Transition to an Electronic Health Record in Stroke Rehabilitation: Perspectives on Assessment and Workflow

by

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Abstract

This thesis explores the transition to an Electronic Health Record (EHR) system in an inpatient stroke rehabilitation setting at Glenrose Rehabilitation Hospital (GRH), describing the perceptions and experiences of rehabilitation therapists and managers. The thesis begins with a scoping review, with the objective of examining the extent of existing literature on rehabilitation therapists' perspectives on EHR transitions and identifying prevailing gaps in literature. This objective is achieved by systematically searching and analyzing relevant literature from electronic bibliographic databases such as Ovid MEDLINE, EMBASE, CINAHL, and SCOPUS. Due to the sparse availability of studies specifically targeting rehabilitation therapists, the review broadens its focus to include allied health professionals (AHPs). The scoping review classifies the findings as perceived facilitators and perceived barriers; and identifies the following gaps in the existing research- limited isolated studies specifically focusing on perceptions of rehabilitation professionals, a geographical concentration of research predominantly in Australia, and a gap in exploring perspectives around clinical practice. Rather, literature lays an emphasis on the usability and functionality perceptions of EHR systems.

The subsequent qualitative study seeks to fill the identified gap by exploring EHR transition perceptions on assessment and workflow, in an inpatient stroke rehabilitation setting. The study employs qualitative descriptive methods- focus groups and thematic analysis- to delve into the experiences of rehabilitation therapists and managers on transitioning to EHR. The thematic analysis is informed by the themes of E.M. Rogers' Diffusion of Innovations (DoI) theory, and the findings are organized under DoI theory's key technical themes—relative

advantage, compatibility, complexity, trialability, and observability—and social themes—adopter categories, psychological factors, and team and organizational dynamics.

Under technical attributes, EHR offered a relative advantage and observable benefits over traditional systems in enhancing communication and information access, patient-centered goal setting and continuity of care. However, it introduced challenges like compatibility issues with existing workflows, increased documentation burdens and technical complexities. The study also illuminated the essential role of human and social factors in EHR adoption, with participant categorization into Rogers' adopter categories revealing varied staff readiness and acceptance. The transition's psychological effects, marked by resistance, anxiety, and adaptation levels, underscored the need for a supportive organizational culture with peer support and proactive leadership to facilitate EHR adoption.

Preface

This thesis is an original work by Palak Jhingan. The thesis consists of two studies- a scoping review and a qualitative descriptive study. The latter received research ethics approval from the University of Alberta Research Ethics Board, titled “Perspectives on the transition to an electronic health record”, Ethics ID: Pro00124571 on 13 May 2024.

Dedication

I would like to dedicate this thesis to my sister, Kanak, for her unwavering encouragement and diligent inquiries regarding my progress. I would also like to dedicate this work to my family and friends in India, whose constant support and love have been my anchor across the seas. And to the friends I made here in Edmonton, who are my home away from home.

Acknowledgement

First and foremost, I extend my deepest gratitude to my supervisor, Dr. Trish Manns, for her invaluable guidance, patience, and support throughout this scholarly journey. Her expertise and insight have not only shaped the direction and substance of this research but have also significantly contributed to my professional development. Dr. Trish's vision of the broader context and our intellectually stimulating discussions have served as a source of inspiration, enriching my personal and academic growth in immeasurable ways.

I am immensely thankful to the members of my thesis committee. Special thanks to Alyson Kwok, whose experienced insights and suggestions helped refine the study design, and whose constructive feedback challenged me to push the boundaries of the analysis methods of my research. I extend my sincere gratitude to Dr. Victor Ezeugwu, whose enthusiasm, and thought-provoking discussions, paired with positive feedback, have been invaluable sources of encouragement to my academic journey.

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I am deeply grateful to the members of my cohort, who have provided companionship, motivation, and a sense of community throughout this endeavor. Their camaraderie and willingness to share knowledge and experiences have enriched my journey in countless ways. A

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This thesis not only represents my academic journey but also the collective effort and support of everyone mentioned above. My gratitude towards all of you is boundless and enduring.

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Chapter 1. Introduction and Background

Electronic health records (EHRs), also known as electronic medical records (EMRs), are digital, real-time records that make information about patients available to health care providers. They are designed to support healthcare delivery, including clinical decision support, patient engagement, and the management of healthcare information.[1] With rapid uptake of EHRs into contemporary healthcare systems, they hold the potential to transform the rehabilitation sector by facilitating a holistic approach to patient care. This is reflected through EHRs' ability to integrate a broad spectrum of data- encompassing health, social, economic, behavioral, and environmental factors.[1] Hence, EHRs support a comprehensive understanding of the patients' health status, and subsequently enables personalized and tailored treatments, promoting patient centered care.

Alberta Health Services (AHS) adopted Connect Care, hereinafter referred to simply as EHR, to centralize patient health information management across Alberta, Canada. Launched in 2019, this EHR is being implemented in AHS facilities province-wide, with a full rollout expected by the fall of 2024 (see Appendix A: Connect Care Implementation Timeline). Consequently, inpatient stroke rehabilitation at Glenrose Rehabilitation Hospital (GRH), in Edmonton, made the switch from paper to EHR as part of the fourth phase of the province wide EHR integration, in May 2022. GRH is the largest free-standing, tertiary rehabilitation hospital in Canada. GRH provides specialized physical rehabilitation and therapeutic services to patients of all ages, with interdisciplinary teams that include 16 professional disciplines.

In October 2022, we undertook a study to review patient charts recorded using the newly implemented EHR system in inpatient stroke rehabilitation at GRH. Charts from outpatient stroke, a department that had transitioned to EHR earlier, were also included in this study. While

this study is not a part of the thesis itself, it has been instrumental in shaping the context of the work within the thesis. Below is a concise summary of the findings from the chart review study.

The chart review aimed to evaluate how inpatient, and outpatient physical therapists were using the EHR, hereinafter referred to simply as rehabilitation therapists. Appendix B contains a copy of the paper-based assessment form alongside a snapshot of the EHR interface for reference. The chart review study specifically looked at how rehabilitation therapists conducted assessments, the impact of EHR on their preferred use of outcome measures, and their favored functionalities within the EHR system. The chart review, hence focused on auditing the following aspects: the outcome measures commonly employed by rehabilitation therapists, how therapists made use of EHR's flowsheet and free text functionalities, and the documentation of patient goals. In addition, the timeframe from admission to the establishment of patient-centered goals, and how well patient goals corresponded with assessments was also reviewed. The findings of the chart review indicated a prevalent use of outcomes that did not fully align with best practices. There was noticeable duplication of data between flowsheets and free text entries, along with inconsistencies in the documentation of patient goals. These findings were presented to the rehabilitation therapists in May 2023. During this knowledge dissemination session, the therapists expressed their interest in sharing their subjective lived experiences with transitioning to the EHR, an aspect not covered by the chart review study, which focused solely on objective data. This conversation laid the groundwork for the thesis.

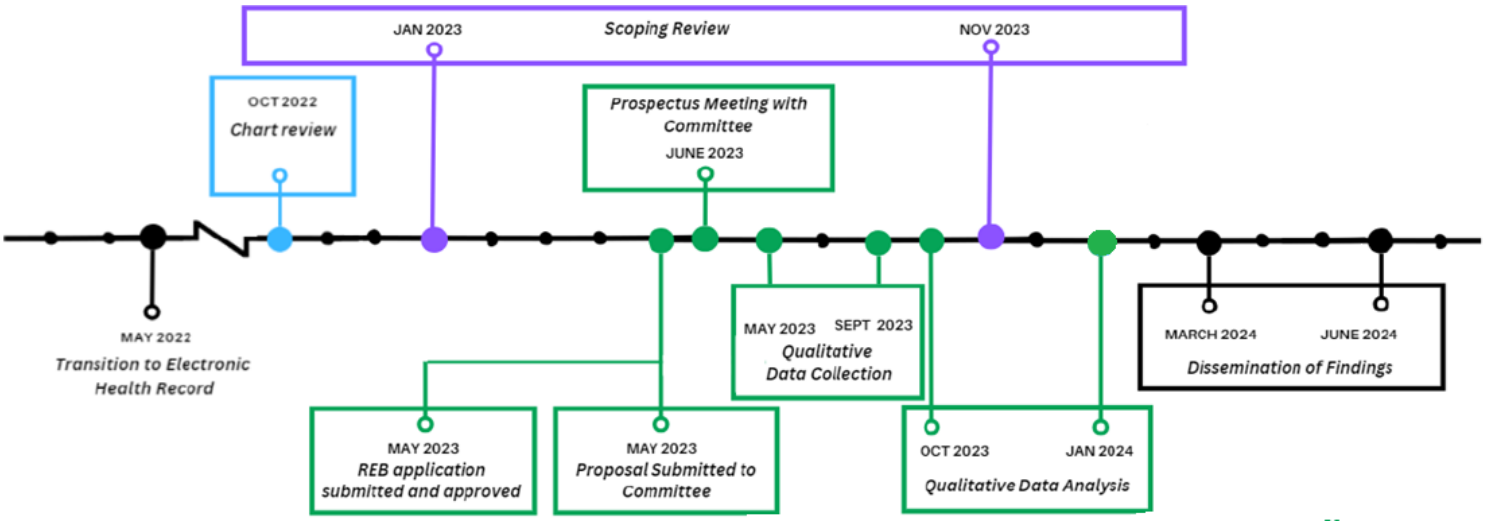
The thesis begins with a scoping review aimed at gathering, summarizing, and mapping existing literature on the perspectives of allied health professionals towards EHR use. Including allied health professionals in our review was a strategic decision driven by the sparse availability of studies exclusively focusing on rehabilitation therapists. This broader inclusion allowed us to

overcome the limitation of a narrow dataset by opening to a richer, more diverse body of existing research. It broadened the scope to capture insights from a variety of healthcare professionals who, while distinct, share common challenges and experiences with EHR systems that are relevant to rehabilitation therapists. The review helps highlight the unique challenges faced by allied health professionals, distill major themes, and identify facilitators and barriers to EHR implementation and use. A notable gap is highlighted in the scoping review, with limited studies exclusively addressing rehabilitation therapists' perspectives on transitioning to EHR systems. Additionally, the findings deliver insights on perceptions of usability, functionality, and workflows changes, and not perspectives on assessment, clinical practice, and clinical reasoning.

Building on the scoping review, the thesis progresses with a qualitative descriptive study that specifically describes the unique experiences of inpatient stroke rehabilitation therapists at Glenrose Rehabilitation Hospital (GRH) with their transition to an EHR. This study seeks to address the gaps highlighted by the earlier chart review study and the comprehensive scoping review of existing literature, specifically by exploring the subjective experiences of rehabilitation therapists at GRH. The qualitative research primarily examines the aspects of assessment and workflow practices related to the EHR transition, while also briefly addressing issues related to usability. The study employs focus group discussions with rehabilitation therapists and managers working with them, as the primary method of data collection, and thematic analysis for data analysis. The findings are presented as themes from E.M. Rogers' Diffusion of Innovation (DoI) theory, which represent the factors influencing EHR adoption- relative advantage, compatibility, complexity, trialability and observability. DoI is a social science theory that seeks to explain the spread of an innovation, or a new idea, within a population or an organization.[2] This theory guides the design of the focus group interview guide, serves as a functional lens for data analysis

in the study, and ensures the presentation of the findings in a distilled manner. To summarize and provide context for how the chart review, the scoping review and the qualitative study relate to each other, along with other key dates pivotal to the fulfillment of this thesis, a timeline is presented in Figure 1.1. below.

Figure 1.1. Thesis Timeline: Correlation of the Studies and Important Milestones



The chart review study is not included in this thesis and is not discussed further. Chapters 2 and 3 of this thesis detail the methods, results, and discussions related to the scoping review and the qualitative descriptive study, respectively. Following which, Chapter 4 wraps up the thesis by exploring strategies for disseminating knowledge, discussing the application of the research conducted, and proposing future research directions.

References

1. Evans RS. Electronic Health Records: Then, Now, and in the Future. *Yearb Med Inform*. 2016; Suppl 1: S48-61. doi:10.15265/IYS-2016-s006
2. Rogers EM. *Diffusion of Innovations*. 4th ed. Free Press; 1995.

Chapter 2. Allied Health Perspectives on Electronic Health Record: A Scoping Review

Introduction

A crucial aspect of clinical decision-making centers on systematic documentation and retrieval of patient information.[3] Historically, documentation was done using physical paper records; in retrospect, a practice that posed constraints related to storage, archive management, and susceptibility to errors and inconsistencies.[4] Over the past decade and a half, the introduction of electronic health records (EHR) into healthcare systems aimed to rectify these limitations, and to streamline organizational efficiency. From the perspective of patient care, the integration of EHR improves data accuracy, facilitates clinical decision-making processes, and enhances information accessibility to ensure continuity of care.[3]

It is important from a patient care perspective that EHRs are implemented effectively. In parallel, healthcare professionals, who serve as the end-users of EHR, must ensure its successful uptake and pragmatic use to actualize benefits. The transition from paper-based records to EHR is a disruptive change to the day-to-day practice and workflow of healthcare professionals. Hence, looking at this transition from the perspective of healthcare professionals is important, and can provide direction to overcome challenges that may arise with EHR use, and help ensure that the intended benefits of the EHR are realized for efficient data management and high-quality patient care.

Existing research has focused on the perspectives of medical and nursing professionals regarding EHR implementation and utilization;[5–11] with limited attention given to allied health professionals (AHP). Thus, this scoping review aims to assess and summarize the extent of

existing literature around this topic within the domain of allied health, by extracting information on the perspectives of AHP on EHR use; and by classifying these perspectives as facilitators and barriers to effective uptake and use. The resulting synthesis will help answer the following questions:

1) What are the perspectives of allied health professionals (AHP) on the use of electronic health record (EHR)?
2) What are the perceived facilitators and barriers to successful EHR integration?

Methods

Prior to discussing the methods employed for this review, it is important to revisit some definitions of key terms that will be frequently used in this section.

Electronic Health Record (EHR). The National Academy of Medicine, formerly known as the Institute of Medicine (IoM), defines the electronic health record (EHR) as a longitudinal collection of electronic health information "for" and "about" persons.[12] EHR represents more than merely a shift in the format in which health information is stored, rather it constitutes a systemic change that has the potential to shape various facets of clinical decision-making; impacting clinical outcomes, assessment methods, clinical trial identification, and resulting in both anticipated and unanticipated changes.[1]

Primary and secondary use. This scoping review will exclusively focus on the *primary use* of EHR, which involves healthcare professionals directly gathering and maintaining patient records for care purposes. We will not address the secondary usage, such as utilizing pre-existing patient records for activities like teaching, research, and policy design.

Allied health professionals. The term allied health lacks a universally accepted definition and differs in its scope across different countries, with most formal definitions laid out in the UK and Australia. Interestingly, even within a formal structure the UK and Australia versions do not reflect the same group of professions.[13]

We will adhere to the definition provided by Allied Health Professions Australia (AHPA) to streamline our focus for this review. AHPA defines allied health professionals by what they are not, rather than what they are; by characterizing them as healthcare practitioners who fall outside the categories of medical, dental, or nursing professions.[14] Using this definition informed the identification of search terms for database searches, and the consolidation of our exclusion criteria.

Scoping review vs systematic review. The limited body of literature addressing the perspectives of AHP on the use of EHR systems guided the selection of scoping review as our methodology of choice. A scoping review, as opposed to a systematic review which is more structured and targeted, is preferrable when the objective is to pinpoint and examine existing knowledge gaps pertaining to broader research questions, while highlighting characteristics or factors associated with a concept.[15,16] Unlike a systematic review, a risk bias assessment is typically not conducted for a scoping review, which we have not included in our study either.

Study Identification

We identified relevant articles by systematically searching electronic bibliographic databases of Ovid MEDLINE, EMBASE, CINAHL and SCOPUS. The search strategy underwent a series of revisions and refinements; a collaborative effort that spanned multiple meetings, and guidance from a librarian. We deconstructed our research question and used the SPIDER standardized systematic search tool to facilitate the identification of subject headings and keywords.[17] The

final search strategy included the subject heading “attitude of health personnel”, supported by identified keywords- “experience”, “perception”, “perspective”, “opinion” etc., connected using ‘OR’ Boolean logic. We then combined the above search terms with subject headings of “allied health”, AND “electronic health record”; which were in turn supported with suitable keywords. Refer to Appendix C: for a comprehensive list of identified subject headings and keywords in the SPIDER tool. Our Ovid MEDLINE search yielded 148 results. The search process was then customised and translated to each of the above-mentioned databases: namely- EMBASE (n=471), CINAHL (n=306) and SCOPUS (n=98). After removing duplicates, the literature search identified a total of 1,023 articles.

Study Selection

Studies with the identified key terms in title, index terms and abstracts (n=1,023) were individually screened by authors PJ and PF using Covidence, a review management software.[18] Any conflicts that arose were resolved by TM. The title and abstract screening for potential inclusion in the review was based on a predetermined inclusion and exclusion criteria, which is summarised in the Table 2.1. Our final selection criteria were narrowed down to only published studies; conducted and published after the year 2000. The decision to include studies published from the year 2000 onward was based on the increased adoption and standardization of EHRs during this period. We excluded studies which did not have allied health professionals as participants, which talked about secondary use of EHR- academic or research related, and those that were not written in the English language. 30 full-text studies remained and were found eligible for full text review. The selected articles were sourced from the web and by utilizing inter-library loans. Thereafter, they were screened by authors TM and PJ for a full text review. Any conflicts were resolved by TM. Overall, this process yielded the 14 studies that are a part of

this scoping review. This screening process is summarized in a PRISMA flow diagram (Appendix D).[19]

Table 2.1. Inclusion and Exclusion Criteria

Include	Exclude
Published studies	Any article published before year 2000
Electronic, e-health record system-implementation or already in place	Not in English
Allied health professionals (AHP)	Not health related
Rehabilitation professionals	Protocol
Therapist, AHP perspectives on EHR use or EHR transition	Exclusively physicians
Any study design is acceptable provided other criteria are met	Exclusively nurses
Articles that are primarily centered around physicians and/or nurses but also include AHP; AHP perspectives should be included in the results	Academic or curriculum integration (secondary EHR use)
	No abstract
	Web articles (must be published, no grey literature)

Data extraction and analysis

We will be utilizing the term *data extraction* throughout this section, as recommended by Joanna Briggs Institute (JBI) to be consistent with other evidence synthesis approaches.[20] We have chosen to do this despite the most current guidelines by Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), that suggest the use of the term data charting to address the process of data extraction, analysis and presentation of findings in scoping reviews.[21]

A standardized form with an a priori protocol and guideline for data extraction was used. The components included in the form were fundamentally guided by the population, concept and context (PCC) framework;[16] which included– description of research participants, study design,

methods of data collection and analysis, results and outcome measures analyzed, and description of the data collection site. The data extraction guideline sheet can be found in Appendix E. In addition to this data, statements and comments which were made within the studies regarding EHR use by AHP were extracted and preliminarily categorized as positive or negative to facilitate the classification of findings into perceived facilitators and barriers.

The analysis of our findings resulted in a two-fold synthesis. The first piece is a summarization of the reviewed studies with a specific focus on the country of origin, percentage participation of AHP, characteristics of EHR, and methods used for data collection and analysis of each study. This will help determine the scope and coverage of the body of literature on the topic. The second piece is a qualitative description involving identification of popular themes, and classification of these themes into perceived facilitators and barriers to EHR implementation and use. The results of our findings are discussed in the section below.

Results

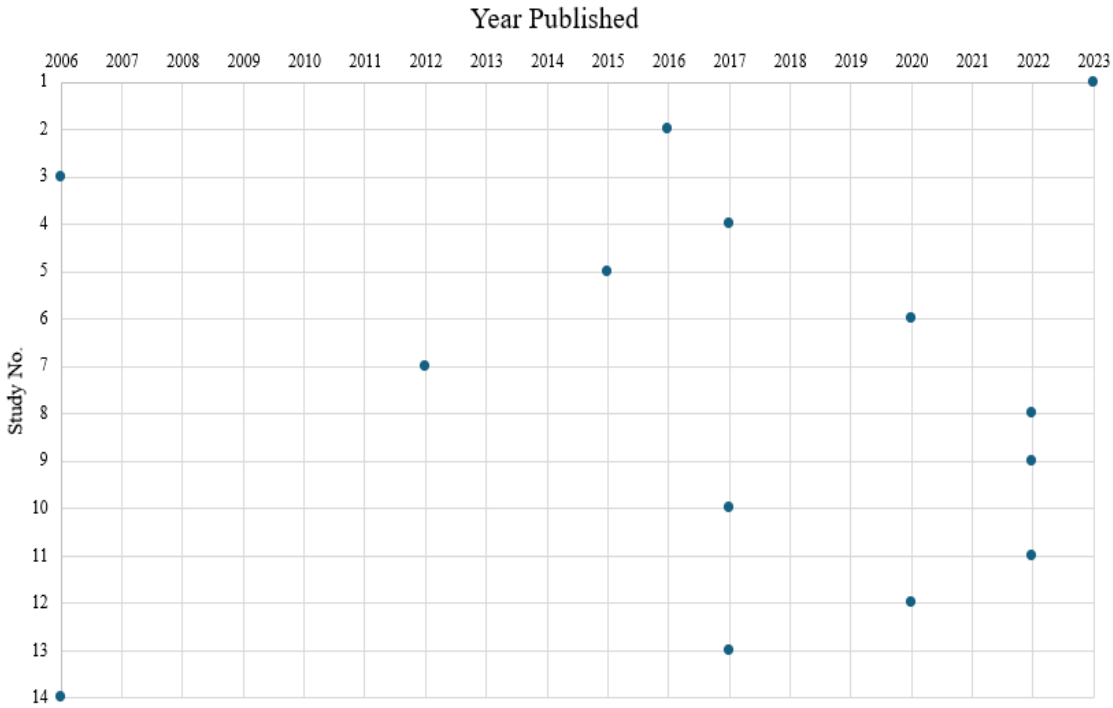
Population, Context and Concept (PCC)

A total of 14 studies met our eligibility criteria and were included in the review.[22–35]Most studies were conducted within Australia (n=7)[24,27,30,32–35] and United States (n=3).[23,29,31] Additionally, studies originated from diverse locations such as Hong Kong (n=1),[26] Germany (n=1),[25] New Zealand (n=1),[22] and Norway (n=1).[28]

The included studies spanned from year 2006 to year 2023. 79% (n=11) of the studies were published in the last decade, with 43% (n=6) published within the last five years. Figure 2.1. depicts the distribution of year of publication. The studies were conducted in a variety of

settings including hospitals (n=9),[22,25–30,32,33] private clinics (n=2),[24,31] a private ambulance and medical services firm (n=1),[23] a community-based physiotherapy clinic (n=1),[34] and an aged care organization (n=1).[35] More in-depth information about the setting(s), population (including the percentage of participants that were allied health professionals (AHP) and EHR characteristics for each study are summarized in Appendix F.

Figure 2.1. Year Published Scatter Plot



STUDY NO.	AUTHOR
1	Alamri 2023
2	Baird 2016
3	Barry 2006
4	Baudendistel 2017
5	Chiu 2015
6	Eden 2020
7	Håland 2012
8	Mishra 2022
9	Mullins 2022
10	Palmer 2017
11	Rowlands 2022
12	Schwarz 2020
13	Yung 2017
14	Ibrahim 2006

Methodologies and Methods

Half (n=7) of the studies used qualitative inquiry as their methodology of choice,[24,25,28,31–35] five used quantitative approaches,[26,27,29,30,33] and two adopted mixed-methods strategies.[22,23] Six out of the seven qualitative studies involved individual interviews,[23,28,31,32,34,35] while the remaining study used focus group method for data collection.[25] In addition to interviews, one study included participant observations,[34] another performed document reviews in parallel,[35] and one

followed participant interviews with a questionnaire.[23] One study employed a repeated measures experimental study design,[24] where two scenarios were examined, and the participants were asked questions before and after receiving a guided demonstration of the EHR software. A summary of the aims, method(s) of data collection, the outcome measures analyzed, and the method of analysis for each of these studies can be found in Appendix G.

The following section synthesizes the findings of the included studies. Findings are categorized into facilitators and barriers of EHR implementation and use.

Facilitators of EHR Implementation and Use

Improved charting quality: objectivity, accuracy, and structure. Participants perceived that the EHR provided more objective and accurate data in comparison to traditional paper records contributing to improved quality of charting.[23] A standardized framework, structured format, ease of data retrieval, and users' confidence in record completeness were some factors that were identified as contributing to the improved documentation.[28,24] This was in contrast to the challenges reported related to transcription and duplication experienced in paper-based and hybrid charting systems.[32]

Novel Functionalities. Barry et al. and Palmer et al. observed that participants expressed a preference for employing EHR screen reminders, which effectively minimized the chances of overlooking essential information.[24,31] Other functionalities, such as the ability to view historical information logically displayed alongside new clinical data and cross-sectoral availability of information was seen as positive.[34, 25] These features provided a comprehensive overview of patients' health concerns and treatment episodes across multiple healthcare settings, contributing to improved continuity of care. In the study conducted by Palmer et al, physiotherapists noted

that EHR allows for easy retention of exercise information, making it convenient to copy and modify entries; hence, enhancing the documentation of patient exercises.[31] Considering future implications, participants in the study conducted by Mishra et al. voiced a desire for an overall improvement in EHR functionalities: e-prescribing, more customizable order sets and fewer click boxes. They also expressed the need for a dictation function.[29]

Enhanced data management and availability of information. Ibrahim et al. recognised EHR as a vehicle to improved data management.[35] They highlighted that the centralization, transparency, and enhanced accountability that the system provides is integral to organizational coordination, in the context of aged care organisations. AHP at National Center for Tumor Diseases (NCT) identified EHR as a tool to reduce professionals' workload by easing data management, particularly in the context of the fragmented storage system of patient information in Germany.[25]

Workflow: adaptability, flexibility, and efficiency. Participants viewed the ease of use of EHR, and its ability to centralize service delivery systems as positive factors that encouraged organizational use of the system for improved workflows.[26,35] The flexibility in the timing and mode of use was identified as a key factor contributing to the acceptance of EHR by Baird et al. The introduction of hardware devices, point-of-care access, and remote accessibility was a positive response to initial difficulties, showcasing adaptability.[23]

Several participants in the study conducted by Håland et al. recognized the potential for EHR to serve as a supportive tool in their work, particularly when its utilization improved efficiency, and positively contributed to key tasks such as patient diagnosis and treatment.[28] AHP in Mishra's study associated high value with efficiency and reduced documentation burden, which are associated with EHR use.[29] Palmer et al. also recognized EHR for its ability to

enhance workflow, especially because of the ability to have multiple patient charts open simultaneously which streamlines work processes.[31]

Despite initial challenges faced during early phases of implementation, AHP recognized the long term benefits of adopting EHR, and hoped for continual improvements in system design so that the EHR supports rather than hinders documentation, ensuring that the records are clinically useful, practical and efficient.[27,29,32,34]

Organizational and Peer Support. Chiu et al. suggested that the presence of supportive organizational conditions play a role in promoting technology adoption.[26] The facilitation of a smooth transition to EHR by support staff and profession-specific change champions was also highlighted by Schwarz et al. and Baird et al.[33,23] Along similar lines, Mishra et al. highlighted the importance of comprehensive end-user training, including initial and follow-up training; and support from other providers, especially those who understand the workflow, as significant predictors of positive EHR experience.[29]

***Improved Communication and Collaboration*.** Baudendistel et al. and Palmer et al. reported improved potential for interprofessional cross-sectoral cooperation, and access and exchange of information between different health professions and settings: reading other providers' notes, sending messages and viewing images within the EHR system.[25,31] These enhancements in communication functions were sought, and were cited as valuable;[29] and were perceived as contributing to a more collaborative and standardized approach to patient care.[31]

Similarly, a close collaboration between end-users and EHR system designers was highlighted as a facilitator to successful implementation by Yung et al.[34]

End-user feedback, medico-legal protection and compliance, positive attitudes. Another facilitator that was identified by the authors were user feedback loops between the end-users and EHR system designers, which ensured that system improvements were based on end-user experiences and suggestions.[23,35] Secondly, the standardized and structured nature of EHR offered medico-legal protection for care providers, and ensured the maintenance of detailed evidence and thorough documentation to assure legal compliance.[24,32] Clinical documentation was viewed as essential for organizing thoughts, identifying gaps in information, and supporting clinical reasoning.[32] Positive attitudes towards the process of documentation, the perceived benefits of reduced writing time and physical demands associated with the use of EHR also posed as facilitators for implementation and use.

Barriers to EHR implementation and use

Challenges with usability and functionality. Some studies reported a lack of flexibility in the choice of hardware utilized for EHR, which was perceived as a barrier for the deployment of such systems in time-critical and hybrid settings such as the emergency department (ED) that involves both outpatient and inpatient-type workflows.[22,30,31] Palmer et al. discussed the discomfort associated with the use of tablets for data entry, particularly with tablet interfaces and smaller font sizes; and other physical discomforts, including vision problems and musculoskeletal issues.[31]

Limitations in software functionalities: a lack of drawing and pictorial capabilities (visual representation of body charts), the need to navigate between multiple screens to view all data, and limited customization capabilities,[31] were all seen as factors that reduced the user-friendliness of EHR. Unanticipated challenges with slow networks, insufficient EHR operation due to technical problems, [31] and internet performance issues [34] were also highlighted as barriers

by some authors. These issues underscored the importance of rethinking the design and build of the database, user interface, and data access at the software level.

Technology apprehension and the initial learning curve. During the initial implementation, authors reported that users faced difficulties and frustrations with their respective EHR systems.[23,24,29,31,34,35] The process of documenting and completing a chart was perceived as complicated and faced an initial resistance. The learning curve to EHR adoption was governed by age and experience [23,27,30,33] and computer literacy.[24,31,34,35] Age and experience-related differences reported by authors of three studies [27,30,33] are summarized in the Table 2.2. below.

Table 2.2. Age and Experience Related Differences

Study	**Parameters**	**Findings**
Eden 2020	System quality, information quality, and individual benefits	Participants aged 45 years and above viewed the respective dimensions less favorably than those below 45 years of age.
Mullins 2022	Prevalence of EHR use	Participants between 30 and 39 years of age and those with less total experience (0–4 years) showed a higher prevalence of use.
Schwarz 2020	Anxiety during the go-live and post-implementation periods	Participants between 20 and 40 years of age reported lower levels of anxiety.

Apprehensions about using a new system, and concerns about the influence of new technology on patient-therapist communication were identified as potential barriers to the uptake of EHR.[24,31] This gap was further emphasised by the varied levels of computer literacy among staff.[35] Barry et al. reported an initial tendency among users to be more focused on the screen

than on the patient during interactions.[24] Several studies highlighted the need for improved training programs, and for additional funding and supplementary grants to address skill gaps and technological training needs.[29,31,35]

Workflow transition. Baird et al. reported initial complications and challenges with workflow, with the new EHR system creating a sudden shift to the daily operations of the participants.[23] This was backed by the findings of Håland et al. who reported that the EHR, during its initial implementation stages may be contributing to impeding work rather than supporting it.[28]

Rowlands et al. reported concerns about duplication, repetition, and fragmentation in health records, leading to an increased burden of storing and retrieving information efficiently.[32] This included duplication between structured forms and progress notes, and re-documenting information already documented by other team members which contributed to inefficiencies in workflow. Another problem identified by Baudendistel et al. was associated with patients' autonomous handling of EHR data, including concerns of increased patient requests interfering with provider's workflow.[25]

Time allocation and workload feasibility. Several authors reported apprehensions around documentation time burden, especially during the initial phase of EHR implementation.[24,25,29,31,33] In the study conducted by Barry et al, participants mentioned using more time, and recording more data in EHR.[24] Schwarz et al. reported that only about half of the AHPs felt that expectations regarding improvement in speed and efficiency of documentation with EHR were met.[33] While Palmer et al. reported a significant increase in documentation time, and cited that a big portion of their participants' workday was spent on documentation, ranging from 30% to 50%.[31] This included sacrificing lunch breaks for documentation purposes,

indicating a potential impact on overall job satisfaction and work-life balance. The perceived shift towards spending more time in front of the screen, and less time with patients was a concern expressed by Håland's participants which seemed to challenge the traditional practitioner-patient interaction.[28]

Data Protection and Security. Baudendistel et al. noted that their participants raised concerns about data protection and security.[25] There was a perception that younger individuals were more open to data sharing, while older generations were more reluctant, due to the risk of data misuse or abuse, particularly by external entities like insurance agencies or pharmaceutical companies. AHP acknowledged the need for disclosure of sensitive information to ensure proper care but raised concerns about data ownership and patient autonomy.

Individual factors: professional identity, attitudes, and health. Håland et al. and Yung et al. identified conflict with professional values, and participants' negative attitudes as barriers to successful EHR implementation.[28,34] AHP's professional values, focused on providing personalized care to patients, were perceived to conflict with the new demands for efficiency and cost-conscious organizational goals associated with EHR implementation. Haland et al. argued that the introduction of EHR is a part of a larger trend challenging professional identity, autonomy and boundaries between professionals.[28]

Yung's findings identified resistance and fear of change as negative predictors for successful integration of EHR.[34] In addition to a negative attitude towards change in existing work processes, participants expressed their fear of losing records during the transition to EHR, and a lack of readiness to adopting new technologies. This was backed by a paucity of motivation and the absence of a burning need for change.

Palmer et al. pointed towards physical and mental health imbalances: musculoskeletal discomfort, such as neck and upper thoracic pain; which was attributed to prolonged computer use and charting, poor ergonomic design and prolonged sitting.[31] They also mentioned a form of post-digital depression and burn-out among some of their participants that may have ensued due to organizational change fatigue.

Discussion

The scoping review set out to capture the scope of the existing literature on perspectives of AHPs on the use of EHR, and subsequently identify the perceived facilitators and barriers to successful EHR integration. A notable facilitator identified in the review is the perceived improvement in charting quality, where EHRs provide a more objective, accurate, and structured format for documentation. Additionally, novel functionalities like reminder systems, historical data views, and cross-sectoral information availability are highlighted as strengths that could improve patient care continuity. The studies also acknowledge organizational and peer support as critical in facilitating smooth transitions to EHR systems, emphasizing the importance of comprehensive training programs and a supportive culture for adoption. Multiple studies in this review underscore the importance of involving end-users in the development and continuous improvement of EHR systems.[31,32,34] Collaborative efforts between professionals and system developers are seen as crucial to ensure that EHRs are user-friendly, support clinical workflows, and enhance rather than hinder the delivery of patient-centered care.

Conversely, barriers such as challenges with usability and functionality, the initial learning curve associated with EHR adoption, workflow transition issues, and concerns around time allocation and workload feasibility present significant obstacles. Concerns around time allocation and workload feasibility stemmed from an increase in required documentation. This

observation raises a pertinent question: Is all the additional charting necessary, or were AHPs potentially under-documenting before EHR implementation? Additionally, despite some fears regarding data security in electronic systems, EHRs are more secure than paper-based methods, suggesting that these concerns may be more about perception than reality. These barriers highlight the need for ongoing development of EHR systems, and for refining EHR implementation strategies, enhancing both security perceptions and documentation efficiency.

The review identifies several knowledge gaps that warrant further exploration. Firstly, there is a need for more studies that delve into how EHR systems impact clinical reasoning, practice, and care delivery. Rowlands et al. and Ibrahim et al. are among the few that address this area, indicating a significant gap in understanding the implications of EHR use on clinical processes.[32,35] The concentration of studies from Australia suggests potential geographic biases in the literature, raising questions about the generalizability of findings to other healthcare contexts. This observation could indicate the progressed level of EHR integration in Australia, the development of EHR research, or the acknowledgment of AHPs as a distinct entity within the healthcare system. It implies that experiences from other countries might vary. In addition to usability and functionality perceptions, future research could focus on understanding the impacts of EHR on clinical practices and align EHR use with the principles of patient-centered care and multidisciplinary collaboration.

Håland and Rowland discuss the drawbacks of the standardization driven by EHR, and the focus of present-day EHR systems on individual work, rather than team collaboration, respectively.[28,32] These concepts are unique to the studies included in the review but may indicate tensions with the EHR systems. Håland highlights the tension between the drive for standardization, inherent to EHR implementation, and the movement towards patient-centered

care. AHPs in their study expressed concerns over the push for standardized care, arguing that such an approach may not fully align with the core values of present-day healthcare provision, which emphasize personalized diagnosis and treatment. This perspective suggests that the objectives of EHR standardization, driven by efficiency and cost-conscious organizational goals, could potentially conflict with the principles of patient-centered care. Integrating EHR systems in a manner that upholds the benefits of standardization while allowing for the flexibility and individualization inherent in patient-centered care presents a complex balance to achieve within practice. Rowlands' research highlights the apparent focus of EHR documentation on supporting the work of individual clinicians or specific disciplines, rather than enhancing the holistic process of care delivery.[32] They argue that the existing documentation practices may be more driven by concerns of medico-legal protection and adherence to internal policies, than by a collaborative approach to patient care. This observation raises concerns about the alignment of current EHR systems with the ideals of a learning health system, which emphasizes the integration of care delivery and learning activities to continuously improve patient outcomes.[36]

This review, by its scoping nature, aims to map the field rather than appraise the quality of evidence. The absence of risk bias assessment and the lack of advanced data synthesis techniques, such as meta-analysis, means that the conclusions drawn should be viewed as exploratory rather than definitive. Furthermore, despite the intention to focus on the perspectives of AHPs, the selection criteria, which permitted the inclusion of studies encompassing healthcare professionals beyond AHPs, resulted in incorporating studies that covered perspectives of a broader range of healthcare practitioners. While this diversity enriched the review, it simultaneously posed challenges in deriving AHP-specific insights, especially when the findings

of the included studies were generalized across different professions. These aspects represent some limitations, if not constraints, of the review.

In conclusion, this scoping review provides a list of unique facilitators and barriers to EHR use by AHPs and highlights key knowledge gaps. With the increasing adoption of EHR, addressing the challenges and research gaps identified becomes crucial for better meeting the needs of AHPs and, by extension, patients.

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Chapter 3. Electronic Health Record Transition in Stroke Rehabilitation: Stakeholder Perspectives on Assessment and Workflow

Introduction

While electronic health records (EHRs) are widely regarded as pivotal for advancing healthcare quality, a study by Joynt et al. found no evidence that EHRs enhanced care quality or patient outcomes (length of stay, discharge home and in-hospital mortality) in acute inpatient stroke care.[37] On further exploration of literature, it became evident that no studies so far have investigated the phenomenon of EHR integration in acute or rehabilitative inpatient stroke care, underscoring a notable knowledge gap. According to Canadian Stroke Best Practice Recommendations, all stroke survivors admitted to acute care should be assessed as soon as possible following admission, preferably 48 hours of admission, to determine their rehabilitation needs.[38] Many are transferred to inpatient stoke rehabilitation settings, as the next step in their pathway of hospital care.[39] Since stroke survivors typically spend more time in inpatient rehabilitation than in acute care, it becomes all the more important to study how a systemic change like the transition to an EHR affects clinical practice: assessments and workflow in inpatient rehabilitation facilities.

On May 28, 2022, the inpatient stroke unit at Glenrose Rehabilitation Hospital (GRH) underwent the transition to an EHR called Connect Care, which is a province wide EHR implemented by Alberta Health Services (AHS). GRH is the largest free-standing, tertiary rehabilitation hospital in Canada, which provides specialized physical rehabilitation and therapeutic services, including inpatient stroke rehabilitation. Before transitioning to the new

EHR, in-patient stroke rehabilitation therapists relied on paper-based assessment formats. The digitization of records fundamentally changed both the method and norms of documentation, affecting how often and in what manner charting was now conducted. For instance, prior to the EHR integration, rehabilitation therapists in inpatient stroke conducted an initial assessment in the first two weeks of the patient's typical forty-day stay and then completed a final assessment upon discharge, with progress notes charted at least once every ten business days.[40] With the implementation of EHR, in addition to assessment charting, an expectation to record details of each treatment session surfaced. Considering the shift away from the previous, more sporadic paper-based documentation, and other adaptations required by rehabilitation therapists due to the EHR transition, it is pertinent to investigate their perspectives. Looking into therapists' perspectives lays the groundwork for effective integrating of EHR into inpatient stroke rehabilitation and enhancement of quality-of-care.

Literature surrounding EHR's uptake in rehabilitation is notably limited. As seen in *Chapter 2,* there are few isolated studies on the transition to EHR in rehabilitation,[24,26,31,34] with no studies conducted in inpatient rehabilitation settings. The few studies that include rehabilitation professionals as their sample tend to focus on system usability,[22,23,35] and satisfaction perceptions,[25,26,29,33,34] with partial examinations of alterations in workflow.[27,31,32] *Why do clinicians document the way they do?* by Rowlands et al. is notable for its exploration of the impact of clinicians' personal practices on their documentation with the EHR.[32] It emphasizes the role of clinical reasoning and experience in shaping documentation practices. However, the study narrowly defines EHR as merely a tool for documentation, rather than viewing the shift from paper to EHR as a systemic transformation. While the study assesses how clinical reasoning influences documentation, it does not consider the reciprocal impact of documentation change,

with EHR, on clinical reasoning and assessment practices. Hence, the existing literature on transition to EHR in rehabilitation highlights a gap in the knowledge of how EHR adoption reshapes clinical reasoning, assessment processes, and the broader landscape of clinical practices.

A prominent study that focuses on describing perceptions on transition to EHR in rehabilitation was conducted by Eden et al, who analyzed staff-reported positive and negative impacts of health record digitization at an Australian tertiary hospital.[27] However, this investigation was not exclusive to rehabilitation therapists, and included a broader array of participants from medical, nursing, allied health, and administrative backgrounds. Eden et al. used interviews and focus groups to collect data, which was analyzed qualitatively, allowing for an in-depth exploration of participants' perspectives and experiences.[27] The authors reported both positive impacts: improved accessibility, time management and efficiency; as well as negative impacts: formulation of draft notes, overuse of copy and pasting, and paper persistence. Although this study differed in context, it nonetheless helped guide our research by shaping the data collection methods utilized in our study, further discussed in the Methods section of this chapter.

EHR is a technological innovation. Greenhalgh et al. applied E.M. Rogers' Diffusion of Innovation (DoI) theory to systematically review the adoption of innovations in health service organizations.[41,2] DoI theory is useful in understanding how new ideas or technologies, such as EHRs, gain acceptance and spread within an organization. Although EHR implementation at a single site does not constitute the widespread diffusion of innovation, serving merely as a small fraction in the broader adoption of EHRs across health service organizations, various themes within the DoI theory provide useful lenses to describe experiences transitioning to an EHR. For example, applying relevant themes from DoI theory can highlight the importance of perceived

attributes of EHR (such as its relative advantage over existing processes, compatibility with existing values and practices, simplicity of use, trialability, and observable results), and the impact of social systems on the EHR adoption process (such as the role of innovators and early adopters in influencing peers).

Addressing the existing knowledge gap on transition to EHR in inpatient stroke rehabilitation, our study aims to explore and describe the experiences and perspectives of inpatient stroke rehabilitation therapists, and the managers working alongside them. The findings particularly delve into the nuances of perceived changes in clinical practices with transition to EHR: assessment, documentation, and workflow. Additionally, relevant themes from DoI theory are used in the analysis and presentation of the results, with an objective of enriching the comprehension of EHR integration as adoption of innovation by an organization. The organization being the inpatient stroke unit at GRH.

The subsequent section details the methods utilized in the study, including the study design, participant recruitment, data collection and analysis, which is followed by the presentation of results.

Methods

Study Design

The study used qualitative description as the research design;[42] utilizing focus groups to gather in-depth insights into rehabilitation therapists' and managers' perceptions regarding the transition to EHR. While therapists served as the principal participants, managers were also involved to explore any differing viewpoints. Additionally, we used the System Usability Scale (SUS) to quantify participants' views on the complexity of EHR.[43] By supplementing our findings with

SUS data, we aimed to enrich the nuanced participant experiences with some measurable aspects of EHR usability.

Philosophical Underpinnings

Qualitative descriptive research describes the "who, what and where of events and experiences" from a subjective perspective;[44] with the philosophical underpinnings of relativism and subjectivism.[45] This research design has the ability to provide clear information on how to improve practice and to uncover findings that lay the groundwork for more extensive and focused work on the topic.[46] Given these considerations, we determined that qualitative description was most suitable for achieving our research aim: to explore the transition to EHR from the perspectives and lived experiences of those directly involved in the process.[45] Additionally, an objective of this study was to provide participants with a practical guide for EHR use that was further supported by our selected study design.

Participants

In our study, we engaged with physical therapists, hereafter referred to as rehabilitation therapists, and clinical leadership staff, who will be termed managers, all working in the inpatient stroke rehabilitation department at Glenrose Rehabilitation Hospital (GRH).

Participation was voluntary and recruitment was done using a sign-up sheet managed by a non-research team member to ensure impartiality and minimize potential coercion. We sought rehabilitation therapists with at least one year of work experience in a tertiary stroke rehabilitation setting. The therapists were required to have worked in the stroke rehabilitation setting both before and after EHR implementation. The managers were expected to have had a

leadership role in stroke rehabilitation at least half the time and must have been in a leadership role both before and after EHR implementation.

Data Collection

Initially, we conducted a pilot individual interview to evaluate our semi-structured interview guide, which included questions about the process of transition to EHR, support from leadership and peers, clinical reasoning and critical thinking in assessments, efficiency and time management, and continuity of care. Based on feedback from the pilot interview, questions regarding system usability were omitted, and replaced with System Usability Scale (SUS) scores.[43] SUS is a ten-item Likert scale for quick, reliable assessment of a product or service's usability. The decision to use SUS was strategically made to gather standardized feedback on EHR usability, and to conserve valuable time during the focus group sessions. This revision allowed us to dedicate the majority of our discussion to more nuanced topics such as adjustments in assessment practices and workflow modifications following the transition. Additionally, we implemented minor adjustments to the phrasing and structure of the remaining questions.

Subsequently, we organized three focus groups: two with rehabilitation therapists (with 3 participants in the first group and 4 in the second) and one with managers (with 3 participants). During these sessions, we asked open-ended questions, guided by the interview guide. Table 3.1. and Table 3.2. provide a summary of the questions that were included in the interview guide. Refer to Appendix H: Semi-structured Interview Guide for detailed questions. After the focus group discussions, participants were invited to complete the SUS questionnaire digitally and provide information about their total years of work experience in rehabilitation and their specific years of service at GRH. The SUS, with its concise and straightforward format,[43] enabled us to obtain reliable usability data without detracting from the depth and breadth of our inquiry into

the participants' experiences and perspectives. Collecting information on participants' years of experience ensured representation of varied insights- with seasoned practitioners providing detailed comparisons to paper-based systems, and newer therapists offering fresh perspectives and innovative approaches to challenges introduced by the EHR.

Table 3.1. Rehabilitation Therapists on the Transition to EHR

Category	**Key Topic**	**Questions/Probes**
Experience	Transition to EHR	- Describe the transition to an electronic health record (what went well, challenges) - Importance of the change - Readiness for the change
Experience	Documentation & Preferences	- Experience with Connect Care documentation - Preference between paper or EHR charting
Support	Guidance & Help	- Guidance received during transition to EHR - Sources of help when stuck
Clinical Reasoning	Charting Changes	- Changes in charting due to EHR - Impact on clinical decisions and documentation expectations
Efficiency	Time Management	- Impact of EHR on time management (treating vs charting)
Critical Thinking	Assessment Expectations	- Expectations for assessment - Critical elements of stroke assessment - Impact of EHR on achieving assessment standards
Continuity of Care	Use of Previous Assessments	- Influence of assessment findings from other sites on decisions
Effectiveness/Patient Education	Patient Access to Charts	- Influence of patient chart access on charting practices

Table 3.2. Managers on the Transition to EHR

Category	**Key Topic**	**Questions/Probes**
Experience	Observation of Transition	- Observations on therapists' transition to EHR - Changes in interaction and feedback provision
Efficiency	Time on Charting	- Perception of time spent on charting by therapists - Areas where therapists get stuck
Clinical Reasoning	Policies & Expectations	- Policies related to assessment - Changes in expectations due to EHR
Critical Thinking	Assessment Standards	- Gold standard for assessment - Impact of EHR on achieving assessment standards

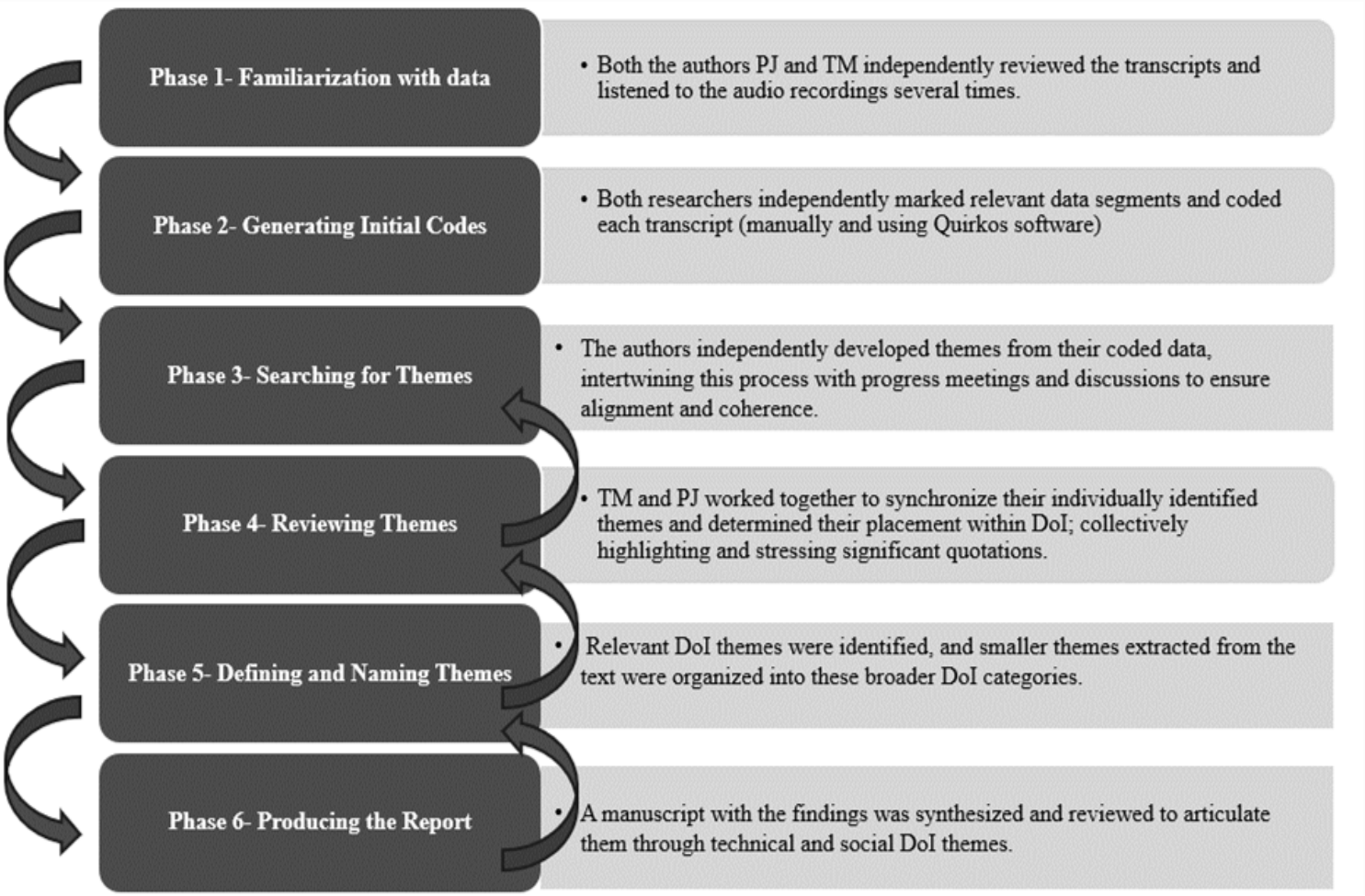
Data Analysis

The focus group recordings were transcribed using otter.ai software,[47] and then manually cleaned to ensure accuracy. The analysis of the final, anonymized transcripts was conducted following Braun and Clarke's thematic analysis method,[48] and the resulting themes categorized into relevant themes offered by the Diffusion of Innovations (DoI) theory.[2] Our analysis process is depicted in Figure 3.1; with DoI lens most actively applied in phases 3 through 6. Another approach to integrating the DoI theory into the final report involved classifying the study participants according to Rogers' five categories of adopters: innovators, early adopters, early majority, late majority, and laggards.[2] In conjunction with thematic analysis, the SUS scores were also computed.[43] These findings are presented in the following results section.

Ethical Considerations

The study received approval from the Research Ethics Board (REB) at University of Alberta (Ethics ID: Pro00124571) and an operational approval from Glenrose Rehabilitation Hospital (GRH). All participants were informed about the study's purpose, their rights as participants, confidentiality measures, and the voluntary nature of their participation. Informed consent was obtained from all participants prior to their involvement in the study. To ensure anonymity of our participants, we employed pseudonyms in the transcription process, safeguarding their identities as per the ethical approval guidelines laid out by the REB.

Figure 3.1. Braun and Clarke's Thematic Analysis- Steps



Results

Participant Demographics and SUS Scores

Eight physical therapists, including one pilot interviewee, and three clinical leaders were involved in discussions. Additionally, six rehabilitation therapists responded to a post-focus group questionnaire that requested demographic information [such as years of experience and tenure at Glenrose Rehabilitation Hospital (GRH)]. They were also asked to complete the ten question System Usability Scale (SUS). Table 3.3. provides a summary of rehabilitation therapists' demographics and SUS scores.

Table 3.3. Participants' characteristics and SUS score

Participant	Years of experience as a Rehabilitation Therapist	Years of experience at GRH	SUS Score (out of 100)
RT1	4	6	50
RT2	12	10	47.5
RT3	10	3	10
RT4	16	9	42.5
RT5	29	21	40
RT6	1	1	52.5

* RT- Rehabilitation Therapist, GRH- Glenrose Rehabilitation Hospital, SUS- System Usability Scale

The rehabilitation therapists had a mean professional work experience of 12 years, and specifically an average of 8 years of experience at GRH. The average SUS score among the therapists was 40.4, indicating a "poor" and "unacceptable" level of usability.[43] The factors contributing to this low usability rating are further examined in the *Complexity* section of the qualitative findings, supported by participants' lived experiences and perceptions.

Qualitative Findings: A Thematic Analysis using the Themes of Diffusion of Innovation (DoI) Theory

After conducting an iterative thematic analysis of pilot interview and focus group transcripts,[48] codes representing the perspectives of physical therapists and clinical leaders regarding the transition to EHR emerged. These codes have been synthesised and presented as subheadings under relevant DoI themes identified by the authors. The DoI themes are further grouped under two categories- *technical themes* (attributes of the innovation-EHR) and *social themes* (attributes of adopters and the organization).

Technical DoI Themes- Attributes of EHR

DOI theory supports the notion of five key attributes of an innovation, as perceived by prospective adopters. These are- relative advantage, compatibility, complexity, trialability and observability. The following section discusses these attributes in the context of EHR transition, as perceived by the rehabilitation therapists and managers at inpatient stroke, GRH. Table 3.4. describes these key attributes, offering a foundational understanding of how they influence adoption processes. This understanding sets the stage for a deeper exploration into the practical implications during the transition to EHR.

Table 3.4. Technical DoI Themes

Technical (Attributes of EHR)	
Relative Advantage	Innovations with a clear, significant advantage over existing options are more likely to be adopted and implemented.
Compatibility	Alignment of an innovation with the adopters' existing workflows, daily routines, perceived needs, and values is an important determinant of successful adoption and assimilation.
Complexity	Innovations that are perceived as simple to use and that encounter minimal obstacles and response barriers within the organizational setting are adopted more readily.
Trialability	Innovations that allow adopters to experiment on a limited basis before full adoption are more readily assimilated.
Observability	If the resulting benefits of an innovation are clearly visible to adopters, it is adopted more easily.

Relative Advantage

Overall, our study participants expressed a positive perception of transitioning to EHR, and the consensus was that they would not revert to paper charting. EHR was perceived to offer a distinct advantage over traditional paper-based record-keeping methods, particularly in communication and coordination. However, assessment flexibility was viewed by some as less beneficial, and time management was consistently perceived as a drawback.

Improved Communication and Coordination. Participants, both rehabilitation therapists and managers, clearly recognized the benefits of faster and more legible note taking (typing versus writing by hand). As well as how having a common database and chat features improved communication and coordination among healthcare and management teams, both within GRH

and across hospitals. One participant particularly valued the ability to quickly access patient information without having to physically locate another provider, stating:

> *"You don't have to go up to the unit and ask other people, you can just look at the chart." – rehabilitation therapist (focus group 1)*

Assessment: Flexibility vs Structure. Participants, particularly rehabilitation therapists, held conflicting perceptions about whether EHR offers a relative advantage over paper-based assessment methods. Some therapists preferred the structured format of the paper-based assessments, which were typically comprehensive, multi-paged forms that guided users step-by-step through the assessment process. This structured format was not replicated in the EHR. Hence, therapists expressed dissatisfaction with the altered structure and increased flexibility of picking and choosing assessment. This dissatisfaction stemmed from a perceived absence of depth in assessment with EHR and the overwhelming choice of outcome measures to choose from.

> *"We're un-standardizing our assessments. It's less the same than it used to be."*
> *- rehabilitation therapist (focus group 1)*

Alternatively, other rehabilitation therapists and managers valued flexibility in assessment and recognized the benefit of having the freedom to assess selectively and minimally; by focusing on clinical relevance and patients' goals. Conclusively, the discussions highlighted the importance of having a functional framework that enables flexibility within its structure.

> *"I think it helped remind us sometimes "why are you assessing that maybe you don't need to." – rehabilitation therapist (focus group 2)*

Time Management Challenges. Time management was an area where EHR was not viewed as advantageous by the rehabilitation therapists. They tried to balance documentation requirements with patient care but expressed concerns about charting demands impacting time with patients. This challenge led to doubts regarding the system's effectiveness in optimizing therapists' time and the necessary adjustments therapists must make to utilize the system most efficiently. Meanwhile, the managers highlighted that EHR could enhance time efficiency if the system was utilized in a way that made information easily accessible and shortened notes.

Compatibility

The EHR was seen as compatible with rehabilitation therapists' current treatment practices and care delivery. However, both therapists and managers discussed challenges in therapists' workflows and documentation practices. These challenges included changes in charting frequency, and difficulties with point of care charting. The managers also emphasized therapists' adherence to older, text-heavy charting within the new EHR system.

Daily Charting on a Computer: A Burdensome Shift in Workflow. Following the introduction of EHR, rehabilitation therapists assumed the responsibility of charting daily on a computer system, which was incompatible with their previous practice of charting once every 10 business days and keeping a portable sheet that recorded work done each day. Logging into the system for each treatment session, to chart daily progress, posed a challenge to therapists' workflow, and disrupted the balance of documentation-treatment time allocation. The therapists expressed concerns about managing a full caseload while meeting the documentation requirements and feeling understaffed. The managers also noted that older therapists, accustomed to more traditional methods of charting, found the EHR system incompatible with their practices.

Familiar Territory: Preference of Free Text over Flowsheets. Despite the availability of flowsheets, a feature in the EHR that presents data in a spreadsheet format, therapists appeared to favor using the free text option. This preference likely stemmed from their familiarity with free text, which is more compatible with the pre-transition paper documentation. Even when therapists utilized flowsheets for recording outcome measures, they still found themselves habitually duplicating the same information into their daily notes. This raised concerns over compatibility of using flowsheets and duplication of data in patients' charts.

> *"A lot of them have reverted to previous practices. And just basically created a smart phrase of their historical assessment and filled it out in the way that they were accustomed to." – manager (focus group 3)*

Point of care charting. EHR was perceived as incompatible with bed side and point of care charting, except while charting outcome measures. In the context of inpatient stroke, therapists identified that simultaneously conducting assessments and treatment sessions while charting on a computer was physically unsafe for patients. Additionally, they acknowledged that this practice prevented them from building a rapport and disrupted the therapeutic relationship. The managers also observed that therapists were hesitant to perform charting at point of care. They recommended employing therapy assistants (TAs) to document assessments and using portable computers to record outcome measures bedside.

> *"I find a little bit more difficult to keep them engaged, while I'm looking at my computer and trying to chart…or they might fall over. That's another big concern."- rehabilitation therapist (focus group 2)*

Complexity

Before discussing perceptions around complexity, it is important to acknowledge that the implementation of a province wide EHR within Alberta Health Services (AHS) is inherently a complex undertaking. The resulting complexity of the EHR can be reasoned as a necessity to meet the diverse functional requirements of a widespread healthcare system. Our participants recognized the system's complexity. The computation of System Usability Scale (SUS) scores and distribution of responses revealed that rehabilitation therapists perceived EHR as challenging to use. Approximately 50% of them expressed a willingness to engage with the system on a regular basis, which was interpreted as a moderate acceptance of its utility in the clinical workflow. However, challenges were highlighted within responses: 83% of respondents characterized the system as cumbersome, and 50% critiqued it for its “unnecessary complexity”. In our discussions, therapists identified complexity as they faced technical challenges, including session timeouts, restrictions in specific functions, and difficulties in employing assessment measures that had been standard in their practice previously. 50% of the respondents reported encountering inconsistencies within the system, potentially compromising workflow efficiency. Perceptions of the system's ease of use were mixed, with 33% of rehabilitation therapists reporting it as straightforward, contrasted by 50% who found it challenging. This dichotomy suggests a variability in end-user experience. The necessity for technical support was underscored by 34% of rehabilitation therapists, split evenly between those agreeing and strongly agreeing, signalling a possible deficit in the system's intuitiveness and user-friendliness. Learning curve perceptions were evenly distributed, indicating heterogeneity in therapists' capacity to assimilate the system's functionalities. This variation suggested a non-uniform experience, which holds consistent with our focus group discussions, and could be attributed to

differing levels of readiness (discussed further under the Social DoI theme: *Adopter Categories*). Furthermore, 75% majority exhibited a lack of confidence in system utilization, which could be a reflection of system's usability shortcomings or a broader resistance to EHR adoption. Table 3.5 illustrates the distribution of responses to the ten statements in the SUS survey. The summary column provides a quick glance at the general sentiment towards each aspect of the EHR system's usability based on the survey responses.

Complexity issues are tackled through initial training and support, with the effectiveness of these elements being key to successful adoption. In our discussions, rehabilitation therapists noted that their initial training on using the EHR for clinical tasks was generic, and not tailored to their specific requirements. Super users and managers provided on-the-ground guidance and assistance which addressed some navigational challenges. However, the lack of specificity in training added to the complexity of the system, resulting in a steep learning curve.

> *"I think (the initial training) is fine to get like an introduction to what the system looks like. But it doesn't actually help us do our job at all."*
>
> *- rehabilitation therapist (focus group 2)*

Table 3.5. SUS responses and Interpretation

	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Summary
1	I think that I would like to use this system frequently		33%	17%	50%		Positive inclination to use the system often.
2	I found the system unnecessarily complex		17%		50%	33%	System perceived as complex by most users.
3	I thought the system was easy to use	17%	50%		33%		Mixed opinions on system ease of use.
4	I think that I would need the support of a technical person	17%	17%		50%	17%	Divided views on the need for technical support.
5	I found the various functions in this system were well integrated	17%	17%	33%	33%		Mixed feelings about function integration.
6	I thought there was too much inconsistency in this system	50%		17%	33%		High perception of inconsistency.
7	I would imagine that most people would learn to use this system very quickly	17%	17%	33%	33%		Opinions split on learning speed.
8	I found the system very cumbersome to use		17%		83%		Majority find the system cumbersome.
9	I felt very confident using the system	50%	25%		25%		Majority lack confidence in using the system.
10	I needed to learn a lot of things before I could get going with this system			67%	33%		Suggests a significant learning curve.

* If there is no percentage next to a descriptor (e.g., "Strongly Disagree"), it means that no respondents selected that option for the statement.

Trialability

Rehabilitation therapists did not report engaging in a trial period or experimentation stage before fully embracing the new EHR system, which they perceived as a sudden change. Some trialability was provided through an orientation and initial training, and through outpatient EHR use, since that department transitioned before the inpatient unit. The overlap of personnel working across both departments provided therapists with the opportunity to experiment with the system, despite variations in its practical application between the two. Furthermore, therapists who had prior experience with EHR systems found adoption easier, while those unfamiliar with EHR and who did not participate in initial training encountered more challenges. A rehabilitation therapist who had experience using EHR at a different site stated:

> ***"****(Using EHR at another site) was a little bit of a crash course in doing patient charting here as well and it was good in a way." – (focus group 2)*

Observability

Some benefits of EHR observed by our participants included patient-centered goal setting and enhancement of continuity of care for patients.

Patient-Centered Goal Setting. The introduction of EHR has highlighted the significance of setting treatment goals collaboratively with patients. This has been accomplished by prompting therapists to document goals exactly as conveyed by patients, and charting progress in terms of patients' goals, in a dedicated section labeled "what matters to me." In addition, therapists have the flexibility to select assessments tailored to patients' specific needs, rather than using a one-size-fits-all approach offered by paper; a customization that helps prevent overassessment.

Continuity of Care: Consideration of Assessment from Other Sites. With EHR, therapists have convenient access to patients' chart histories and information from previous providers, even prior to patients' arrival on site. Therapists perceived the ability to review charts from previous sites as advantageous, as it helps inform their own assessments. To underscore their argument, therapists highlighted the difference between patients from within the province and those from outside. They pointed out the challenges they encounter when working with patients from outside the province, as their previous records are not available on the same EHR system.

> *"By the time the patient actually arrives in the hospital, and I'm screening them, I have more information than I would have previously."*
>
> *- rehabilitation therapist (focus group 1)*

Social DoI Themes- Attributes of Adopters and the Organization

In a systematic review on Diffusion of innovations in Service Organizations, Greenhalgh et al.[41] argue that "people are not passive recipients of innovations", and their interactions with the innovation and with each other heavily influence the process of adoption. Themes encapsulating these social interactions are summarized in table 3.6. below, followed by an exploration of their relevance to the context of this study.

Table 3.6. Social DoI Themes

Social (Attributes of Adopters and the Organization)	
Adopter Categories	DoI theory outlines five adopter categories that describe how individuals embrace new ideas or innovations within a society, these include: innovators, early adopters, early majority, late majority, and laggards.
Psychological Ramifications of Change	Psychological factors, including perceptions, attitudes, social norms, personal traits, barriers to adoption, motivation, and learning processes, critically influence the adoption and diffusion of innovations.
Team and Organizational Culture	The culture within teams and organizations influences the adoption of innovations; supportive, flexible, and collaborative cultures facilitating adoption.

Adopter Categories: Five Types of Adopters

The managers discussed rehabilitation therapists' variable levels of comfort with the transition to EHR, stating that some team members faced "difficulty", while there were others who "were quite comfortable" and "transitioned easily". While Greenhalgh contends that the widely cited five adopter categories are "stereotypical" and lack empirical evidence,[41] their application to our study, to address the variability highlighted by the managers, offers valuable insights into attributes of therapists as adopters.

We used the adopter categorization to classify our participants into the five types of adopters, as defined by the DoI theory (Table 3.7), based on characteristics observed during the discussions and the thematic analysis. Some quotations from participants in each adopter category are also presented in the table below.

Table 3.7. DoI Adopter Categories and Characteristics

Category	Characteristics	Quotes
Innovators	Adventurous and often the first to adopt the innovation	*"And she's very knowledgeable on the system, and she's very quick at finding things as well."*
Early Adopters	Opinion leaders; are crucial for spreading innovation to the group	*"I was eager to see the change and excited about it"*
Early Majority	Deliberate in their decision-making; adopt innovations after observing others	*"Like I think there was a lot of good things (about EHR), but yes It's definitely more cumbersome than writing."*
Late Majority	Skeptical but eventually adopt innovations due to social pressure or necessity	*"And when I looked at it, I was like I will never match that, like I can't do it."*
Laggards	Resistant to change and typically adopt innovations only when they become unavoidable	*"But honestly, it bothers me that the assessments are not the same."*

The eleven participants, both rehabilitation therapists and managers, were categorized into these five types of adopters, with varying characteristics and attitudes towards the adoption of EHR. Two participants were identified as *innovators*, who were the earliest to adopt EHR, noted for their deep knowledge of the system and their efficiency in navigating it. Another two were categorized as *early adopters*, recognized as opinion leaders who were not only eager for the change but also proactive in sharing their insights on the effective use of EHR. The *early majority* group included four participants who took a more measured approach, accepting EHR after seeing its application by others, despite acknowledging its greater complexity compared to traditional methods. The *late majority* comprised two individuals who, despite initial skepticism, eventually came around to accepting EHR, influenced by the social imperative and the necessity of the change. Lastly, one participant was categorized as *laggard*, being the last to come on

board, adopting EHR solely when it became inevitable, and they notably harbored concerns over the changes brought about by the new system.

Psychological Ramifications of Change

The EHR adoption decision unfolded a trajectory of change contingent on broader organizational decisions. At the end-user level, our participants had limited control over these changes, which evoked feelings of uncertainty and anxiety, as they navigated unfamiliar territory. The managers called the EHR transition process “anxiety producing” for the rehabilitation therapists. They also observed varying levels of comfort with the EHR and computerized equipment among therapists, describing the transition as a "generational change” for some. While some therapists smoothly transitioned to the EHR (innovators, early adopters, and early majority), there were others who resisted the change (late adopters and laggards). This resistance was evident through some residual reliance on paper, self-doubt in professional competence and expression of discomfort with the perceived lack of a structure with EHR.

Team and Organizational Culture

In a service organization like GRH, the scope of adoption extends beyond individuals to encompass teams, departments, and the entire organization, where structural changes and new ways of operating are implemented across multiple levels.[41] A facilitatory team culture, common goals, positive inter-personal relationships, support and feedback from colleagues and management were some factors that assisted the adoption and acceptance of EHR by the inpatient stroke team.

Help and Support from Peers. Despite the generational gap observed among physical therapists, where older, more experienced therapists occasionally encounter technological

challenges, our participants noted seeking assistance from more technologically proficient colleagues and super users. They identified each other as first points of contact when requiring support with the EHR system. The managers noted that other teams, such as the outpatient stroke team, also provided support, and appreciated the overall increase in the interaction between teams. These interactions highlight the importance of peer support in navigating technological complexities within the workplace.

> *"Everybody in our office has figured out ways to have shortcuts and say "this is a quick way to do this" I wouldn't have thought of it. So, we work together really well." - rehabilitation therapist (focus group 1)*

Real-time Feedback from Managers. The managers valued EHR's capability to offer immediate, real-time feedback to rehabilitation therapists by accessing their charts in the EHR system. This feature allowed managers to collaborate more effectively with therapists and offer timely suggestions to enhance system efficiencies.

> *"Somebody did something awesome the other day, and I could see "oh, look at that". So, I said "hey, that was really awesome."- manager (focus group 3)*

Overarching Goals and Guidance from Management. Both rehabilitation therapists and managers, as a team, shared the overarching goal of prioritizing patients' beneficence and of providing quality care. By implementing and supporting efficiency improvements, managers aimed to provide therapists with more time for innovation, fostering a culture conducive to progress; an environment that encourages critical thinking among staff members. This objective was directed towards establishment of best practices and patient centered care. Additionally, their emphasis on interdepartmental collaboration and knowledge transfer promoted teamwork and

communication. Overall, a dedication towards improving patient outcomes and organizational effectiveness was made apparent in our discussions.

Multigenerational Support. The managers discussed the importance of tailoring support strategies to accommodate the diverse values and expectations of different generational groups within the team. They recognized that while the overarching goals and expectations for performance remained consistent, the approaches to helping each therapist to meet these expectations should be unique to their requirements. The managers emphasized the need for recognizing the distinct barriers each generation of rehabilitation therapists might face and creatively adapting support mechanisms to address these challenges effectively. By avoiding a one-size-fits-all approach, the managers supported the idea of customizing strategies to meet collective goals while respecting and leveraging the diverse strengths of the multigenerational inpatient stroke rehabilitation team.

These insights, structured around the attributes of the EHR system itself and the characteristics of the adopters and organizational context, underscore the multifaceted nature of EHR adoption at GRH inpatient stroke unit. These findings offer a nuanced understanding of the perceptions and experiences of rehabilitation therapists and managers. Viewed through the lens of DoI, the social and technical themes highlight the interplay between technology and human factors in facilitating change.

Discussion

This qualitative study on EHR implementation at GRH brought to light both advantages and challenges as perceived by rehabilitation therapists and managers working in inpatient stroke rehabilitation. On one hand, participants acknowledged the system for its role in facilitating

interdepartmental communication and for fostering an emphasis on patient-centered care through patients' goal-specific documentation. On the other hand, the increased frequency of daily charting on a computer, and the limitations in bedside documentation posed challenges, impacting therapists' workflow and patient interaction time. EHR integration also revealed psychological and cultural obstacles, including feelings of unease and opposition to the change. Some therapists faced self-doubt about their professional identities.

Divergent Perspectives Between Rehabilitation Therapists and Managers

There were some differences noted between the perceptions of rehabilitation therapists and managers. Rehabilitation therapists ascribed the intentional duplication of patient information, in flowsheets and free text, to ensuring that everything was consolidated into one daily note. However, the managers highlighted that duplication in the EHR led to "data overload" for other providers involved with the patient and posed time management challenges for rehabilitation therapists. The managers also recognized the volume and detail of information charted as potentially excessive, questioning the "value" it added to patient care. They observed that the additional time spent on charting took away from patient interactions and hindered innovative efforts to advance patient-centered goal setting. While rehabilitation therapists equated this depth in detail with professional competence, the managers attributed the resistance to shortening notes to a prevailing culture of resistance to change, a reluctance in embracing new learnings, and some degree of mistrust in the ability to find information on the EHR. Additionally, managers identified a prevailing reluctance towards point-of-care charting and proposed the use of therapy assistants (TAs) to facilitate this practice. On the other hand, rehabilitation therapists highlighted the difficulties and constraints associated with point-of-care charting and emphasized their preference to utilize TAs primarily for clinical assistance, rather than for charting duties. Lastly,

rehabilitation therapists acknowledged lack of training as one of the reasons for difficulties encountered during the transition to EHR. Managers reasoned that these challenges were compounded by rehabilitation therapists' reluctance to embrace new learning and modify established work practices.

A Culture of Resistance to Innovation in Stroke Rehabilitation

Resistance to change was noted beyond just EHR implementation, extending to other assessment areas in stroke rehabilitation. An example from our focus group discussions includes the debate over continuing to use the Chedoke-McMaster Stroke Assessment (CMSA) despite evolving evidence suggesting a shift towards more contemporary, evidence-based practices and utilization of functional measures.[49] The resistance observed both in the adoption of EHR and in moving away from CMSA is rooted in comfort with the familiar, where clinicians' long-standing reliance on established practices, whether it be CMSA or paper-based records, hinders the transition to new methodologies or technologies. Perceived complexities and concerns about the impact on existing workflows, and the anticipated steep learning curve with both EHR implementation and adopting newer assessment tools create additional barriers, fueled by skepticism regarding the new approaches' efficacy. These challenges are symptomatic of a cultural and behavioral inertia within rehabilitation where established routines are deeply ingrained and perpetuated over time. Overcoming these barriers necessitates a comprehensive strategy that extends beyond technological fixes or highlighting the newer tools' features. It requires a concerted effort to educate on the benefits of change, provide support during the transition, and foster a cultural shift towards valuing continuous learning and improvement, as advocated by Scheets et al. in their article *Moving Forward*.[50] Along similar lines, our study guides future efforts of EHR

integration in rehabilitation to not only focus on the technological aspects but also on fostering an environment conducive to change.

Navigating Professional Standards and Professional Identity

The tension between professional identity and the pursuit of perfection in documentation with EHR presents a paradox for rehabilitation therapist in the shifting landscape. On one side, therapists recognize their primary responsibility is to provide rehabilitative care, with the fundamental charting expectations intended to support provision of care. These charting expectations are detailed in the standards of practice of the College of Physiotherapists of Alberta (CPTA),[51] requiring patients' chart notes to be sufficient to illustrate progress chronologically, and ensure safe transfer of care. Although cognizant of CPTA's charting requirements, and the recommendation to reference rather than duplicate information, therapists grapple with an internal drive to produce a "perfect note," motivated by self-imposed standards of flawless documentation, often at the expense of their personal time. This dichotomy not only highlights cognitive dissonance in their professional identities,[52] but also underscores a deeper systemic challenge within the "EHR-in-Rehabilitation" environment. It raises the critical question of whether striving for perfection in documentation truly serves the best interests of patients, and how rehabilitation therapists can reconcile their professional identity with the absence of guilt for not producing a "perfect note," within a culture that values meticulousness highly.

Rationalizing the Use of Diffusion of Innovations (DoI) Theory in the Study

Grouping the perceptions on assessment and workflow into relevant Diffusion of Innovations (DoI) themes, helped highlight both, the challenges, and successes within each theme. For

example, participants discussed the advantages and drawbacks of EHR over paper. While both these elements are discussed under the heading *Relative Advantage*, they illustrate an "advantage-disadvantage" spectrum of perceptions. The use of DoI themes provided a practical categorization, to facilitate the adoption of targeted strategies to address and modify elements within each theme. For instance, according to DoI, *trialability* is pivotal in facilitating the adoption of an innovation. Addressing the deficiency in offering trial periods for EHR use and the lack of tailored training for inpatient rehabilitation use can enhance acceptance. By improving trialability, organizations can expect smoother transitions. Therefore, the application of the DoI theory in our study offered practical guidance for enhancing EHR transition processes beyond merely documenting perceptions. Additionally, applying DoI theory to categorize participants into the five adopter categories helped to account for the variability in perceptions observed in our discussions and reflected in the responses to the System Usability Scale (SUS).

Situating Our Research in Literature

Our results align with research exploring the perspectives of medical,[5–8] nursing,[9–11] and allied health professionals,[53] and much of the evidence on the phenomenon of transition to EHR in these sectors can be applied to rehabilitation environments. Nonetheless, the methods for assessment, workflows, delivery of care, as well as the purpose and utilization of EHR significantly vary across these healthcare domains. Hence, highlighting the need for a focused exploration to address the unique requirements of inpatient rehabilitation. This qualitative descriptive study is a pioneer towards understanding the assessment and workflow changes that transition to an EHR brings forth in the specific context of inpatient stroke rehabilitation, as an attempt to bridge the existing knowledge gap.

Limitations

While this study provides valuable insights into the transition to EHR at GRH, there are limitations, including a relatively small participant pool and the singular focus on a specific inpatient stroke rehabilitation setting. These constraints may affect the broader applicability of the findings, suggesting a cautious approach to generalizing the study's conclusions across other inpatient rehabilitation settings, and to outpatient rehabilitation setting. These limitations highlight the importance of conducting further research involving a broader participant base and inclusion of multiple sites to validate and extend the findings.

Future Direction

Building on the foundational insights from the inpatient stroke transition to EHR, our research provides an impetus to future inquiry. Expanding the scope of the study to include multiple rehabilitation disciplines and departments could help analyze differential impacts of EHR across various rehabilitation specialties to illuminate common and context specific challenges and best practices. Additionally, employing different research methodologies, such as longitudinal studies could offer insights into the sustainability of change and the long-term impacts of EHR integration. This approach would allow for a concentrated examination of resistance to change, thereby enhancing our comprehension of the obstacles to EHR usage well beyond the initial transition period. Furthermore, engaging with patient perspectives on EHR-related changes in care delivery might also reveal important insights into patient satisfaction and engagement. The potential for EHR systems to contribute to large-scale data analyses and research within rehabilitation settings presents another exciting avenue for exploration. By incorporating these diverse perspectives and methodologies, future studies can continue to advance our knowledge

of EHR implementation in rehabilitation environments, ultimately contributing to more effective, efficient, and patient-centered care practices.

Conclusion

In conclusion, our study detailed the varied perspectives on the transition to a multi-site province wide EHR system, focusing on assessment and workflow changes among rehabilitation therapists and managers working in inpatient stroke rehabilitation. The resulting insights serve as a useful guide for transitions to EHR in inpatient rehabilitation settings. Utilizing the System Usability Scale (SUS) allowed us to capture perceptions of usability, whilst ensuring that the discussions with the participants remained concentrated on critical aspects of assessment and workflow. Furthermore, the application of Diffusion of Innovations (DoI) themes proved beneficial in enhancing the relevance and applicability of our findings.

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Chapter 4. Conclusion and Future Directions

This chapter will conclude the thesis by summarizing the key research findings of Chapter 2 and Chapter 3, discussing the value and contribution thereof. It will review limitations of the studies and propose opportunities for future research.

Chapter 2, the scoping review, set out to capture the scope of the existing literature on perspectives of allied health professionals on the use of EHR, and subsequently identify the perceived facilitators and barriers to successful EHR integration. Targeting allied health professionals (AHPs) as the population addressed the practical challenge of the limited number of isolated studies focusing on rehabilitation therapists, and helped explore how EHR integration and use affects the unique workflow of AHPs. The review provided a summary of the population, EHR characteristics, geographic location, setting, objectives, study methodologies, and outcomes for each of the fourteen studies examined. Subsequently, the review identified improved accuracy, objectivity, and structure of documentation as facilitatory to EHR integration. Additionally, novel functionalities, improved data availability, workflow flexibility and improved communication and coordination were seen as positives. Barriers identified were technology apprehension, time allocation non-feasibility, data security concerns and AHPs attitudes towards EHRs. The review revealed that existing research on AHPs' perceptions of EHR integration and usage primarily focuses on aspects of usability, functionality, and workflow integration. The scoping review helped identify a critical gap in literature regarding absence of studies focusing on inpatient rehabilitation, and the effects of EHR adoption on assessment and clinical practice. Furthermore, the concentration of research primarily in Australia suggested potential geographical bias, highlighting the need for more globally diverse studies.

Chapter 3, the qualitative descriptive study embarked on an exploration of the transition to an EHR system in inpatient stroke at Glenrose Rehabilitation Hospital (GRH). The objective of the study was to describe the experiences and perceptions of rehabilitation therapists and managers, specifically related to changes in assessment and workflow practices. This objective was realized by facilitating focus group discussions, complemented by a concise evaluation of usability perceptions using the System Usability Scale (SUS) survey. Our analysis, which categorized the findings into prevalent themes of Diffusion of Innovations (DoI) theory, revealed an interplay between perceptions towards the technical attributes of EHR, and the social dynamics of its adoption. The transition to EHR was recognized for its relative advantage over traditional paper-based systems, in improving communication, accessibility of patient information and patient-centered goal setting. However, the transition was not without its challenges. Compatibility issues with pre-existing workflows emerged as a barrier, disrupting established routines; and the shift towards daily documentation on computers was perceived as burdensome. The complexity in usability of the EHR system, as revealed by SUS survey responses, further exacerbated these challenges. Our findings also highlighted the critical role of social factors in the adoption process. The categorization of study participants into Rogers' adopter categories illuminated a spectrum of readiness and acceptance levels among the inpatient stroke team, ranging from enthusiastic innovators to reluctant laggards. The psychological impacts of this transition were also discussed, with varying degrees of resistance, anxiety, and adaptation. Importantly, perspectives on supportive organizational cultures, characterized by peer support and proactive leadership were also highlighted as important to the EHR transition process. By situating our findings on transition to EHR in inpatient stroke rehabilitation within the broader context of AHP’s perspectives as identified in the scoping review, we contributed to

the existing knowledge gap, and offered practical recommendations for enhancing EHR integration in inpatient rehabilitation practice.

Dissemination of Findings

In addition to addressing the knowledge gaps and contributing to existing literature, we provided the participants with an early synthesis and recommended guidelines as a practical tool. The document was aimed at encouraging the development of a framework for documenting assessments and treatments. We emphasized the importance of standardizing documentation practices to achieve consistency and facilitate ease of access among providers. Additionally, we underscored the critical role of selecting relevant outcome measures to guide treatment decisions. Among the positive aspects of the EHR, we highlighted the benefits of its flexible assessment options, secure communication channels, and improved access to comprehensive, legible patient information, viewing these features as instrumental in adapting to the new system. These guidelines will inform our ongoing analysis and further recommendations. The document can be found in Appendix I: One-pager Synthesis. To ensure the findings of this study reach a broader audience, Chapters 2 and 3 of the thesis will be submitted for publication to Physiotherapy Canada and Journal of Rehabilitation Medicine.

Limitations

The findings from this thesis illuminate the distinct challenges encountered by the stroke inpatient rehabilitation team at Glenrose Rehabilitation Hospital (GRH). While the insights gained from this study can be tentatively applied to other inpatient rehabilitation settings, it is crucial to avoid broad generalizations. Each rehabilitation department possesses its own unique practices and workflows. Therefore, future research should explore the transition to EHR

systems across various other rehabilitation departments. Additionally, operational differences exist between inpatient and outpatient rehabilitation, further emphasizing the need to consider the unique contexts of each department when evaluating their experiences with EHR systems.

Application of Findings and Future Research

The results of this study can serve as a useful guide to inpatient rehabilitation therapists and, more generally, to any rehabilitation therapists who are transitioning to, or struggling with EHR systems. The study equips rehabilitation therapists with the knowledge to better anticipate and mitigate potential disruptions, ensuring smoother EHR implementation. This thesis could also act as a valuable resource for managers and organizations navigating the complexities of EHR transitions or encountering obstacles in EHR adoption within their teams. Overall, the findings equip both rehabilitation therapists and managers with a deeper understanding of the operational impacts of EHR systems, enabling them to implement more effective adaptations and improve strategies for implementation.

The application of Rogers' Diffusion of Innovations (DoI) theory in the study represents a novel approach to examining EHR integration within rehabilitation settings. This theory explores how new technologies are adopted within organizations, making it highly relevant for analyzing transitions to EHR, which are complex and multifaceted innovations. By categorizing EHR attributes, the study offers an analysis of why EHR may or may not be readily adopted by rehabilitation therapists. Additionally, applying DoI theory to categorize participants into adopter categories such as innovators, early adopters, and laggards, provides insights into the diverse acceptance levels and resistance faced during EHR implementation. This approach highlights the technological, human, and social factors and their influence on EHR adoption. Looking to the future, this integration of DoI theory into transition to EHR research can be expanded to other

healthcare domains to understand better the broader implications of transitions to EHR across different settings. It sets a foundation for future studies to incorporate established theories when exploring the adoption of technological innovations in healthcare settings.

EHR designers could use the results of the study to improve EHR system design to better meet the needs of rehabilitation therapists. One key issue highlighted was the disruption of established workflows, particularly regarding the frequency and location of documentation. EHR systems could be more adaptable, perhaps through mobile-compatible functionalities that allow documentation directly at the point of care, thus minimizing workflow disruptions. Another concern was the complexity of interfaces used by rehabilitation therapists. Simplifying these interfaces could enhance usability by reducing the steps required to enter or retrieve information and focusing on minimizing cognitive load through better user experience design. Furthermore, the therapists' need for clinical flexibility suggests that EHR systems should support a variety of assessment tools and customizable templates. The study also pointed out training gaps. EHRs could include comprehensive, role-specific training modules that are adaptable based on user familiarity with technology, thereby easing the transition process and reducing initial resistance. Lastly, the efficiency of documentation remains a concern, as excessive time spent on administrative tasks detracts from patient care. Implementing features like voice-to-text input, quick-access templates, and predictive text could help streamline documentation processes, allowing therapists more time for patient interaction. By focusing on these specific improvements, EHR designers could create systems that are not only more functional and user-friendly but also enhance overall patient care in rehabilitation settings.

Building on the foundational insights provided by the study, future research could explore several directions using diverse methodologies and incorporating patient perspectives.

Longitudinal studies could trace the evolution of EHR impacts over time, providing insights into the sustainability and long-term effects of EHR systems on workflow, clinical outcomes, and usability. This approach could allow for observing the maturation of EHR use, and the ongoing challenges and benefits that emerge as rehabilitation therapists become more adept with the system. Additionally, comparative studies across different rehabilitation facilities or between inpatient and outpatient settings could illuminate context-specific needs and successes, highlighting how various operational environments influence EHR effectiveness. Moreover, incorporating patient-centered research by including patient perspectives through surveys, interviews, or participatory research methods would reveal insights into patient satisfaction, engagement, and outcomes, ensuring that patient needs are central to EHR studies. By embracing these methodologies, and by focusing on both provider and patient perspectives, future research could advance our study to enhance workflow, clinical practice, and patient care.

This thesis serves as a contribution to understanding the perspectives of inpatient rehabilitation therapists on transition to EHR, advancing the discourse necessary to fully leverage the benefits of EHR in improving assessment quality, workflow practices, and overall patient care.

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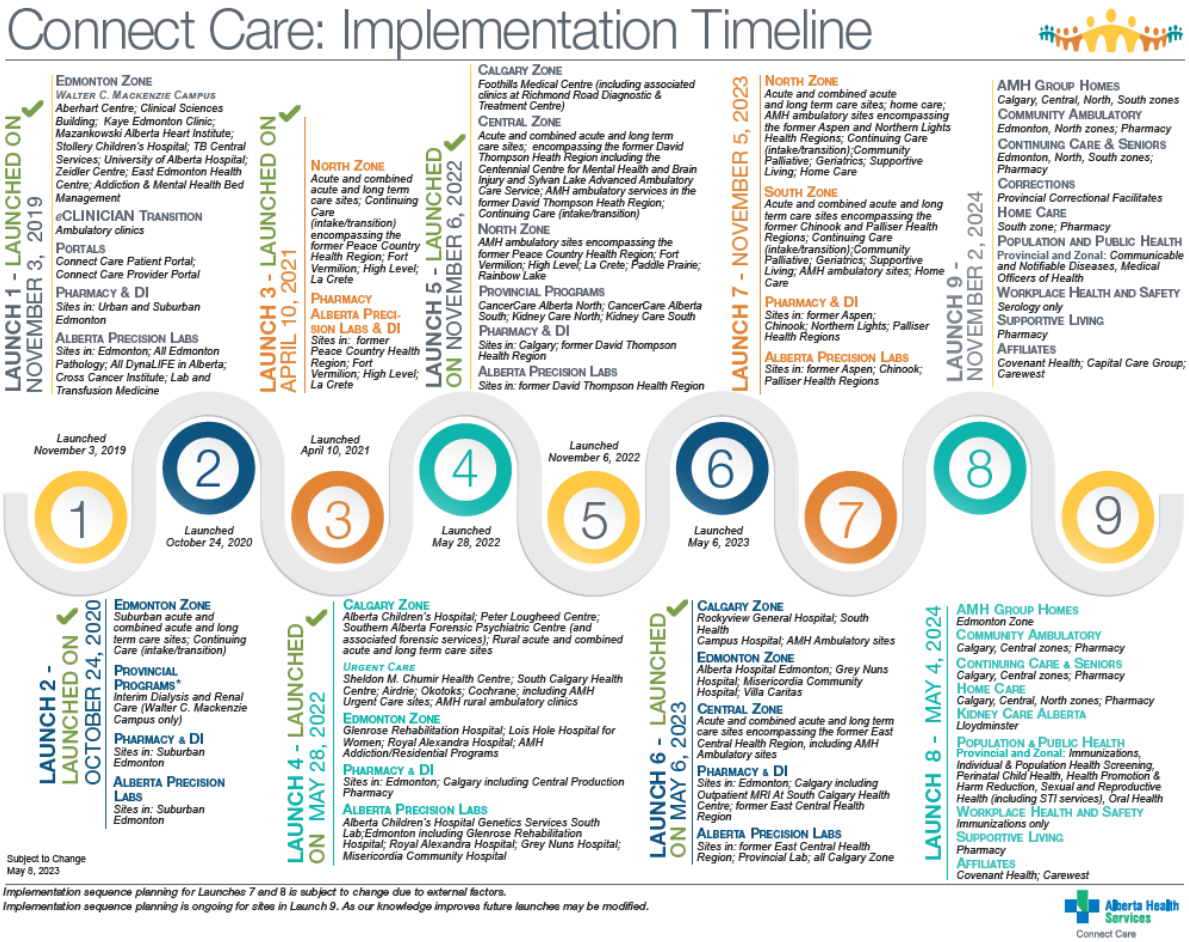
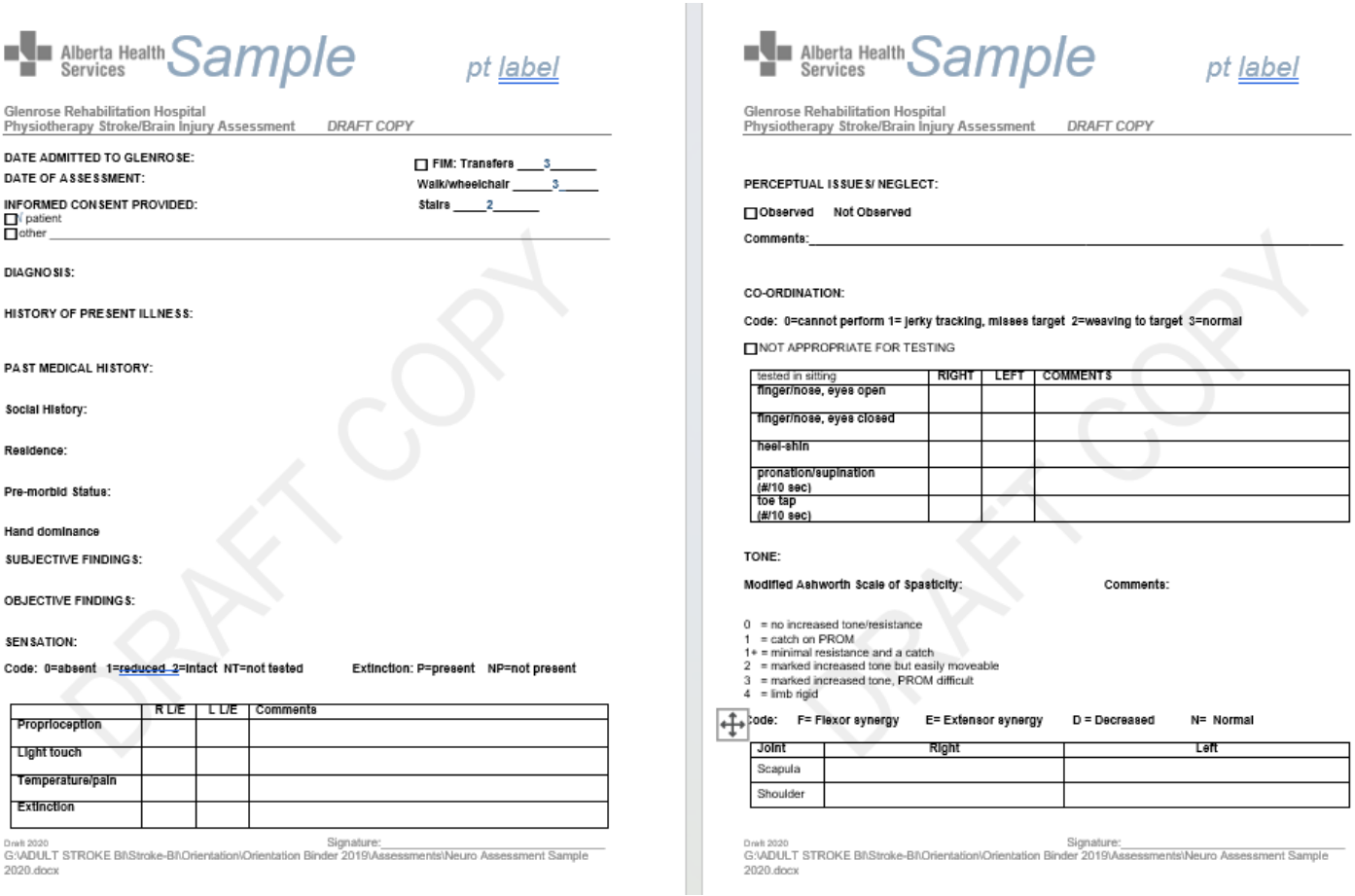
Appendix A: Connect Care Implementation Timeline



Appendix B: Paper form and EHR for Comparison

A. Paper Assessment Form



Alberta Health Services Sample pt label

Glenrose Rehabilitation Hospital
Physiotherapy Stroke/Brain Injury Assessment DRAFT COPY

DATE ADMITTED TO GLENROSE:
DATE OF ASSESSMENT:
INFORMED CONSENT PROVIDED:
☐ patient
☐ other _____

☐ FIM: Transfers ___3___
Walk/wheelchair ___3___
Stairs ___2___

DIAGNOSIS:

HISTORY OF PRESENT ILLNESS:

PAST MEDICAL HISTORY:

Social History:

Residence:

Pre-morbid Status:

Hand dominance

SUBJECTIVE FINDINGS:

OBJECTIVE FINDINGS:

SENSATION:

Code: 0=absent 1=reduced 2=intact NT=not tested Extinction: P=present NP=not present

	R L/E	L L/E	Comments
Proprioception			
Light touch			
Temperature/pain			
Extinction			

Draft 2020 Signature:_____
G:\ADULT STROKE BI\Stroke-BI\Orientation\Orientation Binder 2019\Assessments\Neuro Assessment Sample 2020.docx

DRAFT COPY

Alberta Health Services Sample pt label

Glenrose Rehabilitation Hospital
Physiotherapy Stroke/Brain Injury Assessment DRAFT COPY

PERCEPTUAL ISSUES/ NEGLECT:

☐ Observed Not Observed

Comments:_____

CO-ORDINATION:

Code: 0=cannot perform 1= jerky tracking, misses target 2=weaving to target 3=normal

☐ NOT APPROPRIATE FOR TESTING

tested in sitting	RIGHT	LEFT	COMMENTS
finger/nose, eyes open			
finger/nose, eyes closed			
heel-shin			
pronation/supination (#/10 sec)			
toe tap (#/10 sec)			

TONE:

Modified Ashworth Scale of Spasticity: Comments:

0 = no increased tone/resistance
1 = catch on PROM
1+ = minimal resistance and a catch
2 = marked increased tone but easily moveable
3 = marked increased tone, PROM difficult
4 = limb rigid

Code: F= Flexor synergy E= Extensor synergy D = Decreased N= Normal

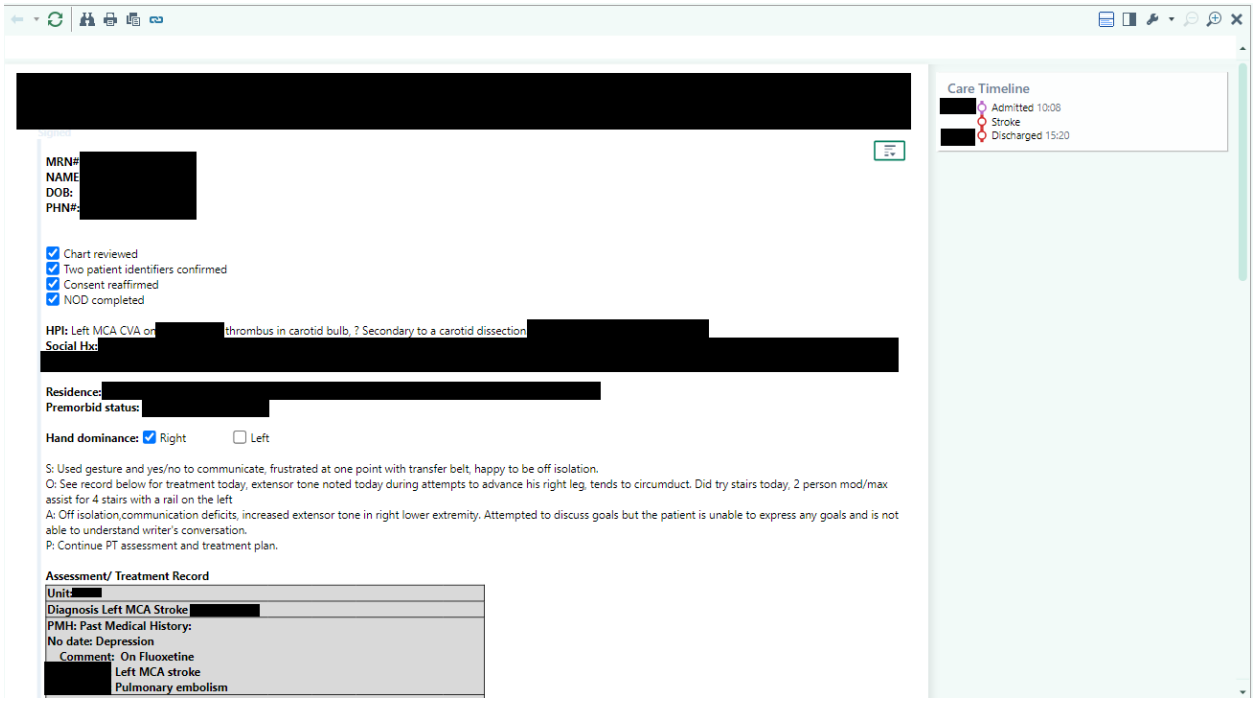
Joint	Right	Left
Scapula		
Shoulder		

Draft 2020 Signature:_____
G:\ADULT STROKE BI\Stroke-BI\Orientation\Orientation Binder 2019\Assessments\Neuro Assessment Sample 2020.docx

DRAFT COPY

B. Electronic Health Record (EHR) User Interface

B.1. Chart note (free text)



[redacted]

Care Timeline

[redacted]
Admitted 10:08
Stroke
Discharged 15:20

MRN#
NAME
DOB:
PHN#:

- [x] Chart reviewed
- [x] Two patient identifiers confirmed
- [x] Consent reaffirmed
- [x] NOD completed

HPI: Left MCA CVA or[redacted] thrombus in carotid bulb, ? Secondary to a carotid dissection[redacted]
Social Hx:[redacted]

Residence:[redacted]
Premorbid status:[redacted]

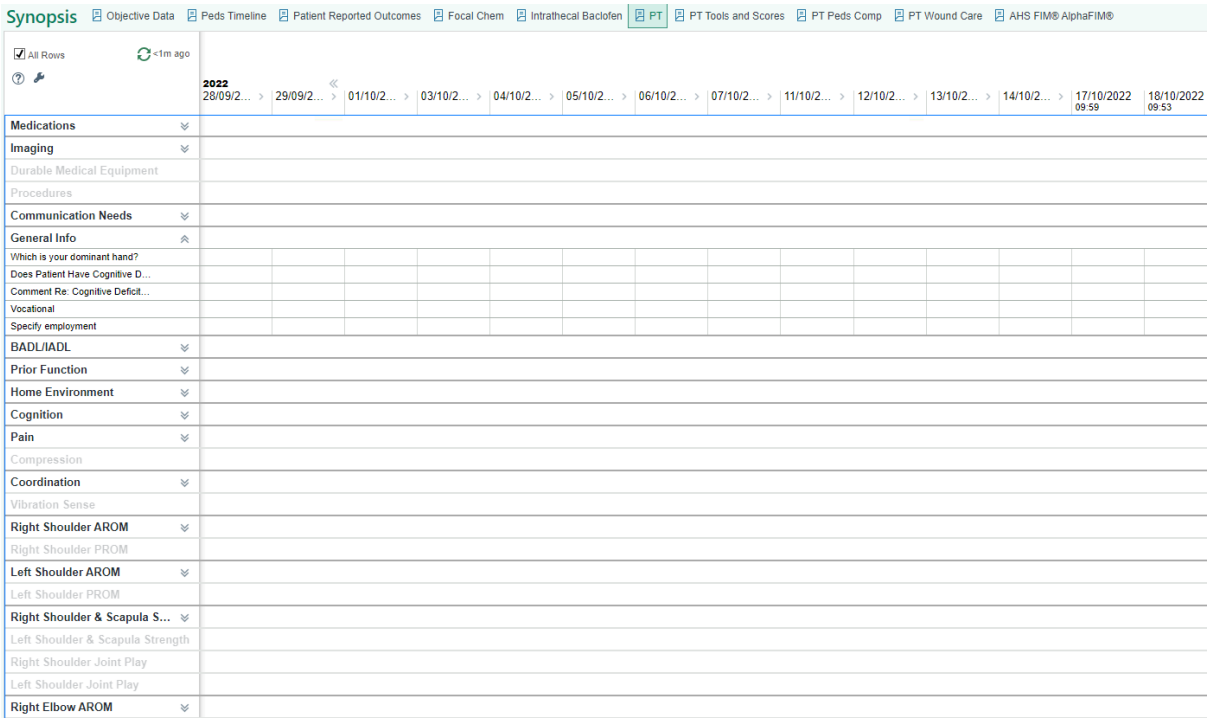
Hand dominance: [x] Right [ ] Left

S: Used gesture and yes/no to communicate, frustrated at one point with transfer belt, happy to be off isolation.
O: See record below for treatment today, extensor tone noted today during attempts to advance his right leg, tends to circumduct. Did try stairs today, 2 person mod/max assist for 4 stairs with a rail on the left
A: Off isolation,communication deficits, increased extensor tone in right lower extremity. Attempted to discuss goals but the patient is unable to express any goals and is not able to understand writer's conversation.
P: Continue PT assessment and treatment plan.

Assessment/ Treatment Record

Unit:[redacted]
Diagnosis Left MCA Stroke[redacted]
PMH: Past Medical History: **No date: Depression** **Comment: On Fluoxetine** [redacted] **Left MCA stroke** **Pulmonary embolism**

B.2. Flowsheet



Synopsis | Objective Data | Peds Timeline | Patient Reported Outcomes | Focal Chem | Intrathecal Baclofen | PT | PT Tools and Scores | PT Peds Comp | PT Wound Care | AHS FIM® AlphaFIM®

All Rows <1m ago

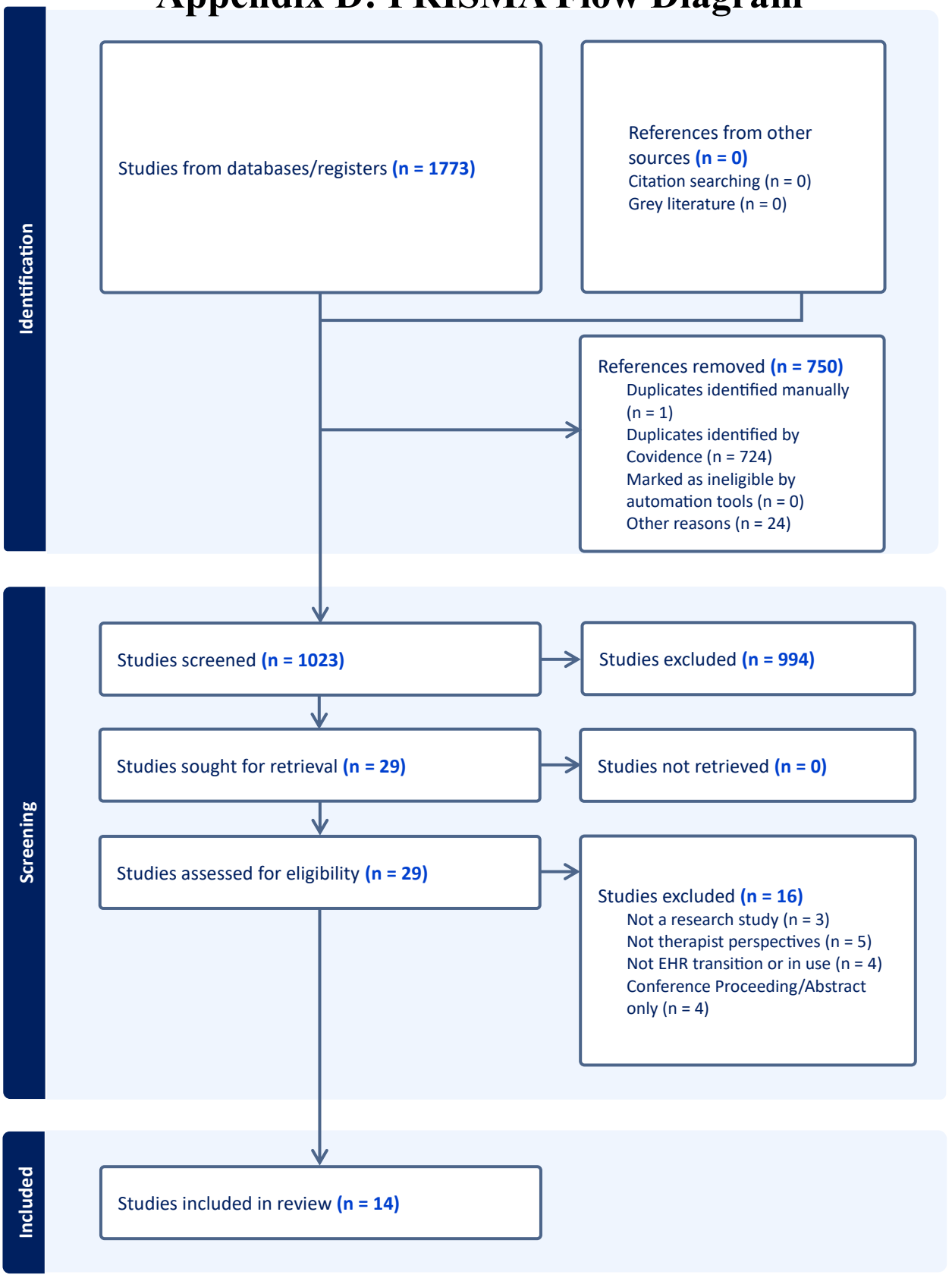
2022
28/09/2… | 29/09/2… | 01/10/2… | 03/10/2… | 04/10/2… | 05/10/2… | 06/10/2… | 07/10/2… | 11/10/2… | 12/10/2… | 13/10/2… | 14/10/2… | 17/10/2022 09:59 | 18/10/2022 09:53

- Medications
- Imaging
- Durable Medical Equipment
- Procedures
- Communication Needs
- General Info
  - Which is your dominant hand?
  - Does Patient Have Cognitive D…
  - Comment Re: Cognitive Deficit…
  - Vocational
  - Specify employment
- BADL/IADL
- Prior Function
- Home Environment
- Cognition
- Pain
- Compression
- Coordination
- Vibration Sense
- Right Shoulder AROM
- Right Shoulder PROM
- Left Shoulder AROM
- Left Shoulder PROM
- Right Shoulder & Scapula S…
- Left Shoulder & Scapula Strength
- Right Shoulder Joint Play
- Left Shoulder Joint Play
- Right Elbow AROM

Appendix C: SPIDER search strategy

SPIDER	RESEARCH QUESTION BREAK-DOWN	SEARCH TERMS
S- SAMPLE	Allied health professionals	((rehabilitation or "allied health") adj8 (profession* or personnel or staff or worker* or employee* or clinician* or practitioner* OR (physiotherap* OR "physical therap*" OR "occupational therap*" OR audiolog* OR "Speech Language patholog*" OR "speech patholog*"
PI- PHENOMENON OF INTEREST	Primary use of EHR	medical record system* OR electronic health record* OR Clinical information system* OR Electronic medical record* OR Health information system* OR e-health record* OR e-medical record* OR computerized health record* OR computerized medical record*
D- DESIGN	Interviews, narratives, surveys, discussions	
E- EVALUATION	Perceptions, experiences, attitudes, views	experience* or perception* or perceive* or perspective* or opinion* or attitude* or belief* or expectation* or impression* or Satisfaction or preferences or concerns or Consideration* or outlook or approach or transition* or implement*
R- RESEARCH TYPE	Any	

Appendix D: PRISMA Flow Diagram



Included studies ongoing (n = 0)
Studies awaiting classification (n = 0)

Appendix E: Data Extraction Guideline

TITLE OF SOURCE	TITLE OF PAPER THAT DATA ARE EXTRACTED FROM
AUTHOR	
COUNTRY	Mention the Country in which the study was conducted
METHODS	This section should include the aim of the study/ research question, the study design (quantitative, qualitative, mixed methods), any theoretical framework if used.
COLLECTION SITE	Here mention the characteristics of the data collection site
PARTICIPANTS	Include the description of the population, the total number and distribution of participants (percentage/proportion of allied health professionals)
DATA COLLECTION	Extract information about how data was collected in the study, essentially the method.
ANALYSIS	Include information about how the data was analyzed- what were the outcomes looked at, what was the framework of analysis, and the method of analysis.
RESULTS	Extract the primary findings of the study, including excerpts from discussion sections wherever relevant. Filter the findings as positive and negative perceptions if conducive.
LIMITATIONS OF THE STUDY	Write down any major limitations of the study that reduce its relevance for the purpose of our review.

Appendix F: Population, Context and Concept

STUDY	SETTING(S) (LOCATION)	SAMPLE (NUMBER)	PERCENTAGE PARTICIPATION OF AHP	EHR CHARACTERISTICS
ALAMRI 2023[22]	Hospital (New Zealand)	Hospital staff (144)	22%	Hospital EHR- Cortex
BAIRD 2016[23]	Private emergency medical services and ambulance firm (USA)	Licensed paramedics, leadership, and mid-management (29)	Unspecified	Paramedic service specific EMR
BARRY 2006[24]	Private sector and research (Australia)	Physiotherapists (5)	100%	Electronic clinical record system- Physiosphere
BAUDENDISTEL 2017[25]	National Center for Tumor Diseases (NCT), University Hospital Heidelberg (Germany)	Patients with colorectal cancer, Physicians and other HCPs (47)	35%	Patient controlled personal electronic health record (PEPA)
CHIU 2015[26]	8 Hospitals (Hong Kong Special Administration Region)	Physiotherapists (93)	100%	Nationally Integrated EHR for APH
EDEN 2020[27]	5 Hospitals- Configuration site- largest hospital in the HHS, a tertiary- quaternary care hospital, Implementation sites- 4 smaller hospitals in the HHS (Queensland, Australia)	Hospital staff (administrative personnel, allied health professionals, medical professionals, and nursing professionals) (916)	12.2%	Integrated EHR
HÅLAND 2012[28]	A regional hospital (Norway)	Hospital staff and IT staff (19)	10%	Not specified

STUDY	Setting(s) (Location)	Sample (number)	Percentage participation of AHP	EHR Characteristics
MISHRA 2022[29]	Virginia Commonwealth University (VCU) Academic Medical Center (Richmond, Virginia, USA); University of Chicago Medicine (UCM) Clinical Facilities (Illinois, Chicago, USA)	HCPs (816)	12%	Epic EHR
MULLINS 2022[30]	Emergency Department in a tertiary metropolitan public hospital (Melbourne, Australia)	ED employees (70)	11.4%	National integrated EHR- My Health Record
PALMER 2017[31]	Outpatient PT clinics (USA)	Practicing state board licensed, outpatient physical therapists (10)	100%	Not specified
ROWLANDS 2022[32]	Tertiary-level hospital (South-East Queensland, Australia)	Clinical staff (allied health, doctors, and nursing professionals) (27)	37%	Read only EMR, hybrid charting
SCHWARZ 2020[33]	3 Hospitals- A metropolitan teaching hospital, a small regional hospital, and a medium-sized secondary teaching hospital (Australia)	AHP (440)	100%	Integrated EHR
YUNG 2017[34]	Community-based physiotherapy	Physiotherapy managers who	100%	National integrated EHR

	clinics (Sydney, Australia)	were also practicing physiotherapists (2)		
IBRAHIM 2006[35]	Aged care organization (Australia)	HCPs	45%	Not specified

* AHP- allied health professionals, EHR- electronic health record, EMR- electronic medical record, HCPs- health care professionals, IT -information technology, ED- emergency department.

Appendix G: Summary of Methods

Study ID	Aim of study	Method(s) of data collection	Outcome measures analyzed	Method of analysis (Methodology)
Alamri 2023	To determine the usability of the inpatient clinical documentation and communication platform known as Cortex approximately one year after full deployment at Christchurch Hospital.	Questionnaire	System usability	Descriptive statistics, coding and theming (Mixed methods)
Baird 2016	To examine the introduction of EMR in a small emergency care organization and identify factors that aided adoption.	Interview, followed by a questionnaire	How the system was being used; attitudes and preferences	Manual coding (Braun and Clarke's analysis) (Mixed methods)
Barry 2006	To compare a sample of traditional and electronic physiotherapy records: to ascertain whether a structured electronic format led to more complete recording, if there was any impact on efficiency, and what the system's acceptability was to users.	Experimental followed by a questionnaire	Content of the records- what data was recorded, number and type of clinical features recorded, how many structures were assessed, the number of details recorded, content of the clinical reports.	Qualitative content analysis (Qualitative)
Baudendistel 2017	To explore perceived benefits and concerns of a pilot web-based patient controlled personal electronic health record (PEPA), providing access to personal health data across sectors.	Focus groups	Perceived potentials and expressed concerns regarding a PEPA	Qualitative content analysis included inductive development of categories and a deductive application of categories. (Qualitative)
Chiu 2015	To examine the moderating effect of voluntariness on the actual use of an EHR designed for use by AHP in Hong Kong (technology, implementation and individual context)	Questionnaire	Self-reported frequency of use in high and low voluntariness environments	Hypothesis testing and univariate analysis. (Quantitative)

Eden 2020	To report early impacts of the digital transformation of a large hospital and healthcare services by surveying staff perceptions of an integrated EMR	Questionnaire	Perceptions of the ieMR and its impacts (positive or negative)	Statistical analysis- one-sample t-test and independent sample t-tests. (Quantitative)
Håland 2012	To show how the EPR has become part of the professionals' boundary work, expressing shifting constructions of professional identities	Semi-structured interviews	Perceptions of boundary work and professional identities with the introduction of EPR	Grounded theory-inspired approach (Qualitative)
Mishra 2022	To report quantitative and qualitative analyses of features, functionalities, organizational, training, clinical specialties, and other factors that impact electronic health EHR experience.	Questionnaire	Net EHR experience-overall satisfaction and usability	Coding and theming (Qualitative)
Mullins 2022	To explore the perspectives of emergency department clinicians regarding EHR use frequency.	Questionnaire	Clinician's perspectives of EHR, including use frequency, barriers and the benefits associated with use (focusing on patient care and safety)	Statistical analysis-descriptive statistics, frequency counts and percentages. (Quantitative)
Palmer 2017	To study physical therapists' work environment and practice which now involves maintenance of EMR while simultaneously providing patient care.	Semi-structured interviews	Daily physical and cognitive work demand	Coding and theming (Braun and Clarke's analysis) (Qualitative)
Rowlands 2022	To gain an in-depth understanding of clinician documentation practices	Interviews and telephone interviews	Time spent documenting, the factors influencing documentation and the review of documentation, the reasons for duplication of documentation, and whether clinicians believed their documentation was read.	Coding and theming (Qualitative)

Schwarz 2020	To investigate the perceptions of AHP to implementation of an integrated EHR across both regional and metropolitan settings.	Questionnaire	Perceptions before, during and after implementation in relation to subjective perceptions, barriers and facilitators and overall satisfaction.	Descriptive statistical analysis (Quantitative)
Yung 2017	To describe the challenges encountered in implementing a nationally integrated EHR system across two independent community-based physiotherapy clinics.	Observation and semi-structured interviews	Details of the adoption process, use of the EHR system, physiotherapists' satisfaction and concerns.	Coding and theming (Qualitative)
Ibrahim 2006	To investigate the impact of information technology integration on the organization's strategic change framework from the point of view of aged care employees	Document review and interviews	Evidence of impact of IT integration	Coding and theming (Qualitative)

* AHP- allied health professionals, EHR- electronic health record, EPR- electronic patient record, ieMR- integrated electronic medical record, EMR- electronic medical record, IT- information technology, ED- emergency department.

Appendix H: Semi-structured Interview Guide

Focus Group Discussion on **Perspectives on the transition to an electronic health record.**

For therapists:

About the experience with the process of transition

1. Tell me about the transition to an electronic health record (probe, what went well, what has been challenging), Do you think this was an important change? How ready were you to adopt such a change?
2. What do you wish you knew when you first started documenting using connect care?
3. Would you go back to paper-based charting if you could? Discuss. (Probe: How does the EHR system fare as compared to the earlier form-based assessment model?)
4. Do you still use paper charting to some capacity?

Support from leaders and peers

5. What was the guidance you received when you transitioned to EHR (where did the guidance come from?)/ where do you seek help when you are stuck? ask about the role and support received from the management.

Clinical Reasoning

6. The EHR changed how you chart, has transitioning to an electronic health record changed what you chart? (Explain).
7. Has the new way of charting changed 'what' clinical decisions you make for assessment and treatment, to fulfill the expectations of documenting with Connect care? {what to assess, what not to assess, which OM to use? Etc.}
8. (How are goals, assessment and treatment related?)

Efficiency

9. How do you think the new system has affected your time management? In terms of time spent treating vs charting.

Critical Thinking

10. What are the expectations for assessment at your site? (probe: how do you chart goals) What are the critical elements of stroke assessment? What is the gold standard? (Does the EHR take you closer or away from achieving this standard?)

    [(Why do you test X (coordination? sensation)

Continuity of Care

11. To what extent do assessment findings from other sites inform your decisions on what to assess (i.e., during a transition from acute care to rehabilitation; do you review assessment findings from previous sites?).

Effectiveness of care/ patient education

12. Some patients have expressed a desire to access their chart notes. Does knowing that a patient can access their information influence what you do when you chart.

For managers:

About the experience with the process of transition

1. What have you observed over the past __- months as therapists transitioned from paper-based charting to an EHR? Has the new system changed the way you interact with the therapists and provide feedback?

Efficiency

2. Do you think the therapists are spending more, less or about the same amount of time on charting? Which area(s) do the therapists usually seem to get stuck with?

Clinical Reasoning

3. What are the policies related to assessment? (probe: What are you mandated to do, what do you include in orientation of new staff about expectations for charting?). (probe: Has the use of EHR changed these expectations?)

Critical thinking

4. What is the gold standard for assessment? (probe: Does the EHR take you closer or away from achieving this standard?)

Appendix I: One-pager Synthesis

UNIVERSITY OF ALBERTA

Perceptions on the Transition to Connect Care (October 2023)

We had the pleasure of connecting with you in September to talk about your experiences transitioning to Connect Care. You shared your perspectives on how Connect Care has impacted daily assessments and workflow over the past year and a half. The conversations were truly engaging and insightful. In this document, we provide our early observations from those discussions. Listed below are common themes that emerged. Selected quotes are provided, as well as questions to ponder as you move forward.

1) **The need for a framework**- The introduction of the new electronic system has stirred up a desire for structure in how assessments and treatment are documented within Connect Care. We've learned that discussions are underway to collectively establish some form of standardization within the department. As these conversations progress, here are some questions to ponder:

- Can we collectively decide 'what goes where' in Connect Care? How can duplication be reduced?
- How can I chart in a way that makes it easy for another PT, or another healthcare provider, to find what they're looking for?
- What outcome measures play a pivotal role in deciding what direction I decide for the treatment? How do I choose them?

"I wish our office had a better framework, as to how and what we were documenting where, so there was consistency. There's still inconsistencies from person to person, which makes it a challenge."

2) **What makes for a good assessment?**- The assessment process helps you to learn about a patient's strengths and challenges so that effective treatment can be planned. Assessment allows transfer of care, and shows you and your patient when progress is being made.

- In your discussions we encourage you to talk about what an effective assessment (chart) looks like in Connect Care - what are the critical aspects?

" I think before it was more trying to hit all these things on the assessment, whereas now we're encouraged to think"
"I just need to assess what I need to know to do the job "

3) **Looking at the positives**- Embracing any form of change can be challenging. Focusing on positives may help in the adjustment to this new way of charting. In our discussions, we heard about positives such as:

- The flexibility to pick and choose assessment
- The option to not do some things
- Secure chat, seamless communication with each other and with other professionals
- Access to patient information from other professionals and across the continuum of care (and legible information!)

"I think Connect Care helped remind us sometimes- Why are you assessing that? Maybe you don't need to- some of what we were doing already"

Contact us if you have questions or comments - Trish Manns trish.manns@ualberta or Palak Jhingan pjhingan@ualberta.ca. We will be completing a deeper analysis that will be shared with you as well.