20210438-01H

Primary Researcher:

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Research Supervisor:

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INTRODUCTION

You are being invited to participate in a research study. You are invited to participate in this study because you are currently employed on an acute care unit within a tertiary care hospital and have experience in caring for patients on clinical pathways. This consent form provides you with information to help you make an informed choice. Please read this document carefully and ask any questions you may have. All your questions should be answered to your satisfaction before you decide whether to participate in this research study.

Taking part in this study is voluntary. You have the option to not participate at all or you may choose to leave the study at any time. The decision to participate or not to participate will not affect your employment.

IS THERE A CONFLICT OF INTEREST?

There are no conflicts of interest to declare related to this study.

WHAT IS THE BACKGROUND INFORMATION FOR THIS STUDY?

[Organization] moved to an electronic health record in 2019. The purpose of the study is to understand acute care registered nurses' experiences in using clinical pathways within the electronic health record both pre- and post after transition to an electronic health record (i.e., from paper-based pathways to pathways integrated into [EHR]). The aims of the study are to determine how nurses perceive the use of clinical pathways within the electronic health record, if there is a difference in knowledge of clinical pathways on the range of nursing experience; and if there are additional factors that promote or discourage clinical pathway use in nursing practice.

WHY IS THIS STUDY BEING DONE?

The purpose of the study is to understand acute care registered nurses' experiences in using clinical pathways within the electronic health record after transitioning from paper charting methods. The aims of the study are to determine how nurses perceive the use of clinical pathways within the electronic health record, if there is a difference in knowledge of clinical pathways on the range of nursing experience; and if there are additional factors that promote or

discourage clinical pathway use in nursing practice. Having an in-depth understanding of this aspect of nursing practice is helpful in informing educational and practical needs of nurses who regularly care for patients on clinical pathways.

HOW MANY PEOPLE WILL TAKE PART IN THIS STUDY?

It is anticipated that about 10 to 12 registered nurses will take part in this study.

WHAT WILL HAPPEN DURING THIS STUDY?

Your participation in this study will consist of participating in one interview (either in person, if permitted or virtually via Microsoft Teams) lasting approximately 30- to 45-minute-long interview. In this interview you will be asked to provide some demographic data regarding your level of nursing experience, as well as describing your experiences in working with clinical pathways on an acute care surgical unit in a tertiary care hospital. The sessions will be scheduled for a date and time that is most convenient for you. At a later time (approximately 3 months after your interview) will also be asked to verify interpretations made by the primary researcher to ensure that the data analysis accurately portrays your experiences. This will consist of reading a 1-to-2-page summary of the findings and providing your feedback via email. Your anticipated time to participate in this study is 1.5hours.

WHAT ARE THE RESPONSIBILITIES OF STUDY PARTICIPANTS?

If you choose to participate in this study, you will be expected to:

- Attend a one-on-one interview with the primary researcher and be willing to describe your experiences in working with clinical pathways.
- Assist in verifying the interpretations of your data by the primary researcher.

CAN PARTICIPANTS CHOOSE TO LEAVE THE STUDY?

You can choose to end your participation in this research (called withdrawal) at any time without having to provide a reason. If you choose to withdraw from the study, you are encouraged to contact the primary researcher.

You may withdraw your permission to use information that was collected about you for this study at any time by letting the primary researcher know. You may choose whether the primary researcher may use data collected from you before your choice to withdraw from the study.

WHAT ARE THE RISKS OR HARMS OF PARTICIPATING IN THIS STUDY?

Your participation in this study will entail that you volunteer personal information, and this may cause me to feel emotional, psychological, or social distress. You will receive assurance from the researcher that every effort will be made to minimize these risks. Steps taken to minimize these risks include the maintenance of participant privacy (colleagues or peers will not be aware of your participation in this study) and confidentiality (the experiences you describe will be anonymized to the best of the researcher's ability).

WHAT ARE THE BENEFITS OF PARTICIPATING IN THIS STUDY?

Your participation in this study will benefit new nurses by identifying the knowledge needs

required to work effectively with clinical pathways within the electronic health record.

HOW WILL PARTICIPANT INFORMATION BE KEPT CONFIDENTIAL?

If you decide to participate in this study, the primary researcher will only collect the information they need for this study.

Records identifying you (this consent form) will be kept confidential and, to the extent permitted by the applicable laws, will not be disclosed or made publicly available, except as described in this consent document.

Authorized representatives of the following organizations may look at your original (identifiable) study records at the site where these records are held, to check that the information collected for the study is correct and follows proper laws and guidelines.

If the results of this study are published, your identity will remain confidential.

Your de-identified data from this study may be used for other research purposes. If your study data is shared with other researchers, information that links your study data directly to you will not be shared.

Even though the likelihood that someone may identify you from the study data is very small, it can never be completely eliminated.

WHAT ARE THE RIGHTS OF PARTICIPANTS IN A RESEARCH STUDY?

You will be told, in a timely manner, about new information that may be relevant to your willingness to stay in this study.

You have the right to be informed of the results of this study once the entire study is complete.

Your rights to privacy are legally protected by federal and provincial laws that require safeguards to ensure that your privacy is respected.

You will be given a copy of this signed and dated consent form prior to participating in this study.

WHOM DO PARTICIPANTS CONTACT FOR QUESTIONS?

If you have questions about taking part in this study, or if you suffer a research-related injury, you can talk to:

Alison Harper
Principal Investigator Name

(XXX) xxx-xxxx
Telephone

If you have questions about your rights as a participant or about ethical issues related to this study, you can talk to someone who is not involved in the study at all. Please contact ***** Research Ethics Board, Chairperson at ***-***-**** extension *****.

Study Title: Nurse Perceptions of Clinical Pathway Use Pre and Post Transition to an Electronic Health Record

SIGNATURES

- All my questions have been answered,
- I understand the information within this informed consent form,
- I do not give up any of my legal rights by signing this consent form,
- I agree to take part in this study.

Signature of Participant

Printed Name

Date

Signature of Person Conducting
the Consent Discussion

Printed Name and Role

Date

*This consent form has been adapted from the consent form template available from the ****
Research Ethics Board at [website].

Appendix D

Table 1: Paper vs. EHR-Based Neobladder CP Comparison

Paper versus EHR Neobladder CP		
	How are they similar?	How are they different?
Quick Facts	<p>Presence of nurse, physician, social work, and home care as involved disciplines.</p> <p>Same estimated length of stay.</p> <p>Similar education topics: e.g., deep breathing and coughing, pain management, care of neobladder.</p>	<p>Many more individual orders in the paper pathway as the same interventions are ordered on different days (e.g., VS frequency, activity orders, diet orders), as opposed to the EHR CP where the same order can be applied with a frequency of “daily”.</p> <p>Education topics: paper CP topics are more specific to the neobladder surgery, while most of the topics within the EHR CP could be applied to a wide variety of surgeries as they are broad (e.g., diet, wound care).</p> <p>Potential for more allied health consults in EHR CP, although all of these consults would likely not always be relevant (e.g., would not need diabetes educator involvement if patient is not diabetic).</p>
Physician Orders	<p>Actual order content remains the same- e.g., dressing care, IV rate and orders to saline lock, BW orders, etc.</p>	<p>Paper CP has a <i>Pre-Admission</i> section and a <i>Day of Surgery Pre-Op</i> section- EHR CP does not.</p> <p>Paper orders do not address code status.</p> <p>PACU orders: in paper CP, PACU has its own page of orders: <i>Day of Surgery/Post-op/Post-Anesthetic Care Unit (PACU)</i>. In EHR, most orders apply to both the PACU and inpatient unit locations. Therefore, PACU has a wider range of orders to follow in the EHR-based CP, instead of just their designated page. However, PACU would likely not implement a wide range of the orders in the EHR-based CP despite them being ordered for PACU and On Unit- e.g., “Remove dressing POD X”, as patient likely not in PACU for this extended time period.</p> <p>Diet orders: paper pathway encourages dietary supplements with each meal as of POD2; EHR pathway orders supplements twice daily.</p>

Paper versus EHR Neobladder CP		
	How are they similar?	How are they different?
		<p>EHR CP has conflicting ambulation orders: bed rest for 2 days post-op yet ambulation ordered to start POD1</p> <p>EHR CP includes within the CP the option for many interprofessional consults (e.g., diabetes nurse educator, occupational therapy, physiotherapy, speech language pathology). Paper CP stresses importance of enterostomal therapy nurse, home care services, possibly social work.</p> <p>Orders seen in different sections of the paper chart, e.g., Kardex, CP document, while in the EHR all orders found in the Orders activity.</p> <p>Nowhere to document gum chewing in EHR as there is on the paper pathway.</p>
Patient Education	Broad teaching topics remain the same.	With paper pathways, the nurse is responsible for completing tasks on the post-operative day they are caring for the patient. In EHR, care of the neobladder is one education topic with the tasks for each post-operative day listed, but the days' teaching tasks cannot be individually signed off.
Care Plan	<p>Variance codes are seen in both formats.</p> <p>EHR care plan goals are taken from both the <i>critical path</i> and the <i>patient outcomes</i> sections of the paper CP. E.g., “vital signs stable” is from patient outcomes, while “activity level” is from the critical path.</p> <p>Some components from the paper CP are not seen within the EHR care plan, however they can be covered by the general care plan that all patients are enrolled in, this avoids double documentation.</p>	<p>The EHR has many more variance codes than the paper CP, however the paper CP allows for a “non-tracked variance” where the nurse may circle the portion of the CP that the patient is not following.</p> <p>Variances differ on EHR vs paper CP. None of the same variances are found in the paper vs EHR CPs.</p> <p>Variances within the EHR seem very focused on institutional factors that may prevent a patient from progressing within a CP. For example, <i>bed unavailable</i>.</p>

Table 2: Paper vs. EHR-Based Open Radical Prostatectomy CP Comparison

Paper versus EHR Open Radical Prostatectomy CP		
	How are they similar?	How are they different?
Quick Facts	<p>Same estimated length of stay</p> <p>Physician and nurse involvement.</p>	<p>Paper CP has more than double the number of orders, however this is due to the same interventions being ordered on multiple days as opposed to the EHR CP where one intervention is ordered with a frequency of “daily”.</p> <p>Social work mentioned in paper CP, not in EHR CP</p> <p>Education topics are not surgery specific in EHR as education is not linked to the surgery.</p>
Physician Orders	<p>Actual order content for basic care and assessments, incision and drain care, medications.</p>	<p>Electronic order set has no order to “initiate clinical pathway” as this CP does not exist within the EHR.</p> <p>Paper CP does not address code status.</p> <p>There is an order section in the paper CP for both the pre-admission unit and same day admission/surgical day care unit. These sections are not present in the order set.</p> <p>PACU orders: paper CP orders “VS, assessment, treatment, and teaching per PACU standards of care” but also includes additional orders for activity (bedrest), diet (NPO to sips CF), and parameters for notifying urology of abnormal urine or JP drain output. EHR order set also orders VS, assessments, treatment and teaching per PACU standards of care, but all order set orders are released in PACU as all orders are relevant to PACU and On Unit.</p> <p>Paper CP orders JP drain removal if output less than 50ml in previous 24 hours. EHR CP orders drain removal if output less than 100ml in previous 24 hours- perhaps this was an update in best practice when these orders were uploaded to the EHR.</p>

Paper versus EHR Open Radical Prostatectomy CP		
	How are they similar?	How are they different?
		<p>Paper CP orders that if wound dressing needs to be changed, ongoing orders to change daily and PRN. EHR orders do not specify frequency to change.</p> <p>EHR order set states to monitor urinary catheter drainage Q1H for 24h post-op. Paper CP only orders to assess output Q4H.</p> <p>Discharge instructions: in paper CP, orders to give patient “open radical prostatectomy patient education booklet”. In EHR CP, orders to give patient two education booklets: one on going home with a urinary catheter, another on going home with a drain. EHR CP also orders patients to receive “Surgery Discharge instructions sheet”.</p>
Patient Education	<p>Nurses may not be aware that they should be asking patients whether they have teaching documents and printing them off if not.</p> <p>As patients should have the same education document now as they would have when CPs were paper-based, it can be said education is the same.</p>	<p>As Nurse Leader 2 spoke to, patients do not have pre-admission appointments anymore so that teaching would be different. Plus, as Nurse Leader 1 noted in their interview, it is quite a task to add education points, it is usually documented in the notes, etc. so it is difficult to see how much/in depth a subject has been taught.</p> <p>The paper CP goes over different patient teaching goals each day, whereas the EHR order set does not order any teaching, only 3 different instructional booklets at discharge.</p>
Care Plan	<p>Topics that are the same across both the paper and EHR care plans include adequate pain management, nutrition, patient teaching, and discharge planning.</p>	<p>Only paper CP includes outcomes of adequate respiratory function, wound outcomes, activity tolerance, and elimination.</p> <p>Only electronic care plan includes patient safety and skin integrity.</p>