Perinatal nurses' experience using electronic health records during labour and delivery

by

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BScN, Kwantlen University College, 2005

A Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of

MASTER OF NURSING

in the School of Nursing

University of Victoria

We acknowledge and respect the Lək^{w}əŋən (Songhees and X^{w}sepsəm/Esquimalt) Peoples on whose territory the university stands, and the Lək^{w}əŋən and W̱SÁNEĆ Peoples whose historical relationships with the land continue to this day.

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Abstract

Since the widespread implementation of electronic health records (EHRs) across Canada in the early 2000s, a substantial body of research has explored their impact on patient care and organizational outcomes. However, limited attention has been given to the experiences of perinatal nurses, particularly those providing care during the critical phase of labour and delivery. This represents a significant gap in the literature. The aim of this study was to examine the experiences and challenges faced by perinatal nurses when documenting care for labouring patients using EHR systems. A descriptive qualitative methodology was employed. Eleven perinatal nurses from a large Western Canadian Women's Hospital were recruited to participate in semi-structured interviews, and the data were analyzed thematically. Davina Allen's Translational Mobilization Theory informed the study. Three key themes emerged: 1) the impact of the location of EHR in the physical space, 2) system design impacts EHR utilization, and 3) HER embodies increased regulatory professional obligations. Findings indicate that EHR documentation has significantly influenced nursing practice during labour by shifting nurses' focus from continuous bedside support to increased time spent on digital charting, thereby affecting the quality and consistency of patient-centered care. Nurses continually navigate the competing demands of documentation and direct patient care, often having to prioritize one over the other in real time to meet institutional and professional expectations. The implications to nursing highlight the importance of continual feedback from bedside staff to contribute to optimization of the EHR.

Keywords: Electronic health records, nursing, perinatal, qualitative, Canada, labour and delivery, experience

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List of Abbreviations

Abbreviations	Unabbreviated
ANT	Actor Network Theory
PSBC	Perinatal Services British Columbia
CPOE	Computerized Physician Order Entry
CST	Clinical Systems Transformation
BC	British Columbia
BCWH	British Columbia Women's Hospital
EHR	Electronic Health Record
EMR	Electronic Medical Record
HO	Health Organization
MAR	Medication Administration Record
NICU	Neonatal Intensive Care Unit
SOCG	Society of Obstetricians and Gynecologists of Canada
TMT	Translational Mobilization Theory
WOW	Workstation on wheels
PHSA	Provincial Health Services Authority

Acknowledgements

To my family—thank you for being my constant. Your love, encouragement, and patience have meant everything. To my husband Sean, thank you for standing beside me through every late night, every doubt, and every victory. To my children Liam and Keira, you are my greatest inspiration, and I hope I can inspire you to achieve great things in your life. To my family, thank you for showing me the value of hard work and compassion.

To my faculty advisors, Dr. Vera Caine and Dr. Olga Petrovskaya, thank you for challenging me, guiding me, and believing in my potential. Your passion for nursing and education has left a lasting impression. Time and time again I was left questioning how to get from point A to point B and your calm words and encouragement helped me to believe that this was possible. I tell people all the time that I'm not sure how I got into doing my thesis, but your belief in my research and the questions I had never failed to point me in the right direction. I will truly miss our time together.

To my friends, thank you for the check-ins, coffee breaks, pep talks, and humor. You helped me stay grounded and reminded me to breathe. Thank you for forgiving all the times I didn't show up because I had schoolwork to do and loving me through all these years.

This journey wasn't easy, but it was made possible by the people who never let me forget why I started. This is for all of you—with deep gratitude and love.

Dedication

This work is dedicated to the many perinatal nurses whose hands hold life at its most fragile, and whose hearts carry both the clinical and emotional weight of every birth story. I hope this research can provide a voice to the incredible work you do.

Chapter 1: Situating the Research

Electronic health record (EHR) systems have been available for decades in North America, however in Canada, their widespread use has only been standard since the early 2000s (Boothe, 2020). Since that time, they have been evaluated and researched for their organizational and patient impacts, and not all findings have been positive such as changes to existing workflows and increased cognitive demands on clinicians (Harrison et al., 2007). While the implementation of EHRs in practice across acute care hospitals warrants extensive change management and preparation, it could be argued that implementation within any critical care area, such as the perinatal space, requires even more thoughtful consideration. Moreover, the care of perinatal patients during labour and delivery in British Columbia (BC) is directed by organizations such as Perinatal Services BC (PSBC) and the Society of Obstetricians and Gynecologists of Canada (SOGC) as well as emerging research implemented at teaching hospitals, which adds complexity to the integration of EHR.

There is a notable gap in research relating to the impact of EHRs on nurses within the perinatal context, specifically those caring for patients during the critical phase of labour and delivery. Although there are studies examining the time required for documentation in EHR (Kossman et al., 2013; Chao, 2016), as well as studies focused on the mental load required to switch between EHR applications and patient care (Colligan et al., 2015; Wiesner et al., 2021), few studies focus on how they are impacted by the implementation of electronic documentation (Chao & Goldbort, 2012).

Nurse focused research continues to be significantly underrepresented as much of the studies relating to EHRs does not always differentiate between nurses and other clinicians as research participants (Chao, 2016). As well, other studies focused on the patient experience as

the primary research outcome (Pors, 2018). While some studies have explored nurses' experience with EHR in acute care settings (Forde-Johnston, et al., 2023), they failed to provide a comprehensive understanding of the nurses' experience in the labour and delivery which can affect the care that is being provided. The aim of this study was to address the gap in perinatal-specific research by answering the question "What are the experiences and challenges of labour and delivery nurses using EHRs while caring for labouring patients?"

Theoretical Framework

My research was guided by Davina Allen's (2015) translation mobilization theory (TMT) and further influenced by application of actor network theory (ANT) in her work.

Translational Mobilization Theory

Robust theory-informed research that places nurses at the centre of a study, positioning them and their work in a place of significance, is not common in current literature. By focusing on nurses' experiences and challenges relating to the use of EHRs, research can provide new insight into the everyday work of nurses, particularly in the perinatal space. Davina Allen in her 2015 book *The Invisible Work of Nurses: Hospitals, Organisation and Healthcare* describes her TMT which provides a framework in which the invisible work of nurses is legitimized in a new way. Invisible work is described by Allen (2015) as that which extends beyond direct patient care activities, as described below. In the current research, I drew on the work of Allen and her TMT framework to design interview guides, examine the data, and analyze the connection nurses have with EHRs. TMT is a theoretical framework that provides a unique view of the everyday work of nurses and how they bridge the gap between patient experiences and organizational priorities (Allen, 2015). This work is described by Allen as 'organizing work' and accounts for such actions as care coordination, navigating unit culture, and legitimizing their role. Organizing

work encompasses four domains: creating working knowledge, articulation work, matching patients and beds, and transfers of care (Allen, 2018). Creating working knowledge is constructed collaboratively between nurses in real time through interactions, observations, and understanding of the patient journey (Allen, 2018). These practices are essential for maintaining continuity of care within complex and often fragmented clinical environments. Articulation work is the alignment of nursing practice whereby nurses are required to operationalize the care that is needed (Allen, 2018). For example, matching patients and beds focus on utilization of the health care system to ensure that the right patient, is in the right bed, at the right time, being cared for by the right nurse. Transfers of care may be best understood through the example of nursing handover. This handover is a time when nurses provide each other with an overview of the patient status and are required to take that information and create an understanding of what care this patient needs for the duration of their shift, and beyond (Allen, 2018). This view of organizing work was drawn on when reflecting on participants' stories about the ways nurses' work has been affected by electronic documentation.

Allen (2015) describes how nurses create and mobilize their clinical knowledge, as well as their organizational knowledge, as part of care of the patient. This involves both the awareness of the dynamic clinical requirements and organizational requirements. In the perinatal practice in BC, nurses are required to uphold the provincial standards set out by Perinatal Services BC (PSBC) and to meet hospital requirements for documentation, which in addition to supporting ongoing care is also used for site specific data collection and statistical purposes. With the introduction of new workflows as one component of the implementation of EHRs, nurses are required to adapt their organizing work in new ways, while still maintaining a high standard of care. Allen (2015) highlights the fact that there is increasing difficultly for nurses to be able to

sustain this high standard in the current health care climate. As organizational priorities require nurses to adapt and change their practices, the importance of their organizing work continues to be unrecognized and undervalued (Allen, 2015). Similar to Allen's observations, the current staffing crisis in BC adds to the complexity of the care delivery and forces nurses to adjust their organizing work daily.

Another component of the TMT is the importance for nurses to understand the local activity systems (Allen, 2015). In the perinatal space, this includes being familiar with the routines of the hospital, the unit culture, as well as the processes to be able to access care for patients at critical times. My personal experience is that during EHR implementation, those designing the system (not nurses) typically examine current work processes and plan for future workflows; however, the emphasis is often placed on physician workflows rather than nurses' work. Examples of how an activity system might change include how a maternity provider (i.e., an obstetrician) is informed about labour progress or how an anesthesiologist is called for an epidural. The foundational care to the patient remains the same but how nurses navigate their daily work is changed. Depending on the hospital, some nurses are engaged in the design of the EHR. However, due to staffing and workload constraints, these contributions often come from nursing leaders versus staff nurses who will be using the system in their daily work. In this research, we drew on nurses' experiences to understand how their interactions with local activity systems have been affected by the implementation of EHR.

Sensemaking is another element of TMT in which the work of navigating the patient story is seen in a new way. Allen (2015) describes sense making as the ability to create order in situations that otherwise do not fit together. An example of sense making in practice is handover, or the exchange of critical patient information, either written or verbal. Handover can occur at

the end of a shift, prior to or after a staff break, or during care transitions. For a labouring patient, handover could be occurring several times over the course of multiple days during inpatient stay. Although tools and checklists have evolved over time, the introduction of EHRs requires handovers to adapt to the structure and layout of the EHR system chosen during its design. If the nurse chooses to maintain their existing processes and ignore the post-implementation documentation layout then the handover charting becomes increasingly difficult to navigate after the verbal interaction with their peer. We sought to understand nurses' experience with handovers while documenting electronically and how it has changed since implementation of the EHR.

One of theoretical perspectives informing Allen's research is ANT that gives equal weight to human or non-human elements (or actors) within the network/relationship of heterogenous elements (Booth et al., 2016; Petrovskaya, 2022, 2023; Wynn & Garwood-Cross, 2024). These actors include familiar participants within the health care community, such as physicians, nurses, and patients, as well as material objects such as computers and electronic documentation. Allen (2015) describes how this view opens analytical space to acknowledge that physical objects or systems are always in relationship within the nurse-patient dyad. A study by Booth et al. (2016) describes the value of utilizing ANT as a nursing research perspective to provide a more rich and robust understanding of how nurses interact with health care technologies. This perspective opens the possibility for further opportunities to explore not just the work that nurses are doing but the influences that affect that work.

Allen (2015) writes that checklists and flow sheets used by nurses are often developed with the intent to support evidence-based practice. However, these documents influence nurses' organizing work (e.g., care coordination) and if they are designed without a good understanding

of this invisible work, the effects on patient care are not optimal (Allen, 2015). Similarly, electronic systems impact nurses' work and their ability to manage patient care trajectories, but this is not accounted for by the system designers. The relationship between a nurse and a patient during labour and delivery is one that requires trust and understanding as the patient transitions through a critical phase of their life. Having a computer in the room and having the nurse's attention diverted has the potential to impact the connection. ANT provided a new orientation for research and invited me to look beyond standard perceptions of the relationships under study. Booth et al. (2016) and Petrovskaya (2023) describe the value of utilizing ANT as a nursing research perspective to provide a more rich and robust understanding of how nurses interact with health care technologies.

In this study I explored how nurse-patient relationships during labour were experienced prior to the implementation of EHR from the nurse perspective, as well as how the nurse experiences these relationships now, giving weight to the influence of the physical computer in the patient's room. In the following chapters I provide an overview of the literature and outline my methodological approach. These chapters are followed by a chapter that includes a paper I will be submitting for publication, followed by a concluding chapter that looks at the significance of my work.

Chapter 2: Literature Review

My review of the literature related to nurses' experience using electronic health records (also referred to as electronic medical records) showed that there is a limited number of studies that place nurses at the center of the research to see how the implementation of these systems affects them (Chao & Golbert, 2012; Wisner et al. 2021). In health care settings implementing EHRs, direct patient care nurses are often overlooked during the planning and implementation phases. Nurses are expected to use their expertise to adapt to new technology, but this extra effort is rarely recognized in workload assessments, and its impact on job satisfaction and patient care is often overlooked. The literature consistently highlights the increased time burden on nurses' work (Campbell & Rankin, 2017; Forde-Johnston et al., 2023; Groot et al., 2022; Johnson et al., 2024; Pors, 2018; Tan et al., 2019; Walker et al., 2019), increased cognitive load (Chao, 2016; Colligan et al., 2015; Walker et al., 2019; Wisner et al. 2021) and the impacts to nurses workflow (Chao & Golbert, 2012; Craswell et al., 2014; Harrison et al., 2007; Ivory, 2015; Kossman et al., 2013) due to EHR use while providing care. Few published studies directly relate to perinatal care (Chao & Golbert, 2012; Ivory, 2015; Park, H et al. 2012; Wisner et al., 2021) which has been identified as having unique care requirements and impacts to nurses. This lack of data devalues the important work of perinatal nurses that is often overlooked and under researched in a way that reinforces the invisibility of their labor within healthcare systems and academic research.

Running out of time

Nurses' limited time is often not considered when new technology or workflows are implemented. Findings across the literature indicate an increase in time required to complete electronic documentation (Campbell & Rankin, 2017; Forde-Johnston et al., 2023; Groot et al.,

2022; Johnson et al., 2024; Pors, 2018; Tan et al., 2019; Walker et al., 2019). Further, managing the unintended outcomes of the EHR such as learning a new technology and navigating the physical space in relation to technology requires time that was previously spent providing patient care. Tan et al. (2019) reported a 40% increase in the time required from nurses to document in an EHR during a caesarean section, as compared to the paper documentation. This significant increase may have an impact on the care being provided and the potential downstream impacts to surgery and wait times in a chronically under resourced heath care system. De Groot et al. (2022) asked community health nurses to better understand perceived impact of electronic documentation on their workload. Nurses' concerns included increased time burden and lack of EHR user-friendliness, which both contributed to decreased work satisfaction. This increased time requirement for documentation takes nurses away from direct care delivery which nurses typically consider a priority. The diversion of time is perceived by nurses as a significant burden when the documentation is related to organizational requirements, such as care coordination and resource management, compared to clinical documentation, such as direct patient care activities (De Groot et al., 2022).

Walker et al. (2020) completed a longitudinal study where they compared time nurses spent at the patient beside pre and post EHR implementation over an 18-month period. This comparison between provides a good example of how EHR use impacts time nurses spent on both direct and indirect care. Walker et al. (2020) concluded that there was a significant increase in the time spent on indirect care, such as documentation and care coordination and a decrease in the time spent at the bedside following the implementation of EHR. While nurses' work of care coordination is crucial (Allen, 2015), the work and time it requires is often unnoticed and unaccounted for by healthcare organizations and not reflected in resource allocations.

Some critics raise a question of who should be doing the work of care coordination and whether the time of the bedside nurse is best spent this way. Campbell and Rankin (2017) employed institutional ethnography to study the impact of EHR on nursing practice. Campbell and Rankin (2017) observed the displacement of patient care priorities such that nurses aimed to satisfy the institutional requirements as dictated by the EHR. These institutional requirements increasingly include collection and documentation of a range of data required for organizational reporting and accreditation rather than the ongoing support of daily care (de Ruiter et al., 2016). While nurses aim to effectively balance organizational and patient priorities (Allen, 2015), they often question whether increased data collection and documentation directly contributes to the care delivery for the patient (Campbell & Rankin, 2017). The time required to complete the mandated documentation often goes unnoticed by the organizational leaders, the public, and policymakers, and contributes to the invisible work that nurses are participating in on a routine basis.

A study by Pors (2018) explored how the relationship between patients and care professionals has been altered with the introduction of a unique patient self-reporting digital chart. Pors concluded that use of EHR required a shift in patients' involvement in care processes whereby the patients were expected to provide data outside of the scheduled pre-natal care visit with the midwife. In other words, patients were involved in administrative tasks and "professional resistance" (p. 613), or in other words clinical reluctance, in which the patient helps to co-produce the record with the professionals, displacing some of the midwives ~~their~~ responsibilities, and subsequently joining together with the professionals in their frustrations with the system. This transfer of responsibility to the patient (e.g., patient completed

questionnaires) can create more time for the care professionals to complete other tasks but is not a singular solution for organizational strain (Pors, 2018).

With nurses feeling increasingly stretched for time and looking for ways to maximize the efficiency of their working hours, new technology is often offered as a solution. A study by Johnson et al. (2025) provides an interesting perspective on ways to utilize Artificial Intelligence (AI) in nursing care. Their study explored using ChatGPT to create nursing care plans for patients in preterm labour and compared them to nurse generated plans for the same patients. The authors concluded that while there were some subtle differences with terminology, a well prompted query by nurses produced clinically appropriate recommendations for their patients (p.18). Johnson et al. (2025) do caution however that ChatGPT should be used as a support tool and that the importance of nurse's decision making should remain the priority.

These studies (Campbell & Rankin, 2017; De Groot et al., 2022; de Ruiter et al., 2016; Johnson et al., 2025; Pors, 2018; Tan et al., 2019) provide evidence of the time burden that nurses are facing with the implementation of EHRs, however most studies lack the nurse centric focus that legitimizes the struggle that nurses face while balancing what is required of them during their shifts in addition to the patient care that they strongly desire to provide. These studies emphasize the organizational processes and the indirect time needed to complete tasks that meet hospital operational demands, but they overlook the additional time nurses must spend mentally and physically juggling and prioritizing the multiple, often competing, responsibilities expected of them. Further, while these studies focused on the influence of EHR implementation on aspects of nurses' work, they did not inquire into the ways in which EHR has changed nurses' work in labour and delivery.

Cognitive Burden in High-Stakes Environments

The implementation of EHR has caused significant cognitive burden for nurses, especially in high acuity areas such as labour and delivery. This cognitive burden relates to indirect-care time requirements (Walker et al., 2019), increased need to interpret and evaluate the functional requirements of the system (Chao, 2016) and the ability for nurses to adapt to the limitations of the digital application (Colligan et al., 2015). A strong correlation exists between the time required for nurses to complete a task and the cognitive effort necessary to perform that task effectively, especially following implementation and the subsequent period of change management (Walker et al., 2019). However, even as the nurses become more familiar with the new workflows and processes, and are ultimately more efficient with their time, the cognitive load of interpretation of the electronic data remains a noteworthy concern.

As discussed, Walker et al. (2019) completed a continuous observation study that looked at pre and post implementation impacts of EHR on nurses' time at the bedside. While this study focused on the time burden for nurses, it also highlighted the indirect time spent away from the patient, which encompassed focused attention and intense sensemaking to access, generate, systematize, and put in use the patient and the electronic data. Over time, Walker et al. (2019) observed the leveling out of time required to complete certain nursing tasks such as computer data entry and a notable adaptability to the new system among nurses. This study was primarily focused on medical and surgical units, which have a different level of acuity compared to a perinatal unit, but some of the findings could be considered transferable to other care areas.

A study by Colligan et al. (2015) examined nurses perceived cognitive demands following the implementation of an EMR at a large pediatric hospital. Nurses rated their level of cognitive burden using the NASA task load index (NASA-TLX) over the course of their first few

shifts following implementation. The researchers found a significantly increased level of cognition required in the early days after a new system roll out; however, the level of adaptability varied significantly among users. Although all nurses were provided with the same classroom training to prepare for the new computer system and workloads, Colligan et al. (2015) noted that new users of these electronic systems adapted at different rates. This emphasizes the need for more individualized training to account for the needs of unique users. This study was effective in identifying the nurses' perceived burden but lacked a focus on the experiences or challenges that they faced.

Research by Chao (2016) specifically focused on perinatal nurses and the impacts to their work following the implementation of EHR. This mixed method study explored nurses' work, intended and unexpected changes produced by the EHR, the clinicians' adaptive responses to those changes, and the effect of EHR on standardization of work routines ~~(p. 108).~~ Chao (2016) reported unintentional consequences relating to the top-down organization-wide implementation of EHR, specifically the limitations to clinician collaboration and the increased cognitive load (p. 110). Chao (2016) also highlighted the importance of support for users during the critical implementation phase to mitigate the cognitive strain placed on nurses as they navigate a new system and figure out where and what to document. There is always a period of adjustment and adaptation with a new electronic system; however, the unintended consequences of these implementations have extensive impacts on nursing workload and cognitive requirements (Chao, 2016).

A study by Wisner et al. (2021) is one of few examples of research relating specifically to perinatal nursing and the effects of implementation of EHR. The authors noted that most design decisions for EHR in perinatal areas are adapted from acute care settings, which do not meet the

needs of the perinatal context. My personal experience echoes this observation. One concern with adapting EHR design from acute care is that it does not consider the mother baby dyad relationship or how their interrelated care needs to be documented electronically. In addition to the increased cognitive load, a key finding from Wisner et al. (2021) was the conflict, or a competing demand, that nurses face between caring for their patients face-to-face and synthesizing that information into the EHR, which takes nurses away from the patient. Nurses in that study reported that during high acuity situations, they abandoned electronic documentation in favour of providing care to their patients and then returning to document retrospectively ~~(p. 830).~~ This tension between "caring and charting" as Wisner et al. (2021) put it, requires nurses to pivot both their attention and their cognition dynamically, depending on the acuity of the labouring patient. This pivoting was more readily supported by paper-based tools (e.g., paper partogram) nurses used prior to EHR because of their size and maneuverability. While I have heard of the use of paper-based tools following the implementation of an electronic system, it does interfere with the principles of a paperless system proposed as the aspiration in current healthcare.

All these studies provide a foundation of knowledge relating to the cognitive burden felt by nurses as they navigate EHRs, both at initial introduction of the application and through ongoing care of their patients. Chao (2016) and Wisner et al. (2021) provide a much-needed perinatal lens and highlight the unique scenarios in high acuity situations of caring for patients in labour. While these two studies highlight the need for individualized training sessions for nurses, in my experience, I have found it is difficult to put those into practice due to fiscal constraints and time limitations inherent during implementations. The studies including observations of nurses (Chao, 2016; Wisner et al., 2021; Walker et al., 2019) need to be assessed with a level of

caution towards the research observer, as they are not typically trained in perinatal nursing and would be viewing the workflows as an outsider. Also, when interpreting survey responses based on a perception of cognitive burden (Colligan et al., 2015), it is difficult to account for external factors such as personal stressors or interpersonal relationships that may be affecting the nurses' responses at that moment in time. The implementation of EHR systems and the shift to electronic documentation during labour and delivery places increased strain on already taxed staff and needs to be considered as part of nurses' work by organizational leaders and those planning implementation activities.

The Influence of Workload on Care Delivery

Nursing workflows and workload are dynamic and change with new technology, research evidence, shifts in practices, and societal expectations. These changes are even more prevalent in perinatal care evolving to promote improved maternal/infant health outcomes. These changes are typically implemented through organizational processes aligned with mandated requirements from regulatory bodies such as Perinatal Services of British Columbia (PSBC) and the Society of Obstetricians and Gynecologists of Canada (SOGC) in BC and Canada. Some critics suggest that the decision makers leading the changes within the organization are not always well positioned to consider the consequences of the changes or the timing of the implementation. For instance, Harrison et al. (2007) cautioned of the unintended consequences of EHR implementation that are often not considered by key decision makers within the healthcare organizations. These unintended consequences include, but are not limited to, new and increased work for clinicians, increased errors, and changes in communication among the interdisciplinary team, which in turn can impact the patient experience and overall health trajectory. Within a high paced perinatal unit, the workload does not allow for a delay in adoption of these new systems, which can

contribute to negative experiences and challenges faced by nurses. Harrison et al. (2007) employed an Interactive Sociotechnical Analysis (ISTA) framework that emphasizes the recursive nature of the nurse patient relationship and their potential for producing unintended consequences (p. 543).

Similar to the studies above that examined the cognitive burden and unintended consequences of EHRs, a mixed method study by Kossman et al. (2013) examined the workflow changes that occurred because of an EHR and paper-based artifacts used to support nurses' clinical judgement while navigating an EHR. These artifacts include problem lists, focused assessment forms, clinical practice guidelines, care plan, medication administration record (MAR), and interdisciplinary summary notes (p. 530-540) which aid the nurses in their work. This study found that nurses reconfigured their work to conform to the constraints of the EHR system, as the layout for completing electronic documentation did not support important aspects of their work (p. 543). The researchers concluded that EHRs are meant to support nurses work and not alter it; however, the findings did not support that expectation (p. 543). Although this study was not perinatal-centric, its findings are transferable and can inform further research with a perinatal focus.

Ivory (2015) suggested that there is an increased need from health organizations to promote standardization of perinatal documentation to ensure efficient and effective care delivery across varying facilities. Documentation standardization is believed to facilitate consistent data collection of similar metrics to enable staffing recommendations and funding allocations considering multiple factors such as nurse, patient, and system factors (p. 312). While standardization provides useful data for administration of health care, the question whether this data collection should be completed by the nurse cannot be ignored. When EHRs are designed

from the lens of administration and data collection, it misses the important considerations related to the workflow of the nurse and the care of the patient (Ivory, 2015). Ivory (2015) discusses the difference between standardization of EHRs compared to personalization based on the needs of individual facilities but fails to identify the individual needs of the users and how their workflows are impacted with the introduction of standardized data fields within EHRs. This study does have a perinatal lens and takes into consideration the unique terminologies required in this speciality; however, it focuses on administrative tasks and not bedside care.

Craswell et al. (2016) interviewed midwives about their perceptions of the accuracy of data collection in the perinatal setting. Concerns over inaccuracy of information related to difficult layouts and unfamiliarity with the EHR led to poor uptake by midwives (p. 300). This challenge contributed to a lack of standardization of data and altered workflows of participants. The hospital in the study had numerous issues with data collection (i.e., electronic charting) and created a new position to audit records to ensure appropriate completion of required charting, a position that was never required prior to the implementation of the EHR (p. 301). The presence of inaccurate data had substantial implications, impacting organizational and resource planning due to inconsistent information, and placing additional pressure on midwives to generate real time documentation. Although this study was completed in Australia where perinatal care has a different model than in Canada, its findings are instructive for understanding challenges of electronic documentation.

Chao and Goldbort (2012) conducted a mixed method observational study examining perinatal nurses pre and post EHR implementation. Nurses were observed during their workday, and their perceptions were assessed using pre- and post-implementation surveys and a Likert scale to determine their perceptions. This study reported no significant decrease in patient care

activities and team communication, though there was a significant decrease in nurses' perception of usefulness of the EHR system. The authors identified a risk to implementation timelines and adherence to change within the organization if a new workflow is not fully understood or supported by nurses (p. 605).

This literature review highlights the growing time and cognitive burden required of nurses in EHR supported health settings as well as the workflow impacts to care delivery. Much existing research focuses on the implementation of EHR systems; however, a gap remains with perinatal nurse-centric research that helps understand nurses' experiences and challenges navigating these applications in a high acuity environment. My research addressed this gap.

Chapter 3: Methodology

This descriptive qualitative study focused on the experience of labour and delivery nurses as they reflected on their everyday work involving an EHR. Our aim was to understand 1) how they interact with the EHR and 2) how they perceive electronic documentation affecting their care of labouring patients. Using thematic analysis (Braun & Clarke, 2017), interview data was analyzed for commonalities and differences, and themes were generated. Descriptive design methodology explores human experiences within a specific context, focusing closely on the interview content and staying true to the participants' own accounts (Doyle et al., 2020; Sandelowski & Barroso, 2003). This design provides understanding of the personal experiences of the participants, which satisfies the aim to place the perinatal nurse at the center of the research. As a researcher, I was afforded the opportunity to engage with frontline nurses whom our clinical informatics team typically supports indirectly. While our work in informatics primarily involves collaboration with practice and operational leaders, this research centered on the experiences of bedside perinatal nurses—those providing direct care to labouring patients in the delivery room.

Setting

Participants, setting, and rationale

BC Women's Hospital (BCWH) is a primary, secondary, and tertiary perinatal hospital in Vancouver, British Columbia (BC) that provides basic maternity care to the neighbouring community, as well as specialized perinatal care to the entire province and the neighbouring territory of the Yukon (PHSA, 2025). Across the Lower Mainland of BC, a regional project called Clinical & Systems Transformation (CST) was completed that brought together many hospitals and health centres across three health organizations (HO) that collectively implemented

an EHR application that provides a digital record among care settings within these HOs (Clinical Systems Transformation, 2014). The EHR is called Cerner, the iteration of EHR that is in use across all these hospitals and health centers is referred to as CST Cerner. Between 2018-2024, a rolling implementation occurred at all acute care sites, and BCWH implemented CST Cerner in their acute care facility in February 2022. This implementation marked the transition from paper documentation to electronic documentation for these nurses.

Recruitment

We intentionally sought out nurses who have worked both with paper documentation and EHR so they could speak to the similarities and differences between the two methods of documentation. We began by speaking with the operations manager so support for this research could be endorsed by the leadership. After receiving ethics approval, postcards were placed in staff areas and handed out during daily staff huddles that LB attended over the course of a few weeks (see Appendix A). The maternal/newborn program also has a staff newsletter, and we added the recruitment material as a submission that was included over the course of a few weeks (see Appendix A). The postcard and newsletter contained directions to contact LB via email by scanning a QR code opening to the participant's personal email (see Appendix B). Upon receipt of an initial email correspondence from the volunteer participant, LB sent an introduction email providing more details of the study such as setting up an interview time and zoom logistics (Appendix C). The welcome email specifically identified that potential participants need to have been on staff for at least three years and have experience documenting on paper and in the EHR. Following the initial welcome email, an exchange between LB and the participant ensued in which a mutually agreeable time was set for the interview. Of 20 participants who put their names forward to participate, 11 nurses were able to complete an interview, while 9 participants

were lost to follow up. Two of the nine who were lost to follow up had scheduled an interview time but had family emergencies and were unable to re-schedule their time. The seven others had sent an initial expression of interest but never replied to subsequent emails despite multiple attempts by LB. Once an interview time was secured, the participants were sent a copy of the consent form to review prior to the meeting (see Appendix E).

Sample

Purposive sampling was used to recruit perinatal nurses from the Maternal/Newborn Program at BCWH who had direct experience providing bedside care in a delivery setting. This site was selected based on the length of time since the implementation of the CST Cerner system, ensuring participants had sufficient exposure to the electronic documentation system in practice. The maternal/newborn program consists of acute perinatal trained nurses who rotate between assessment, antenatal, intrapartum, postpartum, and the obstetrical surgical suite. Nurses who work on these units have completed supplemental education relating specifically to perinatal and newborn care. Of the 11 participants, years of experience varied between three and 26 years with a mean of 12.6 years. Four participants identified that they have worked or are working as a clinical resource nurse, and four identified that they have worked as a charge nurse on one of the perinatal units. Although the initial target sample size was 12 participants, data saturation was deemed to have been achieved with the 11 participants who completed interviews.

Data collection

The 11 interviews took place between December 2024 and February 2025 over zoom and ranged in length between 32-60 minutes (average 42 minutes). Each interview began with the primary researcher (LB) sharing a brief history of her nursing work as well as the aim for this research to encourage open dialogue and information sharing. This allowed participants to share

their experiences based on a common understanding of perinatal terminology. After sharing some information about herself, LB asked them about where they work and what they loved about their job. These questions invited participants to share their experiences in a way that put them at the center of the conversation and honor the stories they shared. Questions such as “How did your day look different prior to the implementation of CST Cerner?” or “Do you think electronic documentation helps or hinders your care of the patient? In what ways?” allowed for the participants to reflect on their experiences and share details of what it is like to care for and document on a patient in labour. All interviews were recorded and stored on a secure network drive and recordings were transcribed using Whisper.ai technology that is locally installed and does not transmit data to a cloud storage server. In addition to any interview notes that were taken during the conversation, reflective notes were completed following each interview to capture any details or thoughts pertaining to the unique conversation as well as to allow the primary researcher to assess the applicability of the interview guide so revisions could be made iteratively.

Data analysis

Drawing on the work of Braun and Clarke (2017), data was thematically analyzed, and patterns of data were identified and coded. Transcripts were analyzed for completeness and to ensure that the conversation of the participants was appropriately captured by the AI software. Audio and video recordings were manually reviewed alongside the verbatim transcripts to be able to identify who was speaking so the comments from the interviewer and interviewee were clearly delineated in transcripts. All individual transcripts were initially reviewed by the primary researcher. One transcript was selected for independent review and analysis by VC and OP. Researchers' notes were then compared and discussed in detail. Observations, reflections, and

insights were documented in the margins of the transcripts and collaboratively examined by the research team, facilitating the identification of similarities and differences in the interpretation. Insights and reflections were systematically grouped according to their relevance, forming initial categories for analysis. These categories were then interpreted through the lens of TMT and ANT which emphasizes the relational dynamics between human and non-human actors within a network. Using TMT and ANT as an analytical tool, the research team examined how technologies (such as the EHR), clinical environments, policies, and nurses themselves interacted and shaped one another. The emerging ideas were refined into overarching themes that captured key patterns within the data. These themes were then reviewed, discussed, and corroborated among the research team to ensure analytical consistency and alignment with both the empirical evidence and the theoretical framework.

Rigor

The trustworthiness of this study is demonstrated through a combination of credibility, dependability, confirmability, and transferability (Polit & Beck, 2021). Transparency of the study process is ensured through detailed interview transcripts and researcher's reflective notes, which support the credibility of the research. Dependability has been upheld through documentation of study processes. The goal is that this research design is transferable to other facilities who also desire to better understand the experiences of nurses' documentation in the labour and delivery unit. The questions in the interview guide has been written to reflect a neutral standpoint so as not to influence participants' answers. Transferability is, admittedly, difficult to assess in qualitative research, however the hope is that the analysis will provide a clear representation of common themes.

Rigor was further upheld through the recognition and transparent acknowledgment of my dual background in perinatal nursing and clinical informatics. This expertise enabled me to comprehend both the clinical context of perinatal care and the technical aspects of EHR design, allowing for a nuanced understanding of participants' explanations and experiences. Polit and Beck (2021) describe this process as reflexivity—the researcher's conscious awareness of their own background, values, and beliefs, and the potential influence these may exert on the research process and outcomes (p. 571). My familiarity with the subject matter reduced the need for clarifying questions that might otherwise be required by someone less acquainted with the field; however, it also necessitated a heightened vigilance toward my own potential biases in interpreting the data. To mitigate this, I engaged in regular discussions with my co-supervisors. While they do not have a background in perinatal nursing, their external perspectives and nursing background were instrumental in challenging and refining my interpretations. Additionally, OP's expertise in EHR-related research contributed valuable insights into the analysis and deepened the theoretical and contextual understanding of the data.

Ethical considerations

A harmonized ethics approval was obtained through the University of Victoria Human Research Ethics Board (BC24-0354) and the Children's and Women's Research Ethics Board (H24-02142), as this work was affiliated with both organizations. An electronic copy of an informed consent was shared with participants prior to the interview date and then reviewed in detail at the start of the interview. Verbal consent for audio recording, transcription, and voluntary participation was obtained. Virtual interviews using Zoom were held for all participants and data was confidentially and ethically managed. Following the interview,

participants were informed of resources available from workplace wellness programs, if they felt this was needed.

Dissemination

To ensure my research reaches a wide audience and has a significant impact, I will continue to employ various strategies for knowledge translation. I will submit my completed thesis to the University of Victoria UVicSpace to ensure permanent, open-access availability. I am preparing to submit my manuscript (see Chapter 4) to the journal *Research in Nursing & Health*. I presented my initial findings at the Canadian Nursing Informatics Association (CNIA) annual conference in Toronto in June 2025. I have also been accepted to present at the Canadian Association of Perinatal and Women's Health Nurses (CAPWHN) conference in Halifax in October 2025. My presentation is titled: "*How perinatal nurses' experience using electronic health records during labour and delivery can promote evidence-informed practice changes".*

I will be sharing my findings with the staff at BCWH whose members graciously contributed as research participants. I will create an infographic that can be circulated in their staff newsletter summarizing the key findings and recommendations. An information session will also be shared with the community of clinical informatics group that meets monthly to share my results with my peers in informatics. My hope is that these methods of dissemination with help put research into practice and motivate evidence-based changes to perinatal care delivery.

Chapter 4: Publication (to be submitted to Journal of Research in Nursing & Health)

Title: Perinatal nurses' experience using electronic health records during labour and delivery: A qualitative study.

Journal: Journal of Research in Nursing & Health

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Acknowledgement. We gratefully acknowledge the meaningful contributions and dedicated participation of those involved in this study. LB acknowledges scholarships received through the School of Nursing at the University of Victoria in support of her thesis research.

Abstract

Background: Since the implementation of electronic health records (EHR) across Canada in the early 2000s, research has largely focused on their impact on patient care and organizational outcomes. However, little attention has been given to the experiences of perinatal nurses, particularly those providing care during labour and delivery. **Purpose:** To examine the experiences and challenges faced by perinatal nurses when documenting care for labouring patients using EHR systems. **Methodology:** A qualitative methodology, using interview data, was employed. Eleven perinatal nurses were recruited from a large urban women's hospital in Western Canada to participate. **Results:** Three key themes were generated: the impact of the location of EHR in the physical space; system design impacts HER utilization; and EHR embodies increased regulatory professional obligations for nurses. Findings reveal that EHR documentation has substantially changed nurses' work of documenting care during labour and affected how nurses support patients. Participants described the ongoing challenge of balancing the need to document with being fully present at the bedside. **Conclusion:** The implementation of EHR has reshaped perinatal nursing practice, altering how nurses engage with patients during labour and delivery. Nurses must continually navigate competing demands between documentation requirements and the delivery of direct, supportive care.

Keywords: Electronic health records, nursing, perinatal, qualitative, Canada, labour and delivery, actor network theory, translational mobilization theory

Electronic health records (EHRs) have been accessible for decades in the United States, while in Canada, their wider use has only started in the early 2000s. Organizational and patient impacts of EHRs have been varied (Harrison et al., 2007). The implementation of EHRs in acute care requires extensive change management and preparation, and additional considerations are needed when EHRs are being implemented in hospitals providing perinatal care. In the province of British Columbia (BC), Canada, perinatal care during labour and delivery is planned, directed, and coordinated by Perinatal Services BC (PSBC) and the Society of Obstetricians and Gynecologists of Canada (SOGC), in addition to nursing professional regulations, which adds complexity to the integration of EHR in perinatal practice.

Research that places nurses at the center to examine how EHR affects nurses' work is limited (Chao & Golbert, 2012; Wisner et al. 2021). Direct patient care nurses are often overlooked during the planning and EHR implementation phases, yet they are required to draw on their extensive skills in adaptability. Interestingly, this adaptability is not accounted for in nurses' workload. The literature consistently highlights the increased time burden on nurses' work (Campbell & Rankin, 2017; De Groot et al., 2022; Johnson et al., 2024; Pors, 2018; Tan et al., 2019; Walker et al., 2019), increased cognitive load (Chao, 2016; Colligan et al., 2015; Walker et al., 2019; Wisner et al. 2021) and the impacts to nurses workflow (Chao & Golbert, 2012; Craswell et al., 2014; Harrison et al., 2007; Ivory, 2015; Kossman et al., 2013) due to the EHR use. Research directly focusing on perinatal care, especially labour and delivery care (Chao & Golbert, 2012; Ivory, 2015; Wisner et al., 2021) is limited. This lack of research devalues the work of perinatal nurse and reinforces the invisibility of their contributions within health care. This study fills a gap by focusing on perinatal nurses' use of EHR in a labor-and-delivery context in a large hospital in Western Canada. The research question was, what are the

experiences and challenges of labour and delivery nurses using EHRs while caring for labouring patients?

Theoretical Approach

In this study, nurses' work is conceptualized as including direct patient care as well as care coordination, which remains marginalized in nursing research focused on care in nursing practice. According to Davina Allen's (2015) Translational Mobilization Theory (TMT), in their everyday (often invisible) work of managing patient care trajectories, bedside nurses bridge multiple agendas – their professional focus on individual patient care and the increasingly pressing organizational priorities. There organizational priorities include resource and bed allocation and meeting quality indicators and regulatory requirements.

Allen (2015) describes how nurses are responsible for mobilizing their clinical and organizational knowledge to provide care. In the context of our study, perinatal nurses are required to uphold the provincial standards set out by PSBC and meet hospital and legal requirements for documentation. With the introduction of new workflows following the implementation of EHRs, nurses must adapt their work while maintaining a high standard of care. Allen (2015) highlights that it is increasingly difficult for nurses to sustain this aspiration within current health care, where nurses' work often remains unrecognized and undervalued.

Another component of the TMT is the emphasis on understanding the local activity systems (i.e., human and non-human actors such as health care providers, paperwork, technology assembled around a specific patient care trajectory) to appreciate the scope of nurses' work and their contribution (Allen, 2015). In the context of this study, this includes being attentive to how nurses understand and act within the routines of the hospital, the unit culture, and processes by which nurses enable care for patients at critical times. In the hospital where the study took place,

EHR design prioritized physician and midwife workflows rather than nurses' processes. Changes in activity systems post-EHR implementation included changes in team communication such as the ways in which a physician or midwife is informed about labour progress or how an anesthesiologist is called for the administration of an epidural. TMT (Allen, 2015) invites researchers' attention to how nurses' work changes or remains the same, as well as how nurses navigate this change. In this research, we drew on nurses' experiences to understand how their interactions with local activity systems have been affected by the implementation of EHR.

Sensemaking, another element of TMT (Allen, 2015), invites researchers' attention to nurses' ability to create order in situations that otherwise do not fit together. An example of sense making is nurses' handover (i.e., the exchange of critical patient information at the end of a shift, prior to or after a staff break, or in care transitions). For a labouring patient, handover occurs several times during their inpatient stay. In the hospital where the study took place, while handover tools and checklists have been developed, the introduction of the EHR precipitated the change in the process of handover, and nurses were at the centre of these changes.

TMT draws on the assumptions of Actor Network Theory (ANT), which views human or non-human elements of the network (e.g., healthcare providers, patients, and material objects including computers and electronic documentation) as potentially equal within the relationship and capable of producing effects (Allen, 2015). With this insight, we view checklists, flow sheets, and computers in patient rooms as material actors that redirect nurse's attention and have effects on human connection and care processes.

Methodological Considerations

The study took place in a large urban hospital in BC, Canada, that provides primary, secondary, and tertiary maternity care to the neighbouring community as well as specialized perinatal care to the entire province and the neighbouring territory of the Yukon (PHSA, 2025). This hospital implemented the EHR in early 2022 as part of the ongoing larger project of Clinical Systems Transformation.

To recruit nurses, postcards were placed in staff areas and handed out during daily staff huddles that the first author (LB) attended in the fall of 2024. The study was also advertised in a staff newsletter. We intentionally sought out nurse participants who have been on staff for at least three years and thus have worked with paper documentation pre-EHR and shifted to electronic documentation post-EHR implementation. Eleven nurses completed the informed consent and interview. A harmonized ethics approval was obtained through the University of Victoria Human Research Ethics Board (BC24-0354).

Participants years of experience varied between three and 26 years with a mean of 12.6 years. Of the 11 participants, four identified that they have worked or are working as a clinical resource nurse, and four identified that they have worked as a charge nurse on one of the perinatal units.

Data collection

Interviews took place between December 2024 and February 2025 over zoom and ranged between 32-60 minutes (average 42 minutes). Each interview began with the primary researcher (LB) situating herself as a perinatal nurse to encourage open dialogue. Opening questions asked participants to describe their roles and what they loved about their job, which encouraged storytelling and sharing of participants' experiences in a way that put them at the center of the

conversation. All interviews were recorded and transcribed verbatim using Whisper, an AI transcription software.

Data analysis

Interview transcripts were checked for completeness and accuracy. Drawing on Braun and Clarke (2006), the data was thematically analyzed, and patterns of data were identified and coded. Selected transcripts and initial coding were done by all team members. Initial themes were developed by LB and further developed through discussions by all team members.

Results

Experiences and challenges faced by perinatal nurses documenting care using an EHR during labour and delivery varied. We identified three key themes: the impact of the location of EHR in the physical space; system design impacts EHR utilization; and EHR embodies increased regulatory professional obligations.

The Location of EHR in the Physical Space

A patient in labour presents for medical care to safely deliver their baby and to seek support through a significant, life changing event. The labour and delivery room frames the setting in which nurses and patients negotiate how best to provide care. As one participant mentioned: *Just sort of meeting the patient where they're at and figuring out what they want from their labour.* (010) According to participants, electronic documentation during labour and delivery impacts patient's experience by introducing noise, as well as additional equipment. The use of computers for documentation requires the use of a keyboard, whose sound can alter the environment in the labour space.

> *The keyboards in the room are actually quite loud and so I find that sound really annoying, … it's an invasive sound, your focus is away from, you're basically focusing on this screen instead of … it takes away the human connection*. (018)

Another participant recalled,

> *I remember when one of the nurses got in trouble for clicking the keyboard in a labour room because the patient was trying to sleep and all she could hear was the clicking on the keyboard*. (012)

In situations where patients require a calm, quiet environment to manage pain and focus, the use of the keyboard can be disruptive. This shift in how documentation is performed can unintentionally interfere with the therapeutic atmosphere nurses strive to create, impacting their ability to remain fully present and responsive to the patient's needs.

The labouring patient is encouraged to ambulate or change positions during labour to help encourage progress and descent of the baby. This includes walking the halls or spending time in the bath or shower. Prior to the implementation of EHR, nurses were able to complete their documentation and continue to support the patient regardless of their physical location. *The biggest thing for me is that it [the paper record such as partogram] was portable so if the patient was in the bathroom in the tub say, I could take it with me* (010). With the introduction of the EHR, nurses have to physically remove themselves from the patient's (bed)side to fulfil documentation requirement. This has shifted their practice.

> *It's detrimental in that I'm not as physically present with the patient, I'm often distracted or out of the room*. (…) *It still affected my mobility in the room, I think that was my biggest thing is that you know the computer is very stationary and because it's built into*

> *the wall it doesn't move and even if I used a WOW* [Workstation on Wheels] *in the room, the WOWs are so big.* (010)

Nurses struggled to be present with their patients while also completing the required ongoing and timely documentation. The EHR system requires attention and concentration that inevitably shifts the focus away from patients.

> *You're so focused on something else that they don't have your attention a hundred percent of the time, which, you're their one-to-one support. ... And when you're focused half on charting on the computer and half on the patient, it just takes away from the patient.* (015)

Nurses are constantly balancing the provision of care with the regulated documentation requirements. At times they are conflicted between advocating for the birth environment that patients desire and the physical constraints they encounter.

Because of the way the electrical and data cables are set up in the labour rooms, computers are not ideally located. Fetal monitoring computers are attached to the main computer station, which requires extra space to accommodate large machines. Combined with the numerous carts and emergency equipment required for a delivery, this EHR setup means that labour rooms are often crowded. *They've installed computers in areas that don't really flow well. Ergonomically terrible* (016). Before the implementation of the EHR,

> *you could still provide that care, you can't really do that with this online CST charting because of the structure of where the actual charting area is and how you can't really position in that sense* (008).

As labour progresses, documentation requirements increase. Monitoring standards defined by PSBC require documentation as often as every 5 minutes while the patient is pushing. This creates a challenge for nurse with EHRs not being in physical proximity.

> *But when someone's pushing, the computer is in one place in the room, the patients in a different place. It's like clicking into all different boxes and you have to have both hands, and the computer is usually further away from the patient*. (015)

Nurses are required to manipulate multiple objects and attend to the physical needs of the patient. When using paper charting, nurses can use one hand on the patient while quickly documenting key information with the other hand, but now they need to step away if they are going to document in real time. Participants also commented on the physical position of their body. This shift in positioning means that

> *now with electronic charting, you're always staring at the computer screen, sort of typing as you're talking to the patient versus before I could just write on a piece of paper as I'm facing them.* (001)

Nurses' work and relationships with their patients have been impacted by the location of EHR hardware in the Labour and Delivery space.

System Design Impacts EHR Utilization

EHR systems have become a standard of care in Canada. Organizational leaders leverage these systems to provide data and metrics to support organizational decision making. When reflecting on their experiences, perinatal nurses identified the benefits of the system such as the transferability of documentation; however, they noted the increased demand on nurses' time. Nursing time is a finite resource and one that is not always considered when new EHR systems are being implemented. Whereas nurses' time spent on direct care is easier to account for, their

time spent searching through the EHR and documenting (sometimes in data fields not relevant to Labour and Delivery but "forced" by the EHR setup) remains unrecognized.

> *I feel like everything takes longer now because back then there was a lot of paper but it was all in the chart so then you're done with a patient or whatever, you would just flip through the chart and I think you wouldn't miss things as easily because you could just go through every single thing and just fill it out, versus now with CST there's probably 10 times the amount of tabs and blank spaces and probably 80% of them you don't even need to chart on.* (006)

This searching through the documentation takes time.

> *Every time you're clicking on a new band, there's a pause, there's a downtime, you're waiting for it to come through, and those pauses are taking time, are moments that I'm not looking at my patient.* (017).

In the hospital where all of the participants work, the EHR is designed in such a way that one application is used for multiple hospitals, health centers, and outpatient clinics. This means that certain aspects of the design are not customizable to reflect specific programs.

> *I think in the beginning that was a huge challenge because it is such a big program, it's like why do I have this navigation band about cardiac stuff, I'm like, I don't need that, like it's like paring it down and making it so it works for you. (010)*

This enterprise design results in shared data fields that are standardized and often irrelevant in different areas of the EHR chart, which contributes to nurses' increased confusion and frustration and distracts from the information relevant to perinatal care.

> *You know when you change like a dressing for c-section for example, there's 30 different cells… and at the bottom it says leeches applied. Why is that band even there? You can't remove it but you're looking at 30 different options.* (002).

Another way in which the EHR has added an often overlooked but tangible demand on nurses' time and work relates to communication within the interprofessional health care team. With the EHR, the team shifted to a Computerized Provider Order Entry (CPOE), in which the providers including physicians, midwives, and nurse practitioners place orders directly in the EHR so that all care requirements are documented and accounted for. Unlike earlier, with a more flexible practice of taking and placing orders, CPOE discourages nurses from taking verbal orders. Instead, nurse must rely on the providers (mostly physicians) to place electronic orders. This change has led nurses waiting for orders to be placed. In cases where the provider is busy with another patient, care delays and frustrations can happen.

> *Well you know, [a physician says] I'm busy right now, I can't put that order in, and I'm [the nurse] like, but that order affects me doing the lab work so you need to put it in or else I can't send the blood work and so sometimes before where it was just a verbal and then it was done.* (010)

In contrast, some aspects of the EHR have created efficiencies for nurses. While demands on nursing time increased due to the limitations of EHR design and shifts in communication, the transferability of electronic documentation has significantly contributed to the ease of access of information nurses need to support patient care. Unlike other care needs, perinatal care and interaction with the health care system does not begin as an acute event or sudden diagnosis but is rather a longitudinal trajectory that begins in the community, transitions to hospital care, and

then back to community for postpartum follow up. The EHR allows the triaging perinatal nurse an easier access to patient information.

> *Now everything is on the computer so if I'm like, to the patient, oh do you remember your recent weight or like did you ever get a rubella screening done and they're like yeah I did, I can actually look into their chart (...) like exactly when they did it.* (006)

Similarly, nurses can access patient information on antepartum admissions or speciality care that may have been provided.

When a patient presents in labour, they are usually in a significant amount of pain and their ability to recall dates and details can be limited. Access to information means the triage nurse can provide care more quickly and have a full picture of the pregnancy history regardless of the state of the patient. Given the transfer of high-risk pregnancies, it is now possible to access information across hospitals from all care providers. Conversely, if a hospital is over capacity, it may need to divert a healthy full-term patient to another hospital.

> *I would agree that it is helpful in seeing visits or encounters from other facilities or the transferability, like not having to photocopy the entire chart if someone is getting transferred somewhere*. (018)

The transferability of information within EHR contributes to ease of access to pertinent data that nurses require to provide safe care.

Data from the EHR impacts organizational processes and workflows and allows decisions about capacity and clinical needs to be made. The hospital where the study took place is laid out across multiple floors and units including triage, labour, antepartum, and surgical suites, and people who provide oversight are covering a wide range of areas. The EHR allows the charge

nurses and clinical resource nurses (CRNs) the ability to have a bird's eye view of each patient's status.

> *I'm better able to see what's going on in the rest of the hospital, as a CRN I'm kind of involved in all the different units…so I'm able to log in from the office and see the patient progress from where I am.* (011)

The data placed by nurses in the EHR helps the CRNs to know where to allocate support and what urgent patient issues may be emerging. It also provides an opportunity for them to provide advice to bedside nurses. However, this support is not always welcomed by experienced nurses who feel that their documentation is being evaluated or scrutinized as they are entering the data.

> *I've had lots of people come to my room and say, I see you've charted this, like, what do you, what's going on? There's like an element of big brother that is, that can be sometimes really helpful and sometimes more annoying than anything.* (016)

While CRNs see this access to nurses' data charted in the EHR as helpful, it can also be seen as intrusive.

The implementation of EHR brings many changes for both staff nurses and operational leaders, but the leaders of the organization are the ones accountable for the change management and staff satisfaction when it comes to large operational changes. Many nurse participants spoke of how this study is the first time they have been solicited for their thoughts and experiences.

> *I was surprised at how little feedback anybody wanted. And I know it's because feedback isn't an option because that's the system we have. That's what we're going to be doing. But it also felt like you dropped this bomb on our world and you don't even care*. (017)

Nurses were eager to have their voices heard on what the use of EHR during labour is really like, regardless of any potential for impacts to their work.

EHR Embodies Increased Regulatory Professional Obligations

As a practitioner, I am aware that perinatal care has long been linked to an increased volume of litigation due to the potential clinical complexity, technological invasiveness, and emotionally charged impact of childbirth. Legal requirements often drive the mandated professional requirements that have a direct impact on and guide the everyday work of nurses. *When I'm documenting, I'm always thinking about liability and legal stuff. (…) I document everything* (001). Legal cases related to birth can be brought forward for years following delivery, so the documentation is not only meant to capture a moment in time but can be called into question more than a decade later.

The current iteration of electronic documentation is heavily focused on charting by exception and misses the storytelling nature that was previously used in nurses' charting. The nurses expressed concerns about the legal longevity of their documentation and whether they would be able to recall the details if they found themselves being questioned years after having provided care.

> *Legally, if I were ever called to defend my charting or the experience or explain the experience, I'm not going to remember from those tick boxes. I'm not going to say, oh, that's what makes this unique. That's what was going on with this … event.* (017)

Prior to the implementation of electronic documentation, the care provided was captured in a narrative that was recorded by the primary nurse. Now there are predefined selections that nurses complete to account for the care being provided. Thus, the ways in which birth stories are captured has dramatically shifted.

It gives a rough clunky, uh, picture of an event that is quite nuanced and very special. Um, it doesn't reflect how I would word things, which means it doesn't reflect how I will remember things. (017)

This need to reflect on the unique nature of the event was shared by multiple participants.

Ideally, EHRs support accurate, real-time documentation of care. In perinatal care, however, as the needs of the patient increase closer to the delivery of the baby, so do the documentation requirements, which makes it increasingly difficult for the nurses to stay up to the minute on their charting. Often, nurses resort to paper scraps and then retrospectively document their care in the EHR.

A lot of time I will chart on paper, like right by the bed on a EFM strip or whatever, and them, um, transfer it over to the computer, but it's not live charting. Um, and you're always backdating everything, and you just need to make it work. (015).

This back dating or transcribing from paper to the EHR is a necessary consequence of the nurse managing competing demands. The nurses feel that there is a lack of clear instructions on where they need to document to meet their mandated obligations but also that they struggle to keep up to date on the changing requirements.

Every other shift it feels like there's something not input correctly or misunderstood. There's still some clarity that needs to be with CST [the EHR] in terms of standards of care of CST and like where the charting is actually the right way to chart versus what should we just create when we went live. (008)

These changes in requirements on what and where in the EHR to chart makes it challenging to successfully meet the mandated requirements. Based on the experiences of

participants, the less familiar the nurses are with the requirements, the more time they need to complete their documentation. This could mean that there is delay in responding to a care issue.

> *These moments of frustration where this triage is taking far too many minutes and it's because they [patients] don't know what magnesium they're taking, or it's not already input into system, or they don't know what blood pressure medication they're taking, and, uh, I have to, you know, you have to be very specific about everything that goes into those little boxes.* (016)

The labour nurses are consistently balancing the legal requirements of their documentation with the care required to support their patients to have a healthy delivery.

Discussion

The purpose of this research was to examine the experiences and challenges of labour and delivery nurses using EHR. Guided by TMT (Allen, 2015) that emphasizes bedside nurses' invisible work of care coordination and the active role of non-human actors such as EHR in shaping nurse patient relationships and nurses' work.

The EHR hardware imposes on the labour room environment, requiring nurses to adjust their bodies in space to coordinate the needs of the labouring patients with the location of the devices, which often requires them to turn away from the patient. Pors (2018) described how the location of the computer can negatively impact the nurse-patient relationship and fragments eye contact. Nurses in that study remarked how the location of the computer requires them to move through the room in a way that disrupts their workflow and does not position them at the bedside. Similarly, Gaudet (2016) remarked how the stationary computer can interrupt the overall workflow. Nurses are required to respond to dynamic needs of both people and technology while they move through the room. Participants felt that the location of the computer screen did not

facilitate their work, and this lack of physical proximity required nurses to pivot frequently. Wisner et al. (2021) discussed how the EHR interfered with nurses' ability to interact with the patient and attend to their needs. Actor network theory (ANT) invites researchers' attention to non-human elements (Petrovskaya, 2022; 2023) such as the noise created in the room by the keyboard. The invasive sounds in the room can be a distraction to the labouring patient and impact their experience. ANT draws our attention to how perinatal nurses navigate the environment of the labour room transformed by the EHR hardware.

TMT is of value in describing and explaining the organisational dimension of nursing work and nurses' role in coordinating care or mobilizing patient care trajectories (Allen, 2018). Nurses' ability to mobilize care trajectories is impacted by the organizational logic (hospital priorities) and intense sense making required from nurses by the EHR. The nurses, in particular in supporting and managerial roles, highlighted the benefits of EHR in providing a quick snapshot of the status and workload of the hospital. This information is important for staffing and workload allocation. In contrast, some aspects of the bedside nurses' work are less supported by the EHR and even interfere with nurses' ability to do their work (Allen, 2015), as we have seen in the example of CPOE and irrelevant data fields. These are issues that impact usability.

Campbell and Rankin (2017), in their institutional ethnography, show how data from EHR legitimize the decisions regarding staffing and coerces nurses to classify their patients to calculate nursing work. These authors criticize EHR for subverting nurses' priority of patient care to satisfy the requirements of data collection that go beyond the local practice site. These data help charge nurses to be aware of the dynamic needs of a complex hospital. Allen (2018) cautions of the dangers for bedside nurses becoming enrolled in management logics that privilege efficiency in patient care that also involves moving patients between units of care over

patient-centredness. While an observation of organizational status can provide situational context, it needs to be balanced with the patient centered care that is at the heart of perinatal nursing. In addition to this operational overview, participants reflected on how the requirements for documentation are constantly changing due to quality improvement projects and patient focused initiatives that require data collection for validation.

The concerns surrounding the legal requirements of electronic documentation is a theme shared by many participants. One of domains of nurses' care coordination role is articulation described by Allen (2018) as secondary work activity that relates to the actions, knowledge and resources necessary to carry on the primary role – caregiving. Articulation requires the perinatal nurse to not only know how to do the work but also be able to execute it efficiently. In this study, many nurses shared how unsure they were about where to document in the predefined sections of the EHR. They felt that the current EHR system lacks clear directions on consistent documentation, while simultaneously feeling a heavy weight of the legal implications of late or incomplete charting. The negotiation between documenting a birth story and fulfilling mandated requirements requires nurses to take into consideration the multiple conflicting interests and ultimately decide whose interests to serve first. This finding supports Wisner et al.'s (2021) observation that nurses documenting in EHR needed to balance direct patient care with charting; they were concerned regarding the legal implication of not documenting appropriately or timely. In our study, nurses were similarly concerned about the consequences to their licence and professional role.

Recommendations

Findings from this research highlight the value of engaging staff nurses in the design and implementation of EHR systems so that they can provide critical insight into the clinical work in

the perinatal context. Staff can contribute to space planning design and explain the workflows involved in their daily care. Nurses need to be involved in optimization and re-designing projects at regular intervals to be able to tailor EHR to the local activity systems. Their input is vitally important regarding documentation requirements outside of mandated standards to prevent documentation for the sake of data collection. Based on my experience, data metrics are incredibly important for organizational planning and funding but when these metrics begin to encroach on the workflows and negatively impact care for a labouring patient, their value needs to be critically reconsidered.

The use of artificial intelligence (AI) to support health care delivery through transcription and documentation is at the forefront of technology research. Examples of AI helpful in perinatal practice, include AI medical scribe, where the conversations in the room are recorded and transcribed, or a device in which the perinatal nurses dictate their care activities in real time, and which flow to the EHR. AI could also be used to create summaries of narrative documentation to be included in EHRs.

Strengths, Limitations, and Future Considerations

While the study had limitations, its findings offer rich material on an important and timely topic of how EHRs transform perinatal nurses' work. The study was limited to a single site, which may limit generalizability of the findings to other facilities or practice sites. On the other hand, contextual information about the study setting will help the reader to translate the findings to other local contexts. This study relied on self-report. People's memory of pre EHR might have been limited or impacted by the more recent experiences including potential struggles with the EHR. Longitudinal studies, documenting change over time, are critical in understanding the nuances as systems are adapted and as they change over time. Further, it

would be of value to examine how EHR have been used in legal proceedings in relation to nurses' ability to recall their experiences. Such studies may inquire into the impact abbreviated and non-narrative charting has on the outcomes of legal proceedings. Future research could examine patient perspectives in conjunction with nursing experiences to gain a more comprehensive understanding of care delivery in the context of EHR use.

Conclusion

Information technology in health care is a necessary advancement to continue to meet the needs of the healthcare system and optimise patient outcomes and care arrangements. How this technology is introduced and what considerations are made towards its impact remains an important area for research. This study focused on the perinatal nurses' experiences and challenges following implementation of EHR and electronic documentation in the labour and delivery suite. Important considerations when implementing EHRs include spatial configurations, the interplay between organizational needs and individual patient care, as well as the legal requirements nurses hold. It is evident that technology shapes nurses' work in ways that require careful and ongoing attention.

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Chapter 5: Reflections and Recommendations

For much of my career, I have had the privilege of working as a labour and delivery nurse at Richmond Hospital, a community-based hospital in the lower mainland of BC. This unit supports the delivery of up to 2200 babies a year and can support premature and sick babies in their neonatal intensive care unit (NICU), for neonates over 32 weeks gestation. My experiences have provided me with the opportunity to assist patients with almost every perinatal complication and has positioned me as an expert in maternal/newborn care. The term expert in relation to maternal and newborn care signifies for me: someone who has the skills and knowledge to anticipate, assess, respond, and react to the changing needs of perinatal patients. When a patient comes into the hospital in labour, their chief complaint can be anything from early pregnancy concerns, high risk complications, or active labour. The role of a perinatal nurse is to care for a labouring patient by providing them with support and to be alongside them and be present with them and their families during this life changing moment.

Since January 2022, I have been working in clinical informatics with a focus on the maternity team, which has provided me with a unique opportunity to combine my knowledge and expertise in perinatal care with the emerging field of clinical informatics. This work has allowed me to explore a new field of nursing. I have had the opportunity to support numerous implementations of EHR across the province, including a rural maternity site on the Sunshine Coast. I am currently working as a Clinical Informatics Manager at a BC Women's and Children's Hospital where I am continuing to support ongoing implementation and optimization projects within CST Cerner, with a focus on work within the perinatal space. I also support ongoing updates to the perinatal content within the EHR that affect all maternity sites across the lower mainland.

This research study has allowed me to incorporate my perinatal background with my current area of work so that I was able to undertake perinatal specific nursing research relating to EHRs. It has provided me with the opportunity to talk with nurses who have been directly impacted by the changes that our team supports daily. Once a change to the EHR system has been identified or requested, it goes through a series of steps where the request is investigated, designed, and validated, before it can receive approval. Governance groups have been established who oversee the decisions related to CST Cerner, so there is overarching responsibility to handle the changes being requested. These governance groups are composed of a collective of specialty specific clinical and operational leaders, who help to ensure that all hospitals with differing needs and policies are considered, and that standardization of care can be emphasized wherever possible. While this can help to promote best practice across smaller maternity sites, it can also pose a challenge for a site like BC Women's Hospital that provides specialized care to the most complex perinatal patients. This research allowed me to talk to perinatal nurses working with the most complex patients and hear about their experiences working with an EHR.

These conversations were incredibly meaningful to me. Despite my perinatal background and my experience in informatics, I have never documented during labour and delivery in an EHR. I have taught countless health professionals the content and supported users during EHR implementations; however, when I was working as a bedside nurse, I was still using a paper system. When I moved to clinical informatics, I became a support for the nurses but not a direct user myself. I wondered about the impact of top-down implementations of new technology such as EHRs and what the bedside nurse experiences while caring for their patients. I can provide care to a labouring patient, and I am familiar with electronic documentation, but I have never

been able to experience what these research participants so pointedly described through their stories. This research allowed me to better understand ~~come alongside~~ the nurses in this study and give voice to the work they do and legitimize the struggles they face.

Throughout this research study, I found that my understanding of the role of EHR versus electronic documentation evolved significantly. In other words, when talking about EHR prior to this study, I mostly equated this topic to electronic documentation. Reading theory-informed literature on EHR, talking to my committee, and analysing interview data, I realized that documentation is one aspect of EHR affecting nurses' work but that there are other affordances of EHR that play significant role in healthcare delivery. In reflection, when I formulated my research question, I was operating from a lens where EHR and electronic documentation were one and the same. What I have come to realize and appreciate through reflective field notes, is that these two entities are related but different. EHR refers to the application as a whole and includes how lab results are released and shared, the transferability of data, and the application that users access, whereas electronic documentation refers to the entering of patient data into the EHR. This realization came through discussions with the research team, as we analyzed the data and began to thematically group the experiences and challenges of the participants. It became clear that many of the issues that nurses in the study were facing related to electronic documentation and not the whole EHR system. They often spoke favourably about the functionality of the system that allowed them to access patients' historical information or to get their test results more quickly. This contrasted with their concerns with entering information while caring for their patients or the constant concern over doing it 'right'. When I reflect on my interview guide, I notice the questions are written from this lens. The data challenged my thinking and made me reflect on how some academic literature limiting "EHR use and effects" to

electronic charting, while important, might be missing other important influences of EHR on nurses' work. On that note, I am confident that my interviews elicited robust data from the participants thanks to an open-ended approach even when the initial question asked about charting.

One of the biggest challenges I faced while conducting this research was participant engagement, which is familiar to most researchers. I found that I had an encouraging number of responses from potential participants from the first moment I advertised my study on the units but then struggled to have volunteers confirm an appointment time and follow through with the interview. In reflection, I wonder if I could have been more upfront about the expected length of the interview in the recruitment materials or if I could have communicated the value of their participation in a different way. I had a total of 20 participants reply to my recruitment email that they were interested in being a participant; however, only 11 people followed through with setting up an interview and attending at the agreed upon time. Two of the participants did confirm their time but did not show up for the interview or reply to my follow up contact. I reached out to each potential participant twice, then considered them uninterested if I did not hear from them after two weeks. I am very thankful for the group of participants who did complete the interview. I did achieve data saturation and was able to name both common themes and unique perceptions. This research provided me with a much-needed perspective of the work of the perinatal nurses documenting electronically and allowed me to elevate their experiences in a way that is often missing from literature.

Implications for Nursing

Nurse centric research provides a foundation for the profession to draw on as nurses' role and responsibilities change with the introduction of digital health innovations. In this study I was

able to recognize the value in their experiences and provide nurses with an opportunity to voice their concerns and pay respect to the daily struggles they face. Focusing on the implications to nursing practice, it is important to highlight the invisible work of nurses to legitimize and show value for the work nurses are doing. This work is often unnoticed by operational leaders and decision makers within the organization and is thus unaccounted for as part of resource allocations and funding. Studies like this provide a basis for organizations to take pause and question their methods of implementation and the impacts nurses at the bedside encounter.

CST Cerner implementation included a series of significant roll outs across multi organizational facilities including acute care, mental health, residential care, oncology, and soon inclusive of the community. Through these activations over the past few years, there has been little to no feedback sought from the bedside staff, who are often the ones called on to be the most adaptable through the implementation. By bringing their work to light, this study validates the importance of nursing time as a finite resource, not to be taken for granted. Davina Allen (2018) would echo this sentiment when describing matching patients with beds. When organizations overlook the work of nurses it can lead to the wrong "fit" in the situation. The participants in this study acknowledged the limited feedback that had been requested from them, but also understood that top-down activations, such as the CST Cerner project, do not account for this. To be successful, project teams are assembled to come into clinical program areas, gather requirements and complete design for the new system with participation from subject matter experts. The limitation to this method is that if the staff members have not used an electronic system before, they are unaware of the associated implications or common pitfalls that can accompany this transition. The educators and subject matter experts do their best to provide the project teams with the information they think will be more appropriate for their workflows,

but then there is no opportunity for reviewing the decisions as the project team moves on to the new site and next activation.

Nurses are adaptable, but this adaptation skill has the potential to make the complexity of the care they provide invisible to an outsider. When nurses quietly adjust to system challenges, the depth and complexity of their care may go unrecognized, which contributes to silently devaluing the profession. Chao and Golbert (2012) concluded in their study that post-EHR implementation, there were no differences in patient care activities or team communication; however, the nurses in their study reported decreased job satisfaction. This highlights the adaptability of nurses (e.g., workarounds), which comes at a cost. Perinatal care allows nurses to actively participate in an intimate family event that often brings a great sense of satisfaction and joy. When organizational changes reduce nurses' job satisfaction, it has the potential to lead to increased turn over of staff and a loss of knowledge in this speciality area. Staff burnout and concerns regarding retention contribute to the health care crisis in our province. Wosny et al. (2023) reviewed research on the experience of health care professional using digital tools and reported a lack of literature relating to the how the users are feeling and what is contributing to their negative experiences. Until nurses and other stakeholders have a better understanding of the impacts on the people using these systems, they will not be able to create measurable change and decrease burden on health professionals, which could impact the retention of specialty nurses.

Nurses' voices matter. This study highlights the need for feedback from the bedside staff to contribute to the ongoing optimization and improvements in the system. One participant (017) remarked how this study was the first time anyone had asked them about the impact of the implementation. "*I was surprised how little feedback anybody wanted. And I know it's because feedback isn't an option because that's the system we have. But it also felt like, oh you dropped*

this bomb on our world, and you don't even care". During the process of design, nurse leaders and educators are recruited to contribute to the design decisions. They do their best to consider the current state workflows and unique circumstances of a given clinical area to promote a smoother adoption of the system. The problem with this is they may not know the details of the workflow if they have never used an electronic system or understand the intricacies of electronic documentation compared to paper. Additionally, they may have been removed from bedside care for several years so some of the nuances of balancing care with documentation (and other elements of EHR interaction) cannot fully be understood until implementation. Davina Allen (2018) would liken this understanding to creating working knowledge: Something that the clinical leaders try to understand but are not close enough to the bedside care to be effective. Harrison et al. (2007) discussed how the consequences of EHR implementation cannot be fully considered during implementation. Post implementation evaluations need to be part of an iterative improvement process. Implementation of EHR systems cannot be a one and done activation.

Nurses in this study emphasized that the documentation requirements mandated by PSBC to ensure compliance with regulatory standards have contributed to an increased workload, subsequently affecting their ability to provide optimal patient care. While nurses acknowledge the necessity of frequent documentation—particularly in safeguarding legal accountability—nurses continue to face challenges in maintaining clinical competencies as mandated by extra-local agents and delivering the same quality of patient support they provided prior to the implementation of EHR. In the contemporary digital era, policy reforms must critically assess the impact to nurses' documentation responsibilities, including the spatial proximity of digital technology and the nurses' ability to reasonably adapt their physical dexterity required to

complete these tasks efficiently and with good quality. Allen (2018) would describe this as articulation work. The guidelines that are disconnected from actual clinical workflows can impede successful adoption and implementation of EHR. Although nurses are aware of both the necessary documentation elements and their required frequency, the practical execution of these requirements in real-time remains unfeasible for many bedside staff.

By acknowledging the invisible work of nurses and the challenges they face, this study underscores the necessity of integrating frontline perspectives into healthcare policy and system design. Without meaningful engagement from beside staff, organizations risk devaluing nursing contributions and exacerbating job dissatisfaction, burnout, and staff turnover. Ultimately, this research highlights the critical need for nurses' voices to be heard and respected in shaping sustainable, equitable perinatal care.

Recommendations

Findings from this research highlight the value of engaging frontline nurses in design and implementation of EHR systems so that they can provide critical insight into the care work they provide in perinatal practice and can inform design decisions in EHRs. Nurses can contribute to space planning design and explain the workflows in their daily care. Although the reality of this recommendation is that beside nurses are difficult to backfill amid a nursing shortage, I would argue that the short-term investment in this work has the potential for long term benefits for all nurses who utilize CST Cerner while caring for labouring patients.

In addition to implementation of new systems, staff nurses need to be involved in optimization and re-design projects at regular intervals to be able to tailor the system to the realities of the care they are providing. The methodology and funding associated with the ongoing sustainment of CST Cerner has not accounted for these types of optimizations and

reviews of the system as part of their funding structure. Thus, the sustainment processes are co-owned by the individual health authorities and need to be prioritized against other competing fiscal priorities. To be successful long term, these organizations need to prioritize digital health optimizations and not just activations. Nurses' input is vitally important regarding documentation requirements and shows the crucial role electronic documentation plays outside of mandated standards; in other words, nurses are orientated to both organizational and patient priorities and seek to avoid documentation for the sake of data collection. Data metrics are incredibly important for organizational planning and funding but when these metrics influence the workflows and care required by a labouring patient, their value needs to be taken into consideration. Craswell et al. (2016) discuss the importance of accurate perinatal data collection as it is used to fund programs and services. While this study was based in Australia, the concerns raised are reflective of the issues in BC. Representation of frontline nurses is paramount to the success of large-scale implementation of EHR.

The use of artificial intelligence (AI) to support health care delivery through transcription and documentation is at the forefront of technology research. For these nurses, that could be AI medical scribe, where the conversations in the room are recorded and transcribed. Another option is a device in which the perinatal nurse can record their real time care which can flow to the electronic chart. The use of AI in health care is still relatively new in BC and is just now being piloted for integrated use by doctors in CST Cerner. The potential benefit for use by nurses, and especially perinatal nurses, could provide the "technology-enabled dexterity" to be able to provide critical hands-on patient care while simultaneously meeting their documentation requirements. This introduction of AI must be done with careful consideration to decrease the risks to patient safety. The nurses in this study were candid about their struggles to meet both

these objectives simultaneously, so a technological aid could greatly reduce the stress and burden associated with the conflict.

AI could also be used to create summaries of narrative documentation that could be arranged to flow to the required sections of the documentation. One of the features of EHR is the ability to have documentation flow to different sections of the patient chart when documented in particular fields. Currently, there is no feature in which data can be extracted from narrative documentation, so nurses in this study shared how they are discouraged from nursing narratives. If AI could be used to summarize narrative documentation, then the required data could be obtained without the need to complete a series of data fields. This would provide a much-needed method to re-incorporate narrative charting back into the EHR, which is something the nurses so desperately want. They highlighted the loss of story telling in their care and how it devalued the individual experiences of their patients. This loss of story telling is also comparable to Allen's (2018) domain of transfer of care. A development of the story helps the nurse to be able to tell that story to others and clearly articulate the trajectory of care.

The introduction of tablets would promote mobility so the documentation could 'travel' (to use the ANT term) with the patient and reduce the interruption of care delivery between the nurse and the labouring patient. Some EHR systems do provide a mobile version of their application for use on a tablet or phone; however, the functionality is typically limited to specific components of documentation, as the formatting is restricted by the size of the handheld device. As the documentation requirements for labouring patient are complex and detailed, extensive design and testing would be required to ensure that any mobile platforms would be able to meet the needs of the perinatal nurse. Canada is in the very early stages of AI integration in health care

and the possibilities, while seemingly endless, need to be critically thought through to avoid the challenges health organizations and nurses face with EHRs.

This research provided a much-needed nurse centric perspective to the experiences and challenges of perinatal nurses; however, it was limited in its design as a cross-sectional study at a single site. Future work could include a longitudinal or time point series in which nurse participants were interviewed at pre and post implementation as well as at a time like this study, when change management is less of a factor in their experiences. Further research could include an investigation into patient perspectives in conjunction with nursing experiences to gain a more comprehensive understanding of care delivery. This would help answer the question that many nurses in the study were asking: what the patient thought about EHR and how they were being cared for by the nurse during labour?

Significant effort was made to build rapport and establish trust with participants, creating an environment where they felt comfortable sharing their experiences openly and authentically. This in-depth engagement allowed for a deeper exploration of the complexities and nuances of their day-to-day clinical practice, particularly as it related to electronic documentation during labour and delivery. Each participant took part in an approximately one-hour semi-structured interview, providing ample time to elicit rich, detailed narratives about their experiences. The open-ended nature of the interviews allowed participants to reflect deeply on their work, express their perspectives in their own words, and highlight the challenges and adaptations they encounter while using the EHR in the delivery setting. By situating the study within the specific context of BC Women's Hospital, the research explored how organizational structures, technology, and clinical practice interact and influence one another. These details contribute to the transferability of findings, enabling readers and researchers in similar settings to assess the

applicability of the insights to their own environments. The analysis was grounded in two complementary theoretical frameworks: ANT and TMT, both developed by Allen (2015). These frameworks provided a structured lens through which to examine the interactions between human and non-human actors, including the EHR, and helped illuminate the social, material, and organizational dynamics shaping perinatal nursing practice. The integration of theory enhanced the development of themes.

Conclusion

Information technology in health care promises advancement to continue to meet the complex needs of the population. That said, the success of these technological innovations depends largely on how they are introduced into clinical environments and the extent to which the experiences of nurse are considered. From the ANT perspective, success of technological innovation does not rely solely on either technology or human actors but on their interconnections and ability to interact within these networks to produce various effects. Nurses are the largest group of health care professionals and play a central role in delivering safe, effective, and compassionate care. As such, their insights are vital to understanding the real-world implications of digital systems. This study focused on the perinatal nurses and their experiences and challenges following implementation of electronic documentation in the labour and delivery suite. By centering the perspectives of nurses, I seek to highlight the realities of adapting to new documentation workflows while nurses continue to provide high-quality, patient centered care. In addition to contributing to the local practice area and to the larger state of knowledge, the goal of this research is to inform the optimization of EHR systems in ways that align with the clinical needs, cognitive demands, and workflow patterns of perinatal nurses. Findings from this study aim to support not only improved system usability and functionality but

also call for more thoughtful and effective implementations in other maternity settings where nurses remain essential to both maternal and newborn outcomes.

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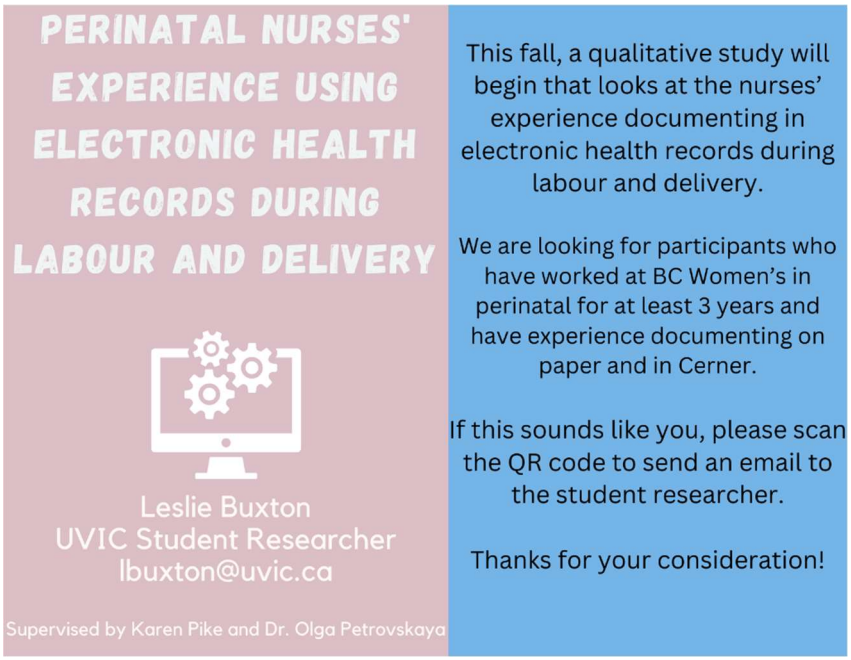
Appendix A

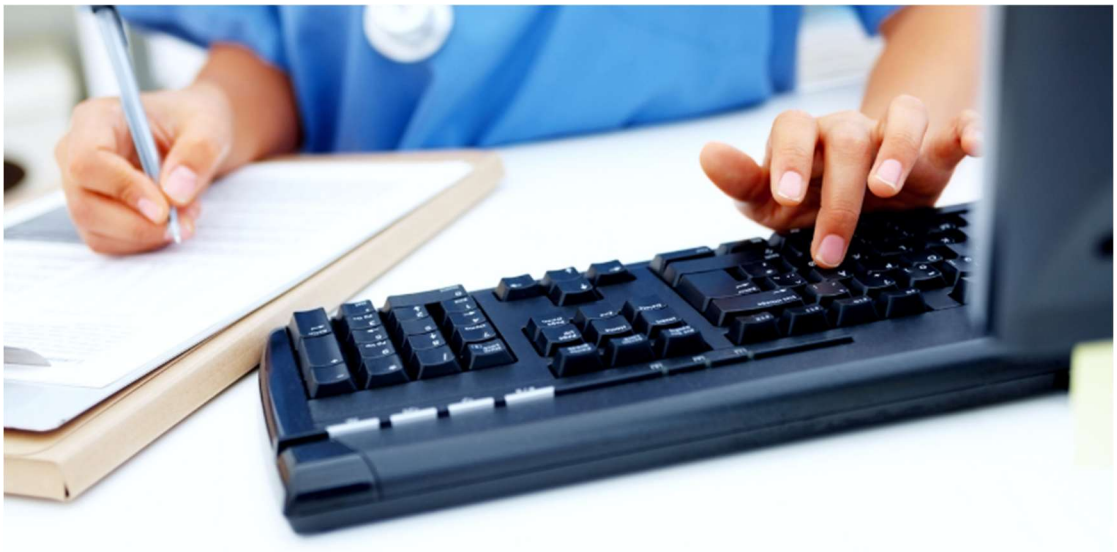
Materials for Recruitment

Postcard-front

Postcard-back



BC Women's Maternal/Newborn Newsletter Submission



Perinatal Nurses' Experience Using Electronic Health Records During Labour and Delivery

This fall, a qualitative study will begin that looks at the nurses' experience documenting in electronic health records during labour and delivery.

We are looking for participants who have worked at BC Women's in perinatal for at least 3 years and have experience documenting on paper and in Cerner.

If this sounds like you, please scan the QR code to send an email to the student researcher.

Thanks for your consideration!

SCAN ME

Leslie Buxton
UVIC Student Researcher
lbuxton@uvic.ca

Supervised by Karen Pike and Dr. Olga Petrovskaya

BC WOMEN'S HOSPITAL+ HEALTH CENTRE

University of Victoria

Appendix B

Sample Participant email generated from QR code

Perinatal EMR Research Participant

To: lbuxton@uvic.ca

Cc/Bcc, From: buxtonleslie@gmail.com

Subject: Perinatal EMR Research Participant

Hello,

I am interested in being a research participant for your study.

Thanks,

Appendix C

Sample Participant Recruitment Email

Dear _____,

Thank you for your interest in participating in the qualitative study **Perinatal Nurses' Experience Using Electronic Health Records During Labour and Delivery.**

What is the purpose of this study?

The aim of this study is to fill the gap in perinatal-specific research by answering the question "What are the experiences and challenges of labour and delivery nurses using electronic health records while caring for labouring patients?"

This study is important because there is a notable gap in the research relating to the impact of electronic health records for nurses within the perinatal space, specifically those caring for patients during the critical phase of labour and delivery.

You have been invited to participate in this study because you have documented on the paper partogram as well as in CST Cerner and can provide a real-life perspective of what it is like for nurses to use electronic health records in their daily work.

Will I receive any compensation for taking part in the study?

You will receive a $25 gift card as a small thank-you gift for completing the interview.

What's next?

I will be in touch soon to arrange a time to meet with you for 45-60 minutes to complete the interview over zoom. Please note that this time needs to be outside of your work hours.

If you have any questions or concerns, please reply to this email and I will be happy to answer them.

With kind regards,

Leslie Buxton Graduate Student Researcher, University of Victoria
Dr. Olga Petrovskaya Principal Investigator, University of Victoria
Karen Pike Co-Investigator, BC Women's Hospital and Health Centre

Appendix D

Sample Interview Guide

These interviews will be conducted over zoom to be more convenient for the participants. Recognizing the barriers associated with in person meetings such as childcare, travel time, and parking. I plan to utilize both the recording and transcription functions of the platform to help with my field notes. I would also plan for up to 15 minutes of "logging on" time as some people are less familiar with videoconferencing than others.

Introduction

"Thank you so much for taking the time to meet with me and agreeing to answer some questions about your experience using electronic documentation.

- Your responses will be kept confidential
- No details will be shared with your supervisors
- This conversation will take around 45
- Are you ok if I record this session to help with me with my notes?"

Before we get started, I want to take a minute to review the consent I sent you. Did you have a chance to review it?

Yes

Do you have any questions?

You understand that your participation in this study is voluntary

You understand that you can withdraw my consent at any time (up to 2 months after the interview)

You agree to take part in the study

You agree to have this interview recorded

No

Go through the full document

The aim of today is to better understand your experiences and challenges by reflecting on your everyday work. I want you to know that you can ask to stop the interview at any time. Before we get started, a little about me…"

> Discuss my background and what has led to me doing this work
>
> The aim of my introduction is to put the interviewee at ease and hopefully contribute to an open dialogue

“This interview will consist of a series of questions related to your work, feel free to share as much information as you’d like.

Get to know the participant

1. Can you tell me a little about yourself? How long have you been a labour and delivery nurse?
2. Which units have you worked on? (follow up-which one do you work on the most?)
3. What would you say if your favourite part about your job?

Better understand their work

1. Please walk me through a typical day of work (dayshift or night)
2. How did your day look different prior to the implementation of CST
3. Can you describe for me documenting on paper fit into your care?
4. What are some things that come to mind when you think about how you documented on paper during labour? (Follow-up: things you liked, things you didn’t)

Electronic Documentation Experiences

1. When you think about your workday now, compared to before the implementation of electronic health records, what stands out as different? (Can you elaborate on that more for me? If the answer is short)
2. Can you describe for me the experience of documenting during labour?
3. How does the computer affect the care you are providing?
4. Please walk me through a situation where you are caring for a patient during labour and delivery. How are you balancing the care of the patient with the documentation requirements? How does that make you feel?
5. Do you think electronic documentation helps or hinders your care of the patient? (Follow-up: in what ways? Can you explain that a little further?)

Electronic Documentation Challenges

1. What’s one word you would use to describe electronic charting?
2. When you think about documenting during labour, do you find it straightforward or challenging? (Follow-up: in what ways? Can you elaborate on that further?)
3. Can you describe for me a time that you struggled with documenting during labour? (Follow-up: How did you overcome this?)
4. What (if any) impacts did this have on patient care?
5. How would you describe how your current version of electronic documentation is designed/set up?
6. If you could redesign the system you use now, in what ways would you change it?
7. How do you think electronic documentation has affected your care of labouring patients?
8. What kinds of resources are available for support with electronic documentation? What do you think support should look like?
9. What are some pain points with the system that stand out to you?

10. How would you describe the patient perspective when thinking about electronic documentation?

Conclusion

1. Is there anything else you'd like me to know about your experiences or challenges with electronic documentation?
2. Would you be willing to be contacted at a later date if required?

"Thank you so much for taking the time to meet with me and share your experiences. I value your perspective and wouldn't be able to do this research without your personal reflections.

Appendix E

Consent Form

Participant Consent Form

Perinatal Nurses' Experience Using Electronic Health Records During Labour and Delivery: A qualitative study.

Who is conducting the study?

You are invited to participate in the study **Perinatal Nurses' Experience Using Electronic Health Records During Labour and Delivery: A qualitative study** that is being conducted by Leslie Buxton, a graduate student in the Faculty of Human and Social Development, School of Nursing at the University of Victoria.

I can be contacted by telephone at 604-612-2927 or by e-mail at lbuxton@uvic.ca

As a graduate student, I am conducting research as part of the requirements for a master's degree in nursing. This research is being conducted under the supervision of Karen Pike, Dr. Olga Petrovskaya, and Dr. Vera Caine, who can be contacted by e-mail at karen.pike@cw.bc.ca, olgap@uvic.ca, or vcaine@uvic.ca.

Funding for this study has been received from the School of Nursing at the University of Victoria (graduate funding).

Your decision to take part in the study, or your decision to withdraw from the study, will not affect your employment and results will be anonymized to ensure confidentiality of responses.

What is the purpose of this study?

The aim of this study is to fill the gap in perinatal-specific research by answering the question "What are the experiences and challenges of labour and delivery nurses using electronic health records while caring for labouring patients?"

This study is important because there is a notable gap in the research relating to the impact of electronic health records for nurses within the perinatal space, specifically those caring for patients during the critical phase of labour and delivery.

You have been invited to participate in this study because you have documented on the paper partogram as well as in CST Cerner and can provide a real-life perspective of what it is like for nurses to use electronic health records in their daily work.

It's your choice whether or not you want to take part in this study.

Your participation is voluntary.

If you choose take part in this study, what will you do?

If you take part in this study, you will:

- Attend a zoom interview conducted by Leslie, the student researcher to answer some questions about documenting during labour on paper and electronically.

- You will be asked questions about how long you have worked as a perinatal nurse, as well as some specifics about experiences and challenges documenting on both paper and electronically during your care of labouring patients.

The interview will be recorded for the purpose of data collection and transcribed verbatim so that accurate notes can be taken, and data analyzed. Video recordings will be securely stored for the duration of the study and then destroyed. All participants will be coded so that their response will not be linked to their video.

You do not have to answer any questions that make you feel uncomfortable.

How long will this take?

These interviews will take approximately 45-60 minutes and will be conducted via video conferencing outside of work hours. Your participation is voluntary, and you will not be paid for this time.

What are the possible harms and discomforts?

If you take part in this study, there is a possibility that sharing your experiences may illicit an emotional or distressing response. You are encouraged to share as much or as little as you feel comfortable, and resources will be made available if follow up support is required.

What are the possible benefits of taking part in this study?

Although you may not benefit directly from the study, the results aim to focus the attention on the perinatal nurse and what their experiences and challenges are following implementation of electronic documentation in the labour and delivery suite. The goal of this research is to be able to guide the optimization of the electronic record application to better support nurses who provide perinatal care and to positively influence future implementation at other maternity sites.

Will I receive any compensation for taking part in the study?

You will receive a $25 gift card as a small thank-you gift for completing the interview.

Who will see my information?

- I will review the transcriptions to document responses that can later be coded and thematically organized.
- In addition to the interview notes, I will complete reflective notes following each interview to capture any details or thoughts pertaining to the unique conversation.
- All data will be collected without identifiers.
- Confidentiality will be protected by associating a number with each participant and documenting their responses based on their coded number.

All recording and transcripts will be stored on a password protected UVIC Sharepoint site and only accessible by researchers. The information collected during this study will only be used for the research outlined above and will be kept for 5 years. At which point all paper records will be shredded, and all videotapes/computer files will be deleted.

How will the study results be shared?

Findings from this study will be reported in my graduate thesis and may be submitted for publications. Your name will not be used in these publications.

Please note:

You may end the interview at any time.

You may change your mind and withdraw from this study at any time. There is no need to explain why you have changed your mind.

If you withdraw from the study your contribution will not be used in the analysis or final report. You have 2 months after the interview to withdraw your data.

If you have any questions or if you would like to discuss this study further, please contact the researcher, Leslie Buxton by telephone at 604-612-2927 or by e-mail at lbuxton@uvic.ca.

You can also contact the Human Research Ethics Office at the University of Victoria at 250-472-4545 or ethics@uvic.ca, to check the ethical approval of this study, or to raise any concerns you might have.

Please remember that participation in this study is voluntary.

Consent:

I have read this consent letter…….....yes…….no

I have had the opportunity to ask questions...……...…….....yes…….no

I understand that my participation in this study is voluntary .....yes…….no

I understand that I can withdraw my consent at any time (up to 2 months after the interview)
…….....yes…….no

I agree to take part in the study……..…….…..……....yes…….no

I agree to have my interview recorded…….……..yes…….no

Name of Participant *Signature* *Date*

Appendix F

Ethics Approval

University of Victoria

Certificate of Ethical Approval for Harmonized Minimal Risk Behavioural Study

University of Victoria
Human Research Ethics Board
Michael Williams Building, R. B202 PO Box 1700
STN CSC
Victoria, BC V8W 2Y2
Tel: 250-472-4545

Also reviewed and approved by:

- Children's and Women's Research Ethics Board

Principal Investigator:	Primary Appointment:	Board of Record REB Number: BC24-0354	UBC REB Number:
Olga Petrovskaya	University of Victoria	Board of Record: University of Victoria	H24-02142

Study Title:
Perinatal Nurses' Experience Using Electronic Health Records During Labour and Delivery: A qualitative study.

Study Approved: October 30, 2024 **Expiry Date: October 30, 2025**

Research Team Members:
Karen A. Pike, Adjunct Faculty, UBC
Leslie Buxton, Principal Applicant, UVic Graduate student
Vera Caine, Faculty, UVic

Sponsoring Agencies:
- University of Victoria

Documents included in this approval:

Document Name	Version	Date
Protocol:		
Research Proposal	1	August 13, 2024
Consent Forms:		
Consent form-Verbal	2	October 19, 2024
Advertisements:		
Recruitment Advertisements	2	October 19, 2024
Initial Contact email template	2	October 19, 2024
Questionnaire, Questionnaire Cover Letter, Tests:		
Interview guide	1	August 13, 2024
Other Documents:		
TCPS2 Certificate	1	August 13, 2024
Letter of operational support	1	August 13, 2024

This ethics approval applies to research ethics issues only and does not include provision for any

Appendix G

BCWH PU Approval

BC WOMEN'S HOSPITAL+ HEALTH CENTRE
An agency of the Provincial Health Services Authority

WOMEN'S HEALTH RESEARCH INSTITUTE AT BC WOMEN'S

PROGRAM UTILIZATION FORM

This Form must be completed if your research study impacts a BC Women's Hospital + Health Centre (BCWH) program or clinic. Refer to the *BCWH Program Utilization Form Guidance Notes* for information on institutional approval, program utilization, and the submission process. Note that this process generally takes at least 6-8 weeks.

The Programs/Clinics are responsible for determining if these services will have sufficient impact as to require cost recovery. It is the responsibility of the Principal Investigator/Project Lead to ensure proper consultation is done with the Programs/Clinics prior to finalizing the project budget.

Principal Investigator/Project Site Lead Declaration

It is the responsibility of the Principal Investigator (PI)/Project Site Lead to inform the program/clinic and the Women's Health Research Institute (whri_cwbc@cw.bc.ca) in a timely manner (within 4 weeks) if there will be any potential or has been an actual change in the PI and/or Site Lead's **BC Women's Hospital medical staff privileges or appointment** during the study period, as this may impact the ability of the study to proceed.

If a change in privileges or appointment may occur or has occurred, study approval will be re-reviewed by the program/clinic and by the Women's Health Research Institute.

Please select the declaration option below ~~that best fits~~ with the current research study:

☐ The Principal Investigator overseeing the study holds an appointment with the Children's & Women's Health Centre of British Columbia.

As Principal Investigator, I understand it is my responsibility and agree to inform the program/clinic and the WHRI within 4 weeks of any potential or actual change in my BC Women's Hospital + Health Centre medical staff privileges or appointment during the study period.

Principal Investigator Signature: _____

Print Name _____

Date November 7, 2024

☑ The Principal Investigator has designated a Project Site Lead to oversee study activities who holds an appointment with the Children's & Women's Health Centre of British Columbia.

As designated Project Site Lead, I understand it is my responsibility and agree to inform the program/clinic and the WHRI within 4 weeks of any potential or actual change in my BC Women's Hospital + Health Centre medical staff privileges or appointment during the study period.

Project Site Lead Signature: _____

Print Name Karen Pike

Date November 6, 2024

Section 1: Project Information

Study Title: Perinatal Nurses' Experience Using Electronic Health Records During Labour and Delivery: A qualitative st	
REB#:H24-02142	REB Approval Date:October 30, 2024 ☐ In progress
Principal Investigator Name: Olga Petrovskaya	PI Email: olgap@uvic.ca
Primary Contact Name: Leslie Buxton	Primary Contact Email: lbuxton@uvic.ca
Primary Contact Role:Learner-Student (E.g., Researcher, learner-student, resident)	Study Sponsor (if applicable): Karen Pike
Anticipated start date (in program): 11/01/2024	Anticipated end date (in program): 01/31/2025
Summarize the research proposal, including study purpose, study population, and research method (please be brief and use lay language): There is a notable gap in nurse-centric research relating to the use of electronic health records (EHRs), as much of the work relating to its use does not differentiate between health care members, as well as the patient experience. While some studies have explored nurse's experience with EHR, they failed to provide a comprehensive understanding of the nurses' experience in the labour and delivery suite which can affect the care that is being provided. The aim of this study is to fillthe gap in perinatal-specific research by answering the question Whatare the	

Section 2: Supporting Documents

Include the following documents (if applicable) with your PU Form before the signatories can review your request:

- ☑ Study/Project Protocol
- ☑ RISe (Research Ethics) Application
- ☐ Research Ethics Approval Certificate
- ☑ Consent Form(s)/ Waiver of consent
- ☐ Patient Information Sheet
- ☑ Recruitment Material (e.g., posters)
- ☐ Service agreements (e.g., lab services, imaging, pharmaceutical)

Section 3: BC Women's Hospital Program and/or Specific Clinic

One form must be submitted for each program that is impacted by your study.

<table>
<tr><th colspan="2">ACUTE PROGRAMS</th></tr>
<tr><td>☑ Maternal Newborn Program:
☐ Antepartum/Postpartum
Specify Unit(s):
(Evergreen, Dogwood, Arbutus, Balsam)
☑ Cedar Birthing Suites
☑ Teck L&D, OB Surgical Services, UCC
Specify Area(s): L&D only
☐ Perinatal Substance Use (Fir square)</td><td>☐ Neonatal Program:
☐ NICU
☐ Neonatal Follow-up
☐ MBC</td></tr>
<tr><th colspan="2">AMBULATORY PROGRAMS</th></tr>
<tr><td>☐ Maternity Ambulatory Program
Specify Clinic(s):
(I.e., Anesthesia, Antepartum Homecare, Diabetes in Pregnancy, Fetal Assessment, Fetal, Diagnosis Service, Hematology, Infectious Diseases, Internal Medicine, Iron Infusions, Lactation Consultation, Maternal Fetal Medicine, New Beginnings Maternity, Prenatal/Special Procedures, Social Work, Ultrasound).</td><td>☐ Nurse Practitioner Services
Specify Clinic(s):
(I.e., After Breast Cancer, Aboriginal Mother's Centre (AMC), Vancouver Women's Health Collective (VWHC), WISH drop-in Centre, Sisterspace, Overdose Prevention Site (OPS), Heart Health, Newcomer Services).</td></tr>
<tr><td>☐ Gynecology and Sexual Health Program
Specify Clinic(s):
(I.e., Chronic Pelvic Pain and Endometriosis, Early Pregnancy Assessment Clinic (EPAC), Recurrent Pregnancy Loss (RPL), ACCESS, Continence, CARE Program)</td><td>☐ Gynecology Daycare Surgical Services</td></tr>
<tr><td>☐ Breast Health Program</td><td>☐ Oak Tree Clinic</td></tr>
<tr><td>☐ Sexual Assault Service</td><td>☐ Provincial Medical Genetics Program</td></tr>
<tr><td>☐ Complex Chronic Diseases Program</td><td>☐ Penicillin Allergy Clinic</td></tr>
<tr><td colspan="2">Other, please specify:</td></tr>
<tr><td colspan="2">For a full list of BCWH Services: http://www.bcwomens.ca/our-services</td></tr>
</table>

Section 4	PROGRAM UTILIZATION REQUEST

a) What BCWH Program/Clinic resource(s) are you requesting? Check all that apply.	☑ Staff (e.g., booking clerk, nurse, health records tech) ☐ Infrastructure (e.g., Exam Room, Equipment) ☐ Clinic or Program Records ☐ Parent Advisors (NICU) ☐ Other, please list: ☐ None
b) What tasks are being requested of Hospital Staff for this study?	☐ Introduce research study/staff to patient ☐ Chart flagging ☐ Chart access ☐ Data entry ☐ Sample collection ☑ Other Research interview ☐ None
c) How many research participants will be participating at BCWH (in this program specifically)?	12-15
d) Describe what is being requested **of Program Staff and/or Program resources** for this study. For Acute programs, if more than one clinic area was selected in Section 3, list requests for each area separately. For Ambulatory programs, where applicable, include the following: - Type of resource - Duration (i.e., minutes/hours) - Time (of day) - Frequency (weekly, ad hoc) - Start Date - End Date	Perinatal nurses are being asked to participate in a zoom interview of 45-60 minutes outside of work hours to share their experiences and challenges documenting in CST Cerner during their care of patient in labour and delivery.
e) Describe study activities conducted in the Program by **non-Program Staff.** *e.g., Research staff, trainees, research nurse*	All interviews will be conducted off site during non-work hours.
f) If your study requires participant recruitment within a program, how will your study representative be introduced to the patient or family member?	Recruitment advertisements will be placed in staff areas and a newsletter submission will be sent out in the Maternal/Newborn communications. I will also attend huddles to connect with the staff.
g) How will program staff be oriented to the study (or trained) if necessary?	N/A

h) How will the research results be shared with the program?	The thesis will be publically available through the UVIC website. In the event that this research is published, it will be shared with operations so that it can also be shared with the participants and
i) If required by the program, is funding available to support any requested BCWH Program/Clinic resources?	☐ Yes ☑ No
j) Please include any additional information about your study that would help during our review.	
k) Would you like to promote your study on the BC Women's Hospital website?	☐ Yes ☑ No

Please see next page for required signatures:

For Acute Programs, please see Section **5.1**

For Ambulatory Programs, please see Section **5.2.A**; for Provincial Medical Genetics Program see Section **5.2.B**

Section 5.1: Required Signatures (ACUTE PROGRAMS) *For a full list of signatories, click here*

Program Manager Signature
Add handwritten, scanned signature, or signature line in box below:

Print Name
Date November 7, 2024

Program Medical Lead Signature
Add handwritten, scanned signature or signature line in box below:

Print Name
Date November 7, 2024

Senior Director
Add handwritten, scanned signature or signature line in box below:

Print Name Anne Margaret Leigh
Date November 7, 2024

Senior Medical Director
Add handwritten, scanned signature or signature line in box below:

Print Name Dr. Janet Lyons
Date November 7, 2024

**Once Senior Director/Senior Medical Director signature is obtained, please submit to the office of the WHRI Executive Director (Rm H214 c/o Lori Brotto)*

Executive Director, Women's Health Research Institute Signature
Add handwritten, scanned signature or signature line in box below:

Dr. Lori Brotto
Print Name
Date November 7, 2024