

PATIENTS BEFORE PAPERWORK (PB4P)

Centre for Digital Health Evaluation,
Women's College Hospital Institute for
Health System Solutions and Virtual Care

PREPARED FOR:
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Acronyms

API	Application Programming Interface
CDHE	Centre for Digital Health Evaluation
CPSO	College of Physicians and Surgeons of Ontario
eFax	Electronic Fax
EMR	Electronic Medical Record
eReferral	Electronic Referral
FFS	Fee For Service
FHG	Family Health Group
FHO	Family Health Organization
FHT	Family Health Team
HIE	Health Information Exchange
HRM	Health Report Manager
MOH	Ministry of Health
OH	Ontario Health
OLIS	Ontario Laboratories Information System
OTN	Ontario Telemedicine Network
PAN	Patient Advisors Network
PCPs	Primary Care Professionals
PSS	PS Suites EMR (Telus)
RRR	Rapid Realist Review
S/ICMO	Strategy/Intervention-Context-Mechanism-Outcome
WCH	Women's College Hospital
WIHV	Women's College Hospital Institute for Health System Solutions and Virtual Care

Operational Definitions

Process: refers to the administrative and operational tasks within healthcare, such as coordination of care, patient information management, and provider communication.

People: in healthcare — including professionals, administrative staff, and patients — are central to the system's dynamics, particularly through their intrapersonal and interpersonal interactions. On an intrapersonal level, an individual's beliefs, attitudes, and skill levels shape how they manage tasks, communicate, and delegate responsibilities. Interpersonally, differences in communication styles, levels of expertise, and expectations among these groups shape the healthcare landscape. Integral to the functioning of healthcare systems is the understanding of the scope of practice, which delineates the roles and responsibilities of different people. This clarity in scope of practice is essential for optimizing how people collaborate and work together. It ensures that tasks are allocated based on everyone's expertise, thereby enhancing the efficiency and quality of patient care. A well-defined and respected scope of practice fosters a collaborative environment in which all individuals can contribute to their full potential, resulting in a more dynamic and responsive healthcare system.

Tool: refers to the technologies and digital software systems employed in healthcare management and delivery, including how these components function together to integrate into single digital workflows. This integration is critical because it allows for seamless communication and data exchange between various healthcare systems and devices, ultimately improving efficiency, patient care, and decision-making processes. By integrating diverse technologies into cohesive digital workflows, providers can ensure that patient information is accurately shared and utilized throughout the various stages of healthcare delivery, from diagnosis to treatment and follow-up care.

Systems: refers to the overarching policies, structures, and organizations that shape the operational dynamics of healthcare delivery. These components are typically developed through a combination of government oversight and accrediting bodies, with the goal of ensuring practice standards and patient safety.

eReferral: Electronic Referral (eReferral) is a digital tool designed to simplify the referral process by enhancing communication between primary care clinicians and specialists/organizations by enabling quick and secure referrals to be sent and received through an electronic platform. (Ereferral, n.d.)

HRM: Health Report Manager (HRM®) is a digital health solution that enables clinicians to securely receive patient reports electronically from participating hospitals and specialty clinics. HRM electronically delivers Medical Record reports, (e.g. Discharge Summaries), and narrative Diagnostic Imaging (excluding images) reports from sending facilities directly into patients' charts, within the clinician's EMR. (OntarioMD, n.d.)

eConsult: eConsult seeks to improve patient care through timely access to specialist advice, and often eliminates the need to send patients for in-person specialist visits. Physicians and nurse practitioners use a private and secure web portal to send a specialist a clinical question about their patient and receive a prompt response, generally within two days. (OntarioMD, n.d.)

OLIS: Ontario Laboratories Information System (OLIS) is an information repository that gives authorized health care providers access to lab test orders and results from hospitals, community labs and public health labs. As patients move between hospitals, family physicians, home care and long-term care settings, OLIS makes viewing patients' current and past test results easier and enables treatment decisions to be made at the point-of-care. (eHealth Ontario, n.d.)

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Executive Summary

Background

Patients Before Paperwork (PB4P) focuses on digitizing processes to reduce the administrative burden for clinicians and administrative staff. The use of analog processes such as fax persists despite the availability of safer, more reliable methods of communication. Digital tools such as eReferral, eConsult, HRM and OLIS offer opportunities to improve our referral, consultation, and health information exchange processes, but there is a need to understand how this digitization may impact administrative burden in practice.

PROJECT HIGHLIGHTS

- Interventions that successfully reduce administrative burden, purposefully consider the diverse range of factors that impact the experience of burden, including considerations across people, processes, tools, and systems.
- Digitization of healthcare services and activities can increase or decrease administrative burden depending on design and implementation decisions.
- Digital interventions that adopt a user-centered design approach to their work are more likely to have successful adoption and reduce administrative burden.

Objectives

1) Describe the sources of healthcare administrative burden, related provider outcomes, and broad categories of interventions for addressing administrative burden; 2) Describe the role of digital tools in reducing administrative burden and improving patient safety and access to care, with a focus on consultation, referral, reports management and lab tests (in Ontario, Bundle 1 tools: eConsult, eReferral, HRM, and OLIS). 3) Develop a preliminary approach for measuring impact within the Ontario context.

Methodology

To address the three objectives, we conducted:

1. A narrative literature review of factors contributing to healthcare administrative burden, its impacts on physicians, and categories of interventions to reduce it.

2. A rapid realist review to understand the strategies and mechanisms by which tools like eReferral, eConsult, HRM and OLIS impact safety, access, and administrative burden in various contexts.
3. Semi-structured interviews to help understand: 1) the current state of administrative burden in different clinical contexts in Ontario; and 2) the ways in which tools such as a) eReferral, b) eConsult, c) HRM, and d) OLIS can impact workflow and administrative burden.

Key Findings

Three key findings were underscored across all 3 data collection methods:

1. **Interventions that successfully reduce administrative burden purposefully consider the diverse range of factors that impact the experience of burden, including considerations across people, processes, tools, and systems.** Both the literature and end user interviews highlighted the importance of addressing all these domains when implementing or improving digital health services. For instance, PCPs in Ontario described pain points such as the lack of specialists adopting eReferral limiting its value and HRM standards pushing large volumes of reports to primary care, increasing burden. Many approaches to reduction in administrative burden do not focus on digitization, but instead focus on the simplification of forms and processes or look to optimize how health care teams work together.
2. **Digitization of healthcare services and activities can increase or decrease administrative burden depending on design and implementation and how it integrates with workflow.** The following strategies can enhance the benefit of digital tools across administrative burden as well as have positive outcomes on patient safety, and access to care:
 - a) Centralized Systems
 - b) Standardized and simplified forms/processes

- c) A balance of the push and pull of information
- d) EMR integration

Digital health programs that result in significant volumes of information or make it difficult to delegate tasks often lead to an increase in administrative burden.

3. **Digital interventions that adopt a user-centred design approach to their work are more**

likely to have successful adoption and reduce administrative burden. User-centred design goes beyond optimizing interfaces and should capture how tools work with current user workflows, acknowledging the process, people, tool, and system factors and how they may also need to be changed with the design itself. Approaches to operationalizing this include participation of end-users on governance structures and as decision-makers in tool or system design and training development. Engaging users in tool development processes may result in improved interface features such as search and filter functions, auto-categorization, auto-population of data fields, reduced steps and logins, and other personalized features that enable users to utilize tools and access the information they need in a timely, low burden manner. Denmark and Estonia have engaged and prioritized users in successful nation-wide digitization initiatives that could inform similar efforts in Ontario.

Recommendations

1. **Build mechanisms for user-centred design, including a strong end-user voice, focus on usability and evidence-based decision making into the PB4P project.** Thus, we suggest building the capabilities by creating an infrastructure to enable a wide range of data collection in an efficient and responsive manner over multiple aspects of the program. This should include the ability to observe and measure workflows in real world clinics, connect with a wide range of end users for timely insights and feedback and create a usability lab where workflows can be measured and refined. This work will also need to be paired with channels for

consistent, transparent communication with healthcare professionals and feedback opportunities as developments and progress are shared.

2. **HRM is a considerable administrative burden for PCPs and provides an important opportunity to reduce administrative burden across the province.** While our research findings align with the OntarioMD HRM Task Force recommendations we suggest an initial focus on reducing the volume of incoming documents by reducing duplications and implementing a Core Document Set. Our work shows that the providers are most happy with health information exchange programs when there is a balance between the “push” and “pull” of data. Thus, focusing on the Core Document Set for HRM while, in parallel, supporting widespread access to the provincial clinical viewers (ideally with contextual launch), is likely to produce immediate and tangible improvements to digital health information exchange and administrative burden for PCPs.
3. While this research suggests that, overall, eReferral has the potential to reduce administrative burden, in the short term it would either be neutral or contribute to an increase of the overall administrative burden compared to faxing. However, **the widespread adoption of the eReferral program, namely by specialists, followed by the standardization of referral forms, EMR integration with auto-population of key demographic and clinical information, as well as a centralized wait list management is likely to reduce burden in the medium term.** It is imperative to improve non-digitized processes prior to digitization, such as standardizing and simplifying eReferral forms in a manner that reduces administrative burden while ensuring that forms capture necessary information to inform practice decisions.
4. PCPs highlighted the **need for improving how primary care works in a team-based capacity within their practices but also in the patients’ circles of care, such as specialists and community pharmacists.** They identified clear pain points, such as diffusion of responsibility between specialists and PCPs as well as the increased admin burden of reviewing MedsCheck by pharmacists. As such, we suggest building cross-disciplinary working

groups that focus on improving how clinicians and allied health providers in different institutions work together effectively, recognizing that digitization can reduce burden for some groups at the expense of others. In parallel, capacity-building work should also take place providing guidance on how primary care teams can work effectively together. For example, this could explore the complementary roles of nurses, allied health physician assistants (PAs) and medical office assistants (MOAs) to drive high functioning primary care teams to practice at the top of their scope to drive access across the health care system.

5. Not all administrative tasks are necessary, and the health system may host many sources of unnecessary burden for clinicians and primary care teams to spend their time on. **We recommend conducting a provincial scan of sources of burden across the system to determine opportunities to streamline processes and reduce duplication of work within forms. This would require system-level change, collaboration with other ministries and organizations, and can be completed concurrently with the digitization of necessary burden.** A Manitoba task force worked with physicians to undergo a similar evaluation and identified that 44% of burden was unnecessary within the system (across people, process, and tools). The sources of burden were characterized (e.g., orders and requisitions, sick notes, private insurance forms) and “owners” of the burden were identified (e.g., private insurers, workers compensation board, Manitoba Health). The task force aims to work directly with owners of burden to collaboratively develop solutions for reducing duplication of work and unnecessary tasks. This approach can be implemented in our setting to comprehensively address sources of burden that do not require resource-intensive digitization, but simplification.

1.0 Background

1.1 Context

Patients Before Paperwork (PB4P) is an ambitious project to improve how we use digital tools across our health system. The administrative burden for clinicians and admin staff is increasing, with a clear negative impact on patients' experience of care. In Ontario, 70% of physicians are reporting feelings of burnout (2), with a disproportionate impact on primary care providers. An estimated 18.5 million hours are devoted annually by physicians in Canada to paperwork and administrative duties. This amount of time is equivalent to an additional 55.6 million patient visits that could occur annually (Canadian Federation of Independent Business, 2024). The use of many outdated analog processes, such as fax, persists despite the availability of safer, more reliable methods of communication. There is an exciting opportunity to drive the adoption of digital tools that improve the privacy and security of our health information and communications, while also reducing the administrative burden for our clinicians. Potential workflows that are ripe for "digitization" have been identified including referrals, prescriptions, and lab testing.

While digital tools such as eReferral, eConsult, HRM and OLIS systems offer streamlined, secure alternatives, enhancing communication and data security which can improve how clinicians work it is important to note that this is often not realized. For example, EMRs and use of email and secure messaging have been found to be a significant contributor to administrative burden by increasing expectations around management of documents, shifting of tasks from clerical staff to clinicians, poor usability for patient care, increased cognitive load related to information finding and alerts, and management of message inboxes often outside of clinic hours (Nguyen et al., 2021; Thomas et al., 2021; Melnick et al., 2020; Khairat et al. 2019). Simple digitization of health service activities without consideration of the complex interaction between processes, people, and the tools can lead to low adoption and poor end user experience. Implementation of digital

tools often impacts how individuals and teams work in unpredictable ways. For example, digital tools may make a task simpler but also harder to delegate, which unintentionally leads to offloading of clerical tasks to clinicians. Intentional design to reduce clerical tasks for clinicians followed by early evaluation and design can help mitigate the risks of technology adoption, while increasing the chance of user uptake and satisfaction. As we seek to better understand administrative burden and how interventions that are being used in our local setting may address them, there is a need to be thoughtful in our implementation and evaluation of digital tools in healthcare settings to ensure that we are in fact reducing burden.

1.2 Purpose and Objectives

The aim of this report is to:

- a. Describe the sources of healthcare administrative burden related to provider outcomes (e.g., physician burnout), and broad categories of interventions for addressing administrative burden (e.g. process changes, digitization, human resources).
- b. Within the Ontario context, describe the role of digital tools in reducing administrative burden and improving secondary outcomes (patient safety, access to care, quality of care), with a focus on eConsult, eReferral, HRM, and OLIS.
- c. Develop a preliminary framework for measuring impact in key opportunities within the Ontario context.

2.0 Methodology

Overview of Data Collection Activities

To achieve the program objective outlined above, we completed three key research activities, including: 1) a narrative review, 2) a rapid realist review; and 3) semi-structured interviews. We describe each of these in detail below.

2.1 Knowledge Synthesis: Narrative Review

The rapid, informal narrative review was conducted to provide a concise, high-level overview of factors of the following research questions.

Research Questions

1. What are the sources and drivers of healthcare administrative burden?
2. What is the impact of administrative burden on physicians?
3. What types of interventions have been used to address administrative burden?

Process of Identifying References

Consultation with experts: The review commenced with subject matter experts in healthcare administration burden and digital technology. Experts provided key references that they identified as either foundational or highly pertinent to understanding administrative burdens in healthcare.

Searching the literature: Additional references were identified through scanning the recommended literature reference lists and key search words identified by experts. A combination of empirical, most cited, and publications most relevant to the research question, which may be expert opinion or commentary, were prioritized. Available evaluations from Canadian health authorities were also sought out and prioritized to understand local sources of administrative burden.

Synthesis

Our synthesis aimed to categorize patterns from the literature in a manner that supports readers to evaluate local sources of administrative burden and build approaches to addressing them.

2.2 Knowledge Synthesis: Rapid Realist Review

A realist review synthesizes scientific literature to build a causal model that describes the mechanisms by which a policy or intervention can achieve a set of outcomes within a particular context. A detailed description of the Rapid Realist Review (RRR) methodology is available in

[Appendix B.](#)

Research Questions

1. How do eConsult, eReferral, HRM, and OLIS, or other tools that share the same purposes, affect administrative burden in healthcare settings?
2. How do eConsult, eReferral, HRM, and OLIS, or other tools that share the same purposes, affect patient safety, access to care, and quality of care in healthcare settings?

Design

The rapid realist review was conducted to build our understanding of contexts, digital strategies and interventions, and mechanisms that contribute to preferred outcomes of implementing Bundle 1 tools within the research timeline.

Search Strategy

Due to time constraints, the search strategy was limited to recommended papers identified by subject matter experts. Once this initial group of papers was screened, a draft causal model was constructed, and any gaps in information on key interventions were filled through targeted literature searches.

Study Selection, Extraction, & Appraisal

Screening was conducted in Covidence by the 2 researchers at title/abstract and full-text levels ([Appendix D](#)). Full-text screening and subsequent data extraction occurred in a stepwise manner through continuous appraisal that prioritized most relevant, rigorous, and informative in comparison to existing included papers. This aligns with the realist “fitness for purpose” approach (Pawson et al., 2005) within a rapid timeline.

Analysis & Theory Refinement

Explanatory accounts of causal statements were extracted from publications to develop a program theory. The theory was comprised of context-strategy/intervention-mechanism-outcome (S/ICMO) configurations (De Weger et al., 2020). Similar statements were consolidated into summary configurations describing how interventions may lead to outcomes of interest.

2.3 Qualitative Interviews

We conducted semi-structured interviews to supplement the narrative review and rapid realist review and to help understand 1) the current state of administrative burden in different clinical contexts; and 2) the ways in which tools such as a) eReferral, b) eConsult, c) HRM, and d) OLIS affect workflow and administrative burden. See [Appendix E](#) for the full interview guide. A purposive sampling strategy that leveraged existing OH and CDHE networks was used. We attempted to recruit across practice types (i.e., larger team-based primary care practices and small group fee for service practice) and geographic location (i.e., urban/rural areas throughout Ontario). Participants were eligible to participate if they were a primary care physician or nurse practitioner in Ontario who had experience with at least one of four digital tools (eReferral, eConsult, HRM and OLIS). All interviews were audio recorded, transcribed, and analyzed thematically, with literature review findings.

3.0 Results

3.1 Knowledge Synthesis: Informal Narrative Review

3.1.1 Sources and Drivers of Administrative Burden

The sources and drivers of healthcare administrative burden stem from complex systems, inefficient processes, suboptimal interactions among people (i.e., providers, administrative staff, and patients) and the limitations of current tools. These contributing factors are classified into four categories—systems, process, people, and tools—as described in Table 1 and further explained in [Appendix C](#). **Process**-related burdens are evident in the day-to-day operations, where cumbersome documentation and a lack of standardized, automated practices lead to fragmentation in care coordination. These inefficiencies can have a ripple effect, impacting the overall quality of care and contributing to provider burnout. **People** highlights the pivotal role of human interactions, including the dynamics of communication, expectations, and varying levels of technological literacy that can create friction and inefficiencies. Ineffective communication and

unclear task delegation among healthcare teams can lead to operational bottlenecks, while evolving patient expectations increase the demand for more engagement and add to administrative complexities. Finally, the **tools** designed to streamline healthcare delivery fall short due to user-unfriendly design, insufficient interoperability, and inadequate integration with established workflows. This shortfall is exacerbated by the limited involvement of physicians in the development of these tools and a general lack of organizational support. **System** contributors to burden include stringent regulatory compliance and the intricacies of billing and insurance processing, which introduce another layer of administrative complexity for healthcare providers. Tackling these diverse yet interlinked sources and drivers is important for reducing administrative burden and advancing the efficacy of healthcare services.

Table 1. Sources and Drivers of Healthcare Administrative Burden

PROCESS
Complex, Redundant Documentation and Lack of Standardization and Automation
Fragmentation in Care Coordination and Communication
Inefficient Information Retrieval and Management
PEOPLE
Ineffective Teamwork Communication and Task Delegation
Evolving Patient Expectations and Engagement Demands
Variations in Demographic and Practice Characteristics
Variations in Physician Beliefs, Attitudes, and Technology Skill Levels
TOOLS
Challenges with Design and Usability
Lack of Workflow Integration and Interoperability
Lack of Organizational Support
Lack of Physician Involvement in Tool Design and Implementation
SYSTEM
Regulatory Compliance, Accreditation, and Performance Measurements
Billing and Insurance Processing

3.1.2 Impact of Administrative Burden

The impact of administrative burden on physicians is well-documented. Many studies, reports and surveys have shed light on the consequences of administrative burden for both physicians and patients including: 1. Physician burnout (characterized by emotional exhaustion,

depersonalization, and a diminished sense of accomplishment) (OMA, 2021; Baxter et al., 2022; Kruse et al., 2022; DiGiorgio, 2023; Hamdan & Hamra, 2017), 2. Poor work satisfaction and mental health (OMA, 2021; CMA, 2021; Abid, 2021), and 3. compromised patient care quality (Herd & Moynihan, 2021; Erickson et al., 2017; Jamoom et al., 2016).

3.1.3 Interventions Used to Address Administrative Burden

Interventions addressing administrative burden typically function to improve workflow and can be separated into four categories as illustrated in Table 2: (1) process (2) people, (3) tool, and (4) system-level considerations. Additional intervention examples are described in [Appendix C](#).

Table 2. Categories of Interventions within Healthcare Administrative Burden Literature

	Description of categories and relevant interventions
Process	Interventions to simplify and remove unnecessary processes, forms, and tasks. <ul style="list-style-type: none"> Strategies include eliminating unnecessary forms and regulations, streamlining documentation steps, and removing duplicate efforts across various systems and tools (Nguyen et al., 2023; Erickson et al., 2017; Ayer, 2023; Thimbleby, 2018; OMA, 2023).
People	Interventions that leverage teamwork and better integration of non-physician healthcare professionals to reduce overall administrative burden. <ul style="list-style-type: none"> Scribe interventions (human and AI) can reduce administrative burden by handling documentation tasks (DeChant et al., 2019; Ayer, 2023; OMA, 2021). Hiring clerical staff, nurses, and care coordinators can allow tasks to be assigned to most appropriate team-members, improving workload distribution (Erickson et al., 2017; OMA, 2023; Cook et al., 2013).
Tool	Interventions that improve usability of existing digital tools and the burdens associated with them, as well as implementing new tools to digitize burdensome processes. <ul style="list-style-type: none"> EMR interventions can include making EMRs interoperable with other tools, simplifying logins, voice dictation, removing unnecessary information, and redesigning to better support care delivery (Nguyen et al., 2021; Thimbleby, 2019; Erickson et al., 2017; DeChant et al., 2019; OMA, 2021; OMA, 2023). Non-EMR interventions can include work such as standardizing inbox protocols and employing AI transcription (Cook et al., 2013; DeChant et al., 2019).
System	Interventions that address the complex systems that interventions operate in. <ul style="list-style-type: none"> Revising influential legislation and policies, providing sufficient resources to support implementation and training stakeholders/users, collaborating with stakeholders, including end-users as decision-makers, and conducting continuous evaluation of interventions (Nguyen et al., 2021; Nguyen et al., 2023; Erickson et al., 2017; Thimbleby, 2019; OMA 2021; OMA 2023). Tool-team-routine heuristic can assist in the tool design and acknowledges how tools interact with environments and systems to impact service delivery (Shaw et al., 2018).

3.1.4 Learning from Canadian and international approaches.

Table 3. Administrative Burden Interventions in Canadian Provinces

Nova Scotia (Alegbeh & Jones, 2023)	British Columbia (Thompson & Lefebvre, 2022)	Manitoba (Doctors Manitoba, 2023)
In Nova Scotia , the "Patients before Paperwork" initiative	In British Columbia , an initiative to improve safety and	In Manitoba , a survey revealed that physicians were spending

<p>aimed to reduce physicians' administrative workload by 10% by 2024. This was to be achieved through collaboration with physicians to identify and improve or eliminate inefficient administrative processes. Efforts included streamlining complex or unnecessary forms, updating outdated practices, and reallocating tasks to suitable staff. The project suggested that other regions should also evaluate their sources of burden and set goals to reduce administrative burden on healthcare professionals.</p>	<p>reduce the inefficiency of processes such as referrals, which occurs around 3.7 million times/year in BC, was launched. This initiative utilized EMR-compatible digital tools, such as eConsult, eDocument sharing, and eReferral, to streamline operations for allied health professionals, specialists, and general practitioners. Evaluations of provider experiences indicated moderate improvements in document sharing efficiency, reduction of manual and paper-based tasks, and access to information that supports their decision-making.</p>	<p>about 10.1 hours weekly on administrative tasks, with 44% deemed unnecessary. A goal was set to reduce time spent on unnecessary burden by 10% by 2023. Twenty areas for potential burden alleviation were identified, such as sick notes, referrals, orders, requisitions, and the integration of digital tools and EMRs. A collaborative strategy that engaged multiple organizations that owned or contributed to aspects of unnecessary burden was employed to jointly implement system-wide changes.</p>
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The Deloitte Axe the Fax assessment and the Axe the Fax Report by Beth Gerritsen outlined international initiatives to reflect on when planning next steps (Deloitte, 2022; Gerritsen, 2020). For example, Estonia developed a centralized ePrescription tool over a 3-year period to encompass all national prescriptions (launched in 2010) and was fully embedded into the system to cover 84% of all national prescriptions within 1-year of launch and 99% as of 2022 (Deloitte, 2022; Helmes, n.d.). This was accomplished by working with and integrating existing prescription processes into the national ePrescription system, involving stakeholders and users (e.g., physicians, government bodies, pharmacies) in system development, and connecting all health sites to the centralized system (Deloitte, 2022; Helmes, n.d.). While this was not a Bundle 1 tool, the success of this digital strategy emphasizes the importance of system-level considerations such as working with stakeholders and analyzing existing system policies and solutions. The nation-wide system can also enable widespread impact when making user-centred changes, such as the investigation completed by Parv et al. (2015) which highlighted physician requests for embedded decision-making support and prescription management features. Denmark established a similar centralized e-prescription system that is fully operational (Gerritsen, 2020). Success was attributed to several factors, including having a neutral centralized organization to

provide oversight of digital systems and obtain stakeholder consensus on standards, setting clear digital standards, setting targets and timelines, working with units to dynamically tailor needs with standards, and remaining accountable to patients (Gerritsen, 2020).

3.2 Knowledge Synthesis: Rapid Realist Review

See [Appendix D](#) for study characteristics, Bundle 1 tool causal pathway diagrams, and the summary program theory of S/ICMO configurations informing the findings described below. The included literature on Bundle 1 digital tools focused on the effect of digital intervention strategies (i.e., aspects of tools that impact how they are used or the functions and services they can provide) on administrative burden. Understanding causal pathways stemming from digitization strategies can identify intervention characteristics to consider for our local Ontario health system.

3.2.1 Findings Across Tools

Several digitization strategies that led to decreased administrative burden overlapped across all or most Bundle 1 tools (Table 4, 1st column). These strategies led to various mechanisms and outcomes, such as reducing the need for users to work across multiple interfaces and manual paper processes that can increase burden, or improving users' access to information and enabling them to make the most appropriate care decisions that can eliminate unnecessary steps. Assessing the presence of these digitization strategies within Ontario Bundle 1 tools can identify potential areas of opportunity to reduce administrative burden. Additionally, the consistency of these strategies may indicate that it would be beneficial to investigate their role in future PB4P digital tools of interest. Pathways to increased administrative burden were often related to lack of the beneficial strategies listed in Table 4, such as lack of EMR integration causing clinicians to work in multiple tools or interfaces. Other notable contributors to burden were specialties being unavailable in eReferral and tool forms not requiring users to provide sufficient information to support care (e.g., unclear eConsultation questions).

User-centred interface strategies were well-represented. This included tool features such as search and filter functions, auto-sorting and categorization, highlighting important information through formatting, reducing overall amount and length of reports, embedding pdf readers, reduced steps and interfaces, reduced clicks, reduced logins, and other tailored features that enable users to identify and access the information they need in a timely, low burden manner.

Beyond interfaces, user-centred design (UCD) is also relevant to RRR findings as it is an approach that centers the needs, usability experiences, and contexts of users, considering factors across process, people, tools, and system. The digitization strategies found in the review contribute to UCD as they function to improve digital tools from the perspective and outcomes of the user and how it will operate within their workflow. Building UCD should begin with actively involving users in the design process, a key strategy for eConsult to avoid designing-in burden and may be captured in other interventions with additional studies. Developers of tools should determine how the various aspects of the tool can impede or improve real-world workflow, such as EMR integration enabling auto-population within eReferral forms to directly remove a task. The digitization strategies (Table 4) and S/ICMOs ([Appendix D](#)) offer a starting point for integrating UCD in future iterations of tools and can be further supported through engagement with users. A systematic review of healthcare UCD (Chandran et al., 2020) and other UCD healthcare initiatives (Rudin et al., 2021; Levander et al., 2023) can also offer guidance for tool and workflow redesign.

Table 4. Key Strategies to Reduce Administrative Burden: Insights from Rapid Realist Review of Bundle 1 Tools.

Beneficial Strategies for all or most Bundle 1 tools	Additional Key Strategies for eConsult	Additional Key Strategies for eReferral	Additional Key Strategies for OLIS & HMR
<p>User-centred interface</p> <p>Integration with EMRs and other existing tools</p> <p>Standardized forms and processes</p> <p>Clinical decision-making support language embedded within tools</p>	<p>Users consulted in development of tool/new care responsibility</p>	<p>Digitizing the process of pre-existing, well-functioning referral systems</p> <p>Centralized intake systems</p>	<p>Effective push and pull HIE pathways that support user needs</p>

Reliable online platforms that replace manual processes			
Direct communication pathways between users (e.g., between PCPs and specialists)			
Traceable and retrievable patient information			
Shared access for multiple users (enabling teamwork)			

Digitization strategies that led to improved administrative burden often had concurrent benefits of improving patient safety and/or access to care. This highlights an opportunity to advance multiple healthcare outcomes of interest when thoughtfully applying digitization strategies. The review also identified a need for health systems to address current challenges (i.e., sources of burden) in existing manual systems before digitizing steps to avoid introducing additional technological complications for clinicians. Doing this may enable digitization to increase the efficiency of completing individual steps in health service processes in comparison to manual equivalents.

3.2.2 Tool-Specific Findings

Based on the literature, **eConsult** appears to benefit patient care and offer opportunities to reduce administrative burden for PCPs and specialists through reducing unnecessary referrals ([Appendix D](#)). Key eConsult strategies for reducing administrative burden are listed in Table 4. There is no clear manual analog for eConsult, beyond hallway consultations that may not be formally documented; therefore, it can be considered an additional responsibility added on to practices. While it likely improves access to care, this added burden will need to be considered at a system level to ensure that eConsult users are sufficiently supported and compensated.

eReferral has potential to reduce burden in comparison to fax-based systems, but this was enabled through several important strategies that should be thoughtfully implemented to not increase burden ([Appendix D](#)). It may be helpful to first address existing manual referral

challenges in our system and develop a robust central intake system as scaffolding for eReferral to increase the benefit of introducing it province-wide.

For health information exchange tools like **OLIS** and **HRM**, effectiveness was dependent on the implementation of intervention strategies ([Appendix D](#)). Within local-setting literature, OLIS appeared to be providing users with user-centred functions more readily than HRM. Identifying the appropriate balance between push and pull HIE for local users and ways that the tools can enable teamwork, coinciding with expansions of interprofessional teams (Government of Ontario, 2024), will also be beneficial when updating the tools.

3.3 Qualitative Interviews

3.3.1 Participant Demographics

13 interviews were conducted with primary care clinicians (PCPs) throughout Ontario. [Appendix E](#) provides an overview of demographics of interviewees including practice information. [Appendix E](#) provides the interview guide for semi-structured interviews.

3.3.2 Summary of Themes

We describe the overarching themes within each problem space below, highlighting overall benefits compared to fax, as well as the pain points and opportunities for the associated digital tools. The themes surrounding pain points and opportunities within each problem space are further categorized across process, people and tool.

Table 5. Summary of Themes from Qualitative Interviews

	Process	People	Tool	Comparison to Fax
HRM	Volume of information Fragmented information Ongoing management of both HRM and fax	Diffusion of responsibility Variation of staff delegation Legal and medical responsibilities to review information	Categorization and formatting Routing of information	<p>Benefits:</p> <p>(+) Improves quality of care through quick access to information</p> <p>(+) More reliable</p> <p>Drawbacks:</p> <p>(-) Many PCPs end up using both fax and HRM</p>

				(-) Described as big source of administrative burden currently
eReferral	Lack of form standardization Declined referrals adding administrative time	Inadequate adoption from specialists Navigating specialist directory	Variation in integration with EMR	Benefits: (+) More reliable (+) Notifies patients when referrals sent/received Drawbacks: (-) Most common method is still fax or eFax (-) Adds time compared to fax
OLIS	Lack of Standardized nomenclature across labs	Diffusion of responsibility	Slow download speed Manually requesting labs	Benefits: (+) High Adoption (+) Much preferred to fax (+) Improves quality of care (+) Fast, reliable access to test results Drawbacks: None compared to fax
eConsult	None described	None described	EMR Integration	N/A
System Level	PCP representation on governance structure	Optimizing team-based care Clarifying roles and responsibilities Relationships with pharmacy	EMR considerations	Generally, PCPs described benefits of moving away from traditional fax processes but underscored that digitization can both decrease and increase administrative burden.

3.3.3 Receiving and Reviewing Documents (HRM)

When PCPs described their experience of receiving and reviewing documents from other parts of the health care system (e.g., acute care), they often described a traditional fax-based process (either physical fax or eFax), using Health Reports Manager (HRM), or a combination of the two. All but two physicians (one who used EPIC as their EMR, and the other who only used fax for referrals) had experience with both processes. Overall, when comparing these processes, HRM was described as beneficial for improving quality of care by providing PCPs with reliable access

to patient information faster and more easily compared to faxing. Faxes were often described as less reliable in that they get lost or are cut-off, difficult to read and take too long to arrive. However, the pain points for HRM were strongly emphasized by PCPs as a considerable contributor to administrative burden, especially across the tools and processes discussed, which we outline below.

PROCESS

1. Volume of Information

A key concern underscored by all PCPs interviewed using HRM was the large volume of information that is sent to the PCP through HRM, which is often not necessary and not helpful for patient care and can result in important items being missed. Opportunities associated with this theme often involved the ability for PCPs to select what info they wish to receive from the hospital as well as education for hospitals and specialists on what is and is not appropriate to send through HRM.

“So, the one [note from HRM] that comes from the Emergency Room (ER) has literally down to the vitals that were taken in the ER by the nurse, and the urine test results, and everything embedded in the note. Then, I get each one of those things separately from the lab as an HRM... But then at the very bottom will be the plan from the ER doc about what to do next. And that will often have, follow up with your family doctor in one to two weeks. I leave it in their capable hands to take care of XYZ... then I will get 5 copies of the hospitalist note each time with a separate addendum from when they went in [to the chart]... I’ll get the same note five times.”
- Participant 06 (P06)

“It’s sending too much like it needs to be more... oriented around the fact that as the primary care doctor, this is what actually needs to be pushed to my EMR... the rest of the stuff if I need it, I can always pull myself.”
- Participant 09 (P09)

2. Information is fragmented

Another key theme described was the unsystematic way in which information was arriving to PCPs. The lack of context for the PCPs receiving patient data made it more difficult for them to

follow up with subsequent testing or care with the patient.

“They’re trying to send you information about what’s going on, but they’ll send it in a highly piecemeal manner. So when you enter [Emergency Room], there will be a flag that you went to emerg, but that’s it. But there’s no chief complaint... it’s just that you [patient] went to emerg... that means nothing to me.”

- Participant 03 (P03)

3. Ongoing management of HRM and Fax

Many of the participants highlighted that ongoing management contributes to burden at their practice, because some specialists and hospitals still only use fax. As a result, many PCPs received duplicates of patient information: one version through fax and one version through HRM, but still had to review both sets to ensure it was a copy.

PEOPLE

4. Diffusion of responsibility

PCPs described their experiences with diffusion of responsibility that can be reinforced by HRM because they had quicker access to information. For example, some discussed that even if they did not order a test, they felt the need to follow up, even when it may not be their responsibility.

5. Variation with staff delegation

PCPs had different experiences with delegation of tasks to staff. Some PCPs found ways to delegate tasks to administrative staff, while others felt that delegating tasks to staff was not possible, especially for practices who do not have admin staff to delegate tasks to.

“...that was one of his biggest gripes was about just the time-consuming aspects of downloading [in] HRM, so that is one of the [ways] we have essentially delegated the vast majority of HRM downloads to the staff, sorting them out... They’ll change the category, ‘cause the categories are often miscategorized.”

- Participant 07 (P07)

6. Legal and medical responsibilities to review information

PCPs also explained that alongside the influx of information available to them via HRM, they feel medically and legally responsible to review information when it is available to them, contributing to administrative burden.

TOOL

7. Categorization and formatting

PCPs frequently described issues surrounding a lack of standardization in the documents or in the labelling of documents. Clinicians reported spending more time, especially with HRM, as reports were not categorized or labelled correctly, or reports were sent multiple times with minor additions or changes to the documents. The lack of formatting options for HRM costs PCPs more time as they had to go through each document closely instead of having the ability to save time and find the answers needed.

8. Routing of information

PCPs described increased administrative burden due to the inability for HRM information to filter to respective clinical contexts when a PCP worked in more than one setting. One PCP underscored this challenge as they work in more than one clinic and the information would only get sent to one primary location. This resulted in their need to shred/delete non-relevant information and then send the information onward to the appropriate clinic.

3.3.4 Referring Patients (e-Referral)

When PCPs described their experience of referring patients to other healthcare clinicians the most common mode was via fax or eFax. Although almost all (11 of 13 PCPs) described some experience using eReferral, only 5 of 13 PCPs reported using it on a weekly basis. One PCP reported using eReferral and then stopping usage predominantly due to lack of uptake from specialists in the area (see Theme 12). Three PCPs described having never used it because it was either not offered through their EMR (P03), or they have always used faxing or eFax and it

would be more cumbersome to change (P06), or they felt it would not integrate well into their workflow (P11). For those with experience using eReferral, they found it to be more reliable than fax, notifying both the PCP and the patient when the eReferral had been sent and received, while offering patients email reminders and instructions for their upcoming referred visit. However, there were also drawbacks compared to fax, such as that eReferral takes longer (one PCP estimated 20-25% longer than fax).

PROCESS

9. Lack of form standardization

PCPs highlighted the importance of standardized forms for referrals coupled with the need for a centralized intake to help reduce administrative burden. Currently, many specialists have varying requirements and forms for their referrals, inhibiting workflow significantly.

“They require their individual form, and that creates a lot of administrative burden and hassle because... as you can imagine... a city like Toronto... there are hundreds of clinics that have its own form. There’s hundreds of different permutations of the same document, and if they’re refusing to accept them, that creates a bigger problem for my patients, my staff, myself, it’s just not an easy workflow.”

- Participant 09 (P09)

10. Declined referrals adding administrative time

PCPs described declined referrals as another burden since there is no function to simply forward the new eReferral onto another specialist, forcing PCPs having to create a new eReferral form.

“There’s a huge pain of the frustrations being that because you don’t have a sense of their [specialists] wait time often, often depending on the specialties, some you know they’ll decline the referral and it might take you two or three or even four tries before you find somebody who’s accepting a patient.”

- Participant 08 (P08)

PEOPLE

11. Inadequate adoption from specialists

Almost all PCPs described the lack of adoption amongst specialists in their respective areas as a key pain point of eReferral. Poor adoption amongst specialists leads to an increased administrative burden amongst PCPs, especially when dealing with declined referrals, as it

required them to create a new form (as described above).

“The other challenge as well to in our region is that we don't have a lot of specialists on eReferral anyway. So, we were still very much like a community that relies on fax.”

– Participant 09 (P09)

12. Navigating Specialist directory

The value of eReferral is limited by the lack of adoption by specialists in some regions, and the lack of information on specialists' wait times and practice focus in many instances. For instance, PCPs described challenges with navigating the specialist directory as many specialists were listed, but not actually using eReferral (i.e., only accepting fax).

TOOL

13. Variation in EMR integration

EMR capabilities to integrate eReferral varied significantly amongst the types of EMR. For example, PCPs described more user-friendly integration with PSS, and subsequently higher uptake, compared to lower integration and adoption amongst those using Accuro and EPIC.

3.3.5 Receiving and Reviewing Lab Results (OLIS)

The process most commonly used for receiving and reviewing lab results was through Ontario Laboratories Information System (OLIS). All PCPs had experience with using OLIS, but with one PCP describing no longer using it due to a change in their EMR (which did not have OLIS), while another used less frequently as the lab commonly used by patients in their area did not use this tool. Generally, PCPs described OLIS positively and much better than fax for reviewing results, emphasizing OLIS's seamless integration into their EMR. PCPs described OLIS as improving quality of care by providing fast and reliable access to test results and supporting the coordination of care by preventing duplicate lab ordering. For example, several PCPs noted the benefit of being able to look up labs ordered by other clinicians, even if they were not copied on the order.

14. Lack of Standardized nomenclature across labs

The need for a consistency of language standardization in labs was underscored to ensure labs are easy to find and track over time, for example the use of “Vitamin D” compared to “25-hydroxy Vitamin D” (P09).

TOOL

15. Slow download speed

PCPs noted time wasted on slow download speed, especially when reviewing older documents.

16. Manually requesting labs

One PCP detailed their “frustrating” experience when manually requesting labs (i.e., via faxing or calling), as they often did not automatically arrive via OLIS (P13).

3.3.6 e-Consult

As there is no comparable analog for eConsult, we did not ask PCPs about how it compares to fax. The feedback pertaining to eConsult was in general positive, with many benefits described by PCPs. For instance, eConsult was described by almost all PCPs as helpful when they needed a quick response from a specialist for issues outside of their scope or when clarification/a second opinion was warranted. PCPs noted that eConsult helped to increase their confidence and reduce the need for a full referral, thus enhancing quality of care by providing patients with more timely responses. The benefits of eConsult were described as especially helpful in more rural locations where one must expand their network to access certain specialists. Despite the benefits, usage of eConsult ranged drastically from weekly to yearly across PCPs. Those who used eConsult less often described pain points/opportunities within the realm of digitization.

TOOL

17. EMR Integration

Amongst those using PSS, one of the most common complaints amongst PCPs was the lack of integration with their EMR. The use of eConsult often required multiple logins, which at times fail, as well as time spent duplicating the entry of information so that it was reflected in the EMR

chart. However, for PCPs using Accuro, eConsult was better integrated into the EMR, facilitating further adoption of eConsult.

“So, it goes [from] like EMR to one ID to OTN- if anything in that pathway breaks, like the one ID login fails... which happens probably like one in five times or more frequent like it happens all the time, it just gives an error that breaks the data transfer and then nothing shows up in OTN.”

– Participant 01 (P01)

3.3.7 System Level

As part of the interview process, PCPs were welcomed to provide recommendations on other tools, processes and policy changes that they felt would have a positive impact on reducing administrative burden. Generally, PCPs described benefits of moving away from traditional fax processes but underscored that digitization can both decrease *and* increase administrative burden.

PROCESS

18. PCP representation on governance structure

This theme highlights the need for physicians and other clinicians to be a part of the governance structure and the decision-making process for their EMRs. One PCP noted that this was more important to them than specific digital tools:

“... The docs fundamentally want the tool, but the benefits of governance and decision making for an electronic medical record system in the long run is a bigger driver and more important to us than the immediate needs of using OLIS and HRM.”

- Participant 03 (P03)

PEOPLE

19. Optimizing team-based care

PCPs discussed the need to optimize team-based care, by making the best use of skills and scope offered by each member of the team. Most of the PCPs interviewed (62%) were part of Ontario Health Teams (OHTs), so they were part of an integrative team with other allied providers such as social workers or dieticians. However, as Participant 02 highlighted, the family doctor

continued to serve as the first touchpoint between the patient and health care services.

“... I think some of the other issues related to admin burden are related to not optimizing team-based care, which is quite common throughout all team-based practices in Ontario. Everyone still needs to see me [Family Doctor] first for the most part... there’s no reason why they [patient] couldn’t just go to the dietician directly to talk about their prediabetes... the family doctors are still a strange bottleneck, right?”

- Participant 02 (P02)

20. Clarifying Roles and Responsibilities with Specialists

With HRM and OLIS, PCPs described their concerns about clarifying roles and responsibilities with specialists. These concerns were common as many PCPs highlighted the need to demarcate responsibilities without the diffusion of responsibility. For example, if they were not the ordering physician and test results came through, it is not their responsibility to follow up, but that of the ordering clinician.

“It’s more that... responsibility of when I get documents coming through, like blood tests coming through, making it very clear that, if you’re the specialist and you ordered this, you do need to be responsible for following up on it.”

- Participant 01 (P01)

“...now that that specialists basically tells me how to take care of the patient and a lot of that stuff, you know, you don't get paid for, it takes up time in your life and you're probably doing it with less expertise than really should be applied to the thing. So that's admin burden...”

-- Participant 07 (P07)

21. Relationships with Pharmacy

MedsCheck were emphasized as programs that increased administrative burden for PCPs, predominantly due to the influx of faxes associated with them, some of which did not report anything to follow-up on, and/or were viewed as done unnecessarily.

"The biggest thing, this has been in the media... faxes and clarification with [the] pharmacy. It's always clunky and like they don't see what we're seeing, we don't see what they're seeing - so that I think is a big issue...you know, the endless faxes from the MedsCheck referrals is like a huge a huge administrative burden that I find it very hard... then there's also, like all the MedsCheck reviews that are done, and those of like probably 95% of them, they're checked off as like nothing like, there's nothing to follow up on.”

- Participant 10 (P10)

TOOL

21. EMR considerations

PCPs discussed several considerations and opportunities for further EMR advancement to support the reduction of administrative burden. PCPs expressed the challenges with the current

EMR certification to achieve user needs, highlighting their desire for one, unified EMR and for accessible Application Programming Interfaces (API) to utilize their own data for quality improvement:

"I would say a unified EMR that can be accessed remotely if you ask me what my dream is, I would say unified EMR that works in multiple settings that I can use AI on for voice recognition would be ideal."

- Participant 12 (P12)

4.0 Discussion

Triangulating Findings for Process, People, Tool, and System

PROCESS

The narrative review highlighted that administrative burden can be reduced by assessing and simplifying unnecessary steps, removing duplication, and information sharing within administrative processes (Nguyen et al., 2023; Erickson et al., 2017; Ayer, 2023; Thimbleby, 2018; OMA, 202). A key example/priority area where processes embedded in digitized tools has been described as increasing administrative burden for PCPs is within HRM. Despite the potential benefits of HRM to improve PCP access to patient information and quality of care, it was (in its current state) described as adding more administrative burden time than traditional faxing processes. PCPs described their experience with the influx of information it sends PCPs as unnecessary or piecemeal, and the need to review each item took additional time during the workday. This underscores an important opportunity area: to consider the balance of what Campion et al. (2012), describe as the "push" and "pull" with health information exchange. Opportunities around managing this balance of push and pull could be in the digitization space, such as allowing filters or choice of what information is sent automatically and what/how PCPs can retrieve information. Findings from the RRR support this as health information exchange tools that gave users the ability to organize, manage, search, and filter received information was an important digitization strategy that led to decreased administrative burden. Other key strategies to continue to improve HRM is to center users within the design, which can be done by acting on

the HRM Taskforce findings, further (compensated) engagement, and integrating HRM with EMRs to reduce unnecessary information and task duplication.

Another priority area identified within 'process' is specialist adoption of eReferral. Almost all PCPs underscored the lack of adoption from specialists as a key barrier to its usage, which leads (in part) to referrals being declined and them needing to repeat the process again (from scratch). This is a local, context-specific finding that will need to be targeted with regional campaigns and supported with efforts to ensure that eReferral has user-centred design. Within the RRR, a Scottish eReferral system contained standardized forms designed for specialists which improved the quality and usability of incoming referrals, reducing unnecessary back and forth (Bouamrane et al., 2014). This approach can be leveraged to improve the specialist experience with Ontario eReferral systems and encourage adoption, but it must be balanced with the PCP perspective to ensure that design changes do not reduce usability for PCPs, which occurred within Bouamrane et al. (2014). One proposed method to manage this was to standardize a general format that works across specialties, improving PCP process experiences while ensuring that the information captured is sufficient for specialists. Other important eReferral process changes identified were to develop a robust central intake system and embed decision-support language.

PEOPLE

Regarding the use and integration of team members to reduce administrative burden, diffusion of responsibility was underscored as a large pain point for PCPs. In particular, some PCPs noted for HRM and OLIS, that they felt specialists were offloading work to their primary care colleagues. This is an issue that has been discussed by the College of Physicians and Surgeons of Ontario (CPSO) in their policies and guidance document titled "Advice to the Profession: Continuity of Care", but continues to persist (CPSO, n.d.). Opportunities to address this might include education for specialists on what is and is not appropriate to delegate. Within the narrative review, teamwork and delegation of tasks was an important theme for interventions addressing administrative

burden (Erickson et al., 2017; OMA, 2023; Cook et al., 2013). It will be beneficial for local clinics and teams to assess their available human resources and who may be available to share HIE tasks with physicians. This work will need to be supported by the creation of role protocols and guidelines, as well as system approaches, such as government funding to support additional staffing in teams. Vendors of HIE tools will also need to support shared access and the ability to delegate tasks within their tool, another supportive digitization strategy in the RRR.

TOOL

Priority areas pertaining to specific tools and their usability were especially prominent for HRM, eReferral and eConsult. For HRM, challenges due to errors in categorization of reports, inability to send to multiple locations, and a need for formatting enhancements (e.g., underline/bold) were often noted. For eReferral, PCPs underscored the importance of listing only the specialists that are using eReferral, listing services offered and wait times, having the ability to forward referrals if declined, and the need for consistent (and seamless) integration across all EMRs. For eConsult, the biggest opportunity discussed by almost all PCPs was integration with the EMR, and not needing multiple logins (i.e., via OTN). This was consistent with the following RRR digitization strategies for reducing burden; EMR integration to reduce interfaces used and enable auto-population of information, user-centred interface (e.g., streamlined logins, reduced clicks and interfaces, format that promotes easy information acquisition, ability to tailor view and searching), and implementation of standardized forms and processes to increase efficiency. Indeed, this research points to the importance of user-centred design. When investing in re-design, it will be paramount to act upon PCPs' requests and seek feedback.

SYSTEM-LEVEL CONSIDERATIONS

Key system-level considerations underscored important opportunities for addressing administrative burden. Within the narrative review, system-level sources impacted many areas of physician practice and interacted with other sources of administrative burden (Nguyen et al., 2021; Nguyen et al., 2023; Erickson et al., 2017; OMA 2021). Supportive system level

interventions included work such as addressing legislative barriers and providing sufficient funding, resources, and training for those implementing interventions. Within the interviews, PCPs highlighted the need for physician representation on EMR governance structures to ensure decisions have the end-users (e.g., PCP) reflected throughout. This was supported by literature showing that when physicians are not involved in the design of digital health tools, technologies often fail to align with the real-world needs and can increase burden (Tutty et al., 2019; OMA, 2021; Thimbleby, 2019), (Erickson et al., 2017). As this work is done, we should also aim to better understand and address barriers to diverse involvement of PCPs in the design process. PCPs also emphasized the importance of optimizing team-based care, considering the team scope and skill set to maximize team functioning, time, and resources. This is reinforced in literature, for example, the Primary Care Needs OurCare Report, (2024), which explored at a national level the future of primary care in Canada. In their report, they underlined the need to expand team-based primary care to increase access to care – and care that embraces a holistic approach, while simultaneously reducing clinician burnout.

Building relationships across PCPs and other health care practitioners, namely specialists and pharmacies, may facilitate better system coordination and enable specialists to consider what they are ‘offloading’ to their primary care colleague. Managing the distribution and reallocation of administrative burden across a healthcare system can be a difficult task with diverse stakeholders that possess differing priorities and experiences with burden. As digital tools are implemented, the 3 laws for paperlessness may provide beneficial reminders to facilitate appropriate system decision-making (Thimbleby, 2019). The laws recommend: “Keep in sight the goal of improving healthcare”, “Only implement evidence-based change”, and “Plan for cultural change and moving goal posts” (Thimbleby, 2019). Considering these “laws” can support governing bodies to prioritize important health system outcomes, invest in sufficiently evaluated tools, and be adaptable in their approach when making decisions and providing resources and training for tool users. When

looking at the national ePrescription system established in Denmark, part of its success was attributed to having a neutral, centralized organization assigned to the task of obtaining consensus for standards and governance across all relevant stakeholders (Gerritsen, 2020). This approach can also be leveraged for decision-making processes and managing competing agendas. Finally, at the heart of the digitization process of primary care is arguably one of the most influential developments, which were underscored as a priority focal area – the EMR. There is desire from PCPs to move to a unified EMR system where they have access to their own data to enact their own QI projects. Gaps in provincial EMR certification were highlighted, describing initiatives from other provinces, like Alberta (Alberta Health, 2015) where they have moved to a unified system.

5.0 Limitations

There are several limitations to note in this evaluation including:

1. Narrative review: The non-systematic search strategy due to timeline and resource restrictions may have introduced source selection biases and impacted the themes we determined from the literature. The findings from this review should be interpreted as exploratory rather than a comprehensive assessment of available literature on the 3 research questions addressed.
2. Rapid realist review: The non-systematic search strategy due to timeline and resource restrictions may have introduced source selection biases and impacted the themes we determined from the literature. We have attempted to mediate this through expert review of findings and study appraisal. The overall more favourable outcomes identified in the literature may also indicate potential bias. Significant findings are more likely to be published. Researchers in both peer-reviewed publications and white papers have often been associated with the development of the tools, and assumptions in favour of the benefits of digitization may have impacted hypothesis testing. The risk of bias was not

assessed; therefore, the local lived experiences identified within the qualitative study should be prioritized for Ontario intervention planning. Lastly, the single reviewer data extraction approach may have introduced bias in the interpretation of the S/ICMOs. We attempted to mediate this through having 2-reviewer extraction for the first 2 publications of each intervention with conflict resolution to train the single reviewer for future extraction.

3. Qualitative interviews: There were challenges in recruiting PCPs from smaller FFS clinics and rural locations within the proposed project timelines. Although we had some representation from more remote locations (e.g., Sudbury), we did not have any PCPs from rural locations. Further, although we had two physicians who practiced in multiple areas some of which included smaller FFS practices, we did not have substantial representation from smaller FFS practices to meaningfully compare across practice types.

6.0 Next steps

Preliminary Evaluation framework

Our findings suggest that the ability for ongoing iterative user centred design and programmatic evaluation is important to understand impact and inform ongoing strategic decisions. We propose creating an evaluation approach that creates an infrastructure to enable a wide range of data collection in an efficient and responsive manner over multiple aspects of the program. Recognizing the benefit of shared learnings across Canada and similar physician engagement in other provinces (Thompson & Lefebvre, 2022; Alegbeh & Jones, 2023; Doctors Manitoba, 2023), it may be beneficial to collaborate with other evaluation teams when establishing next steps.

There are three proposed components for the future Evaluation Approach across phases:

a) Digital Simulation Lab

A digital simulation lab that includes a clinic-like environment with computers that mimic real clinical digital systems including EMRs, digital tools, virtual care mediums etc. The creation of a digital simulation lab will allow the project team to conduct an in-depth analysis of the clinician's

experience with the use of different tools and workflows. Data collected could include time motion studies on key workflows, competitive analysis, and usability testing of different tools. Lastly, patient case simulations could be conducted to analyze clinician behaviour and interaction with different tools.

b) Reference Clinics (Sentinel sites)

A collection of 5-7 primary care clinics that represent a variety of practice delivery types, patient populations and locations across the province. Partnerships would be established with the clinics to support data collection through contracts, data sharing agreements, etc. Through the sites, data on quantitative fax use, EMR or other tool adoption and usage could be collected. Such data could be cross referenced with de-identified EMR data and further interviews and/or surveys with patients and PCPs.

c) Reference Panel

A panel of 30-40 diverse primary care providers who can provide feedback and input into the evaluation through surveys, interviews and focus groups. By establishing a panel of interested PCPs, it would both streamline and simplify recruitment attempts to gather feedback from PCPs, while still providing high quality data. The reference panel could provide qualitative data on their experience, suggestions for improvement, barriers or facilitators to adoption, and feedback on prioritization for policy.

When integrating the findings of this proposed approach with the work described in this report (i.e., narrative review, rapid realist review, qualitative interviews), a set of context-specific logic models for necessary inputs to implement tools, potential outputs, short-term outcomes (e.g., reduced administrative burden derived from changes made to tool), and long-term outcomes (e.g., province-wide adoption of tools) can be created. This would align with provincial goals to reduce

administrative burden for the healthcare workforce and facilitate the adoption of tools of interest that benefit the healthcare system while improving physician experiences and patient outcomes.

7.0 Recommendations

Based on the findings from the literature reviews and qualitative interviews we highlight several recommendations on next steps to support the overall program goals.

1. **Build mechanisms for user-centred design, including a strong end-user voice, focus on usability and evidence-based decision making into the PB4P project.** Thus, we suggest building the capabilities by creating an infrastructure to enable a wide range of data collection in an efficient and responsive manner over multiple aspects of the program. This should include the ability to observe and measure workflows in real world clinics, connect with a wide range of end users for timely insights and feedback and create a usability lab where workflows can be measured and refined. This work will also need to be paired with channels for consistent, transparent communication with healthcare professionals and feedback opportunities as developments and progress is shared.
2. **HRM is a considerable source of administrative burden for PCPs in Ontario and provides an important opportunity to reduce administrative burden across the province.** While our research findings align with the OntarioMD HRM Task Force recommendations we suggest an initial focus on reducing the volume of incoming documents by reducing duplications and implementing a Core Document Set. Our work shows that the providers are most happy with health information exchange programs when there is a balance between the “push” and “pull” of data. Thus, focusing on the Core Document Set for HRM while, in parallel, supporting widespread access to the provincial clinical viewers (ideally with contextual launch), is likely to produce immediate and tangible improvements to digital health information exchange and administrative burden for PCPs.

3. While this research suggests that, overall, eReferral has the potential to reduce administrative burden, in the short term it would either be neutral or contribute to an increase of the overall administrative burden compared to faxing. However, **the standardization of referral forms followed by the widespread adoption of the eReferral program, namely by specialists, EMR integration with auto-population of key demographic and clinical information, as well as a centralized wait list management is likely to reduce burden in the medium term.** We wish to underscore that it is imperative to improve non-digitized processes prior to digitization, such as standardizing and simplifying eReferral forms in a manner that reduces administrative burden while ensuring that forms capture necessary information to inform practice decisions.
4. PCPs highlighted the **need for improving how primary care works in a team-based capacity within their practices but also in the patients' circles of care, such as specialists and community pharmacists.** They identified clear pain points, such as specialists offloading responsibility to PCPs as well as the increased admin burden of reviewing MedsCheck by pharmacists. As such, we suggest building cross disciplinary working groups that focus on improving how clinicians and allied health providers in different institutions work together effectively, recognizing that digitization can reduce burden for some groups at the expense of others. In parallel, capacity building work should also take place providing guidance on how primary care teams can work effectively together. For example, this could explore the complementary roles of nurses, allied health physician assistants (PAs) and medical office assistants (MOAs) to drive high function primary care teams that enable all to practice at the top of their scope to drive access across the health care system.
5. Not all administrative tasks are necessary, and our system may host many sources of unnecessary burden for clinicians and primary care teams to spend their time on. **We recommend conducting a provincial scan of sources of burden across the system to determine opportunities to streamline processes and reduce duplication of work within**

forms. This would require system-level change, collaboration with other ministries and organizations, and can be completed concurrently with the digitization of necessary burden. A Manitoba task force worked with physicians to undergo a similar evaluation and identified that 44% of burden was unnecessary within the system (across people, process, and tools). The sources of burden were characterized (e.g., orders and requisitions, sick notes, private insurance forms) and “owners” of the burden were identified (e.g., private insurers, workers compensation board, Manitoba Health). The task force aims to work directly with owners of burden to collaboratively develop solutions for reducing duplication of work and unnecessary tasks. This approach can be implemented in our setting to comprehensively address sources of burden that do not require resource-intensive digitization, but simplification.

8.0 Conclusion

In conclusion, the literature and PCP interviews identified that digitization can both increase and decrease administrative burden depending on various factors. We have offered insights into these factors as well as recommendations and next steps to support the reduction of administrative burden experienced by PCPs, which may in turn promote increased adoption.

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Appendix A

Appendix A: Key Findings across Methods

Key Findings Across Methods	
NARRATIVE REVIEW	<p>The high-level review of healthcare administrative burden literature identified sources and drivers of burden that can be categorized into four main groups that often interact and influence one another; process, people, digital tools, and system-level factors. These sources impact physicians’ practices across the full scope of their work and results in physicians spending approximately 10 hours on administrative work per week on average as of 2021 (CMA, 2021). Administrative burden is also associated with physician burnout, poor work satisfaction, and poor work-life balance, indicating a need to urgently address this issue alongside nation-wide calls for action from physician and government groups. Evaluations of interventions directly addressing administrative burden are limited but can be similarly grouped across process, people, and digitization interventions. Process interventions focus on simplifying the complex and redundant processes, forms, and tasks that contribute to administrative burden. People interventions focus on integration of non-physician healthcare team-members and making better use of their skills to reduce physician administrative burden. Digitization interventions focus on improving the usability of existing digital tools and implementing new tools that digitize burdensome processes, including those resulting from pre-existing digitized processes (e.g., EMR challenges). These interventions interact with system-level factors and should be coupled within system-level considerations such as revising influential legislation and policy, providing sufficient resources, collaborating across relevant stakeholders and physicians, and conducting continuous evaluation of interventions to ensure they effectively reduce burden within the local system it is situated in. Case studies of work conducted in other Canadian provinces may identify areas for shared co-learning across the country.</p>
RAPID REALIST REVIEW	<p>The available literature on bundle 1 digital tools largely focused on the effect of digital intervention strategies (i.e., aspects of tools that impact how they are used or the functions and services they can provide) on the administrative burden that tools contribute to users’ workflows. Many digitization strategies that led to decreased administrative burden overlapped across all or multiple tools, including:</p> <ul style="list-style-type: none"> • User-centred interface and engaging users in design decision-making. • Integration with EMRs and other existing tools used by clinicians. • Having standardized and well-laid out forms that streamline processes. • Establishing reliable online platforms that replace manual processes. • Embedding decision-making support language in tools. • Enabling direct communication pathways between clinicians. • Enabling traceability and auditing of patient information. • Providing shared access for multiple users within tools (enabling teamwork). <p>These strategies led to mechanisms and outcomes such as improved user experience to improve overall efficiency and time on administrative burden, reducing the need for users to work across multiple interfaces and use manual paper processes that increase burden, and helping to users to more easily find relevant information to make most appropriate care decisions that eliminate unnecessary steps or actions. These strategies often had concurrent benefits of improving patient safety and/or access to care. The review also identified a need for health systems to address current system and process challenges (i.e., sources of burden) in existing manual systems before digitizing steps to avoid introducing additional complications for clinicians. On the individual tool level, several important strategies and considerations were identified in the global literature that can be considered for relevance to future local approaches to improving the administrative burden associated with bundle 1 tools.</p>

QUALITATIVE INTERVIEWS

Several themes emerged when interviewing 13 PCPs across four key problem spaces: 1) receiving and reviewing documents from other parts of the healthcare system (via fax or HRM); 2) referring patients to other healthcare providers (via fax or eReferral); 3) using eConsult; and 4) receiving and reviewing lab results from other parts of the health care system (OLIS).

- 1) When PCPs described their experience of receiving and reviewing documents from other parts of the health care system (e.g., acute care), they often described a traditional fax-based process (either physical fax or electronic fax (eFax)), using Health Reports Manager (HRM), or a combination of the two. Overall, when comparing these processes, HRM was described as beneficial for improving quality of care by providing PCPs with reliable access to patient information faster and more easily compared to faxing. However, the pain points for HRM were strongly underscored by PCPs, as a considerable contributor to administrative burden, especially across the tools and processes discussed. Common pain points included volume and fragmentation of information, needing to manage both fax and HRM processes, diffusion of responsibility, variation in delegation, legal and medical responsibilities to review information, issues with lack of labelling and inaccurate categorization, routing of information (i.e., to more than one clinic), and formatting for readability.
- 2) When PCPs described their experience of referring patients to other healthcare clinicians the most common mode was via fax or eFax. For those with experience using eReferral, they found it to be more reliable than fax, notifying both the PCP and the patient when the eReferral had been sent and received, while offering patients email reminders and instructions for their upcoming referred visit. However, there were also drawbacks compared to fax, such as that eReferral takes longer to complete, one PCP estimated by 20-25%. Specific pain points and opportunities included themes surrounding lack of standardization of forms, referrals often being declined and adding time, inadequate adoption from specialists, navigating specialist directory, a need for service lists and wait times, variation in integration with the EMR, and lack of ability to forward declined referrals.
- 3) The process most commonly used for receiving and reviewing lab results was through OLIS. Generally, PCPs described this process positively, underscoring its seamless integration into their EMR and a process that is much better compared to fax. PCPs described OLIS as improving quality of care by providing fast and reliable access to test results, also helping with coordination of care including prevention of duplicate lab ordering. Themes of pain points and opportunities included standardized nomenclature across labs, diffusion of responsibility, slow download speed, and needing to manually request labs.
- 4) As there is no analog for eConsult, we did not ask PCPs about how it compares to fax. The feedback pertaining to eConsult was in general positive, with many benefits described by PCPs. For instance, eConsult was described by almost all PCPs as helpful when they needed a quick response from a specialist for issues outside of their scope or when clarification/a second opinion was warranted, which had additional benefits such as increasing clinician confidence. PCPs also noted that eConsult helped reduce the need for a full referral and helped to enhance quality of care by providing patients with more timely responses to their concerns. However, one key theme emerged pertaining to pain points, being the lack of EMR integration.

We explored system-level pain points and opportunities that PCPs felt would make a positive impact on reducing administrative burden. Generally, PCPs described benefits of moving away from traditional fax processes but underscored that digitization can both decrease *and* increase administrative burden. Themes in this area included:

- d. PCP representation on governance structure.** This theme highlights the need for physicians and other clinicians to be a part of the governance structure and the decision-making process for their EMRs.

- e. **Optimizing team-based care.** This theme describes the need to optimize team-based care, making best use of skills and scope offered by each member of the team. This theme highlights the need for strengthening relationships with pharmacies so that there is a mutual understanding about how products and services can impact other parts of the healthcare system, such as increasing administrative burden for PCPs. The MedsCheck program was underscored as increasing administrative burden for PCPs.
- f. **Relationships with specialists.** Similar to pharmacists, the opportunity to enhance specialists' relationships, namely, to understand scope of practice of PCPs was also discussed.
- g. **EMR considerations.** This theme describes important considerations and opportunities EMRs play in the space of digitization and administrative burden. PCPs expressed the challenges with the current EMR certification to achieve user needs, highlighting their desire for one, unified EMR and for accessible API to utilize their own data for quality improvement.

Appendix B

Rapid Realist Review Methods

Research Questions

1. How do eConsult, eReferral, HRM, and OLIS, or other tools that share the same purposes, affect administrative burden in healthcare settings?
2. How do eConsult, eReferral, HRM, and OLIS, or other tools that share the same purposes, affect patient safety, access to care, and quality of care in healthcare settings?

Design

Protocol development was guided by Realist and Meta-narrative Evidence Syntheses: Evolving Standards (RAMESES) (Wong et al., 2013) and Saul et al. (2013). The rapid realist approach was deemed appropriate to efficiently build our understanding of contexts, digital strategies and interventions, and mechanisms that contribute to preferred outcomes of implementing bundle 1 tools within a short timeline. The research team was comprised of 2 primary researchers (1 WIHV project lead, 1 WIHV research coordinator) and an expert panel (2 WIHV Co-PIs).

Preliminary program theory and search strategy

A preliminary program theory was developed by a primary researcher based on key papers provided by the expert panel. This provided an early opportunity to identify factors of interest to report to the review's local reference panel (Ontario Health). The theory was comprised of context-strategy/intervention-mechanism-outcome (S/ICMO) configurations (De Weger et al., 2020).

Due to time constraints, the search strategy was limited to recommended papers identified by additional subject matter experts beyond the expert panel. Experts were given the RRR research questions and asked to provide publications relevant to all Bundle 1 tools. The original preliminary program theory and narrative review publications were also included in the search strategy. Once this group of expert-informed papers were screened, interventions with limited publications were identified and reference lists of included papers were hand searched to identify publications that may fill this gap. Publications collected through the search strategy were uploaded to Covidence and deduplicated.

Study Selection, Extraction, & Appraisal

Screening was conducted in Covidence by the 2 primary researchers independently and in duplicate at the title/abstract and full-text levels based on eligibility criteria. Due to the rapid nature of this review, full-text screening and subsequent data extraction occurred in a stepwise manner through continuous appraisal that prioritized most relevant, rigorous, and informative in comparison to existing papers included in the review. This aligns with the realist review "fitness for purpose" approach (Pawson et al., 2005) to select most appropriate publications within a rapid timeline. Therefore, not all studies underwent full-text screening and data extraction in the current iteration of this review. Additional appraisal occurred every 3 publications extracted for each intervention answering the question "did the previous 3 publications add new information to the program theory?". Data extraction continued when the response was "Yes". The pre-test of 2 publications per intervention was conducted by the 2 primary researchers independently and in duplicate. Due to the rapid timeline, single reviewer extraction occurred for the remaining publications to reach 9 publications per Bundle 1 tool intervention, or early saturation if it occurred.

Table 6. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Scope	Studies focusing on digitization in healthcare to address administrative burden, specifically through use of eConsult, eReferral, HRM, OLIS, or similar tools OR Studies focusing on digitization in healthcare to address patient safety and care access, specifically through use of eConsult, eReferral, HRM, OLIS, or similar tools	Studies that do not measure the impact of eConsult, eReferral, HRM, OLIS, or similar tools on an outcome of interest
Setting	Healthcare settings	Non-healthcare settings
Methodology	Qualitative and quantitative studies of all types Knowledge syntheses, case studies and reports	Non-empirical opinion pieces, editorials, commentaries
Publication Date	No restriction	-
Language	English	Non-English studies without available translations
Publication Type	Peer-reviewed articles, grey literature	Media articles, non-relevant grey literature

Analysis & Theory Refinement

Explanatory accounts of causal statements were extracted from publications. Similar statements were consolidated into summary S/ICMO configurations to form the final, middle-of-the-road program theory describing how bundle 1 interventions can lead to outcomes of interest (De Brún & McAuliffe, 2020).

Appendix C

Informal Narrative Review Expanded Results

The sources and drivers of healthcare administrative burdens arises from various interconnected elements that often compound each other. These elements fall into four main categories: *systems, process, people, and tools*.

Process: refers to the administrative and operational tasks within healthcare, such as coordination of care, patient information management, and provider communication. Procedural inefficiencies arise, however, when this spectrum encompasses issues such as redundant and complex documentation, a lack of standardization and automation in administrative tasks, fragmented care coordination, and ineffective information retrieval and management. The administrative burden these inefficiencies place on physicians increases dramatically, diverting their attention from providing patient care to managing administrative details. This lowers the quality of healthcare delivery and increases the risk of physician burnout.

People: in healthcare — including professionals, administrative staff, and patients — are central to the system's dynamics, particularly through their intrapersonal and interpersonal interactions. On an intrapersonal level, an individual's beliefs, attitudes, and skill levels shape how they manage tasks, communicate, and delegate responsibilities. Interpersonally, the differences in communication styles, levels of expertise, and expectations among these groups can present significant challenges. For example, if there is a lack of clear communication, tasks may not be effectively delegated, resulting in inefficiency and confusion. High patient expectations and demands for engagement can put a strain on resources, necessitating additional administrative effort to meet their requirements. Similarly, ineffective teamwork, as evidenced by poor communication and unclear task delegation, impedes the smooth operation of healthcare services. These examples show how a complex web of interactions and expectations can increase administrative burdens, resulting in errors, delays, and the need for additional efforts to maintain an efficient and responsive healthcare system.

Tools: are the technologies and software employed in healthcare management and delivery. Although intended to simplify processes and enhance efficiency, challenges with interoperability, design features, ease of use, and integration with current systems have shown to, in fact, increase the administrative burden rather than reduce it.

Systems: refers to the overarching governance, policies, structures, and organizations that shape the operational dynamics of healthcare delivery. These components are typically developed through a combination of government oversight and accrediting bodies, with the goal of ensuring practice standards and patient safety. However, the complexities of these frameworks frequently add a layer of administrative complexity. This complexity stems from the need to navigate a web of regulations and keep detailed records, which, while necessary for oversight and quality assurance, can impose significant operational burdens and may inadvertently increase the workload of healthcare providers.

1. Sources and drivers of healthcare administrative burden.

Table 7. Sources and Drivers of Administrative Burden

PROCESS	
Complex, Redundant Documentation and Lack of Standardization and Automation	<p>Repetitive and overlapping administrative processes that require the same data or actions to be performed multiple times add significantly to administrative burden (Sahni et al., 2021; Nguyen et al., 2023; Erickson, 2017; Ayer, 2023; Thimbleby, 2018; OMA, 2023). These processes frequently require navigating a complex maze of steps, regulations, and requirements, making them difficult and time-consuming for those involved (CMA, 2023). A recent survey by the Canadian Family Physician College (CFPC) found more than 99% of family doctors in Canada who responded personally deal with federal forms, and 83% of them view these tasks as a significant administrative burden (CFPC, 2023). These responsibilities were linked to dissatisfaction with payment, feelings of being undervalued by policymakers, burnout, and a reluctance to continue offering a broad range of services or even a desire to retire early. Notably, 96% of PCPs supported the idea of the government re-evaluating these forms, with younger physicians particularly advocating for such changes due to a more pronounced negative impact. The issue of insufficient compensation for handling these forms was also highlighted, especially among younger physicians. Findings highlighted that a notable number of physicians regularly complete forms like the Disability Tax Credit Certificate, Medical Certificate for EI: Sickness Benefits, and CPP Disability Credit, but often find them to provide little valuable information and to be unnecessarily complex (CFPC, 2023).</p> <p>Additionally, the lack of standardization and automation in administrative procedures creates a significant administrative burden (Sahni et al., 2021). This is especially evident when practices differ significantly across departments, often without clear or consistent guidelines. Such variability necessitates different approaches for similar tasks, resulting in inefficiency and increased administrative time. The need for manual intervention in processes that could be automated compounds the problem, reducing productivity and diverting resources away from direct patient care (Nguyen et al., 2021)</p>
Fragmentation in Care Coordination and Communication	<p>The lack of integrated care pathways and effective communication among healthcare providers across different care settings significantly increases physician's burden (Erickson et al., 2017; OCFP, 2023). This fragmentation causes inefficiencies, such as duplicated tests or treatments and gaps in patient information, necessitating additional administrative efforts to ensure continuity of care.</p>
Inefficient Information Retrieval and Management	<p>Inefficiency in retrieving, accessing, and managing patient information and healthcare documents, caused by inadequate information management systems and workflows, adds to administrative burden (Nguyen et al., 2023; Erickson, 2017). These challenges can result in delays in patient care, treatment errors, and more time spent on administrative tasks.</p>
PEOPLE	
Ineffective Teamwork Communication and Task Delegation	<p>The lack of teamwork, communication and delegation to share clerical and patient care duties, further magnifies administrative workload on physicians (Erickson et al., 2017; OMA, 2023; Cook et al., 2013).</p>

	Without redistributing these tasks, physicians are mired in documentation and administrative duties, detracting from patient care and leading to higher burnout rates (DeChant et al., 2019).
High Patient Expectations and Engagement Demands	Patients introduce administrative duties, ranging from thorough documentation to care coordination and patient education. Managing patient communications, appointments, and access to services, particularly in an era of rising patient expectations and demand for services, demands extensive administrative support (Erickson et al., 2017; OMA, 2021).
Variations in Demographic and Practice Characteristics	Variations in the time that physicians spend on administrative duties point to an unequal distribution of workload. Physicians who practice family medicine (Doctors Manitoba, 2023; Thomas Craig et al., 2021), work in remote areas, are younger, Black, Indigenous, and People of Colour (BIPOC), and are female are more likely to dedicate more time to administrative duties. This discrepancy highlights the need for additional research and should be carefully considered when evaluating, prioritizing, and improving procedures to lessen the administrative load on medical professionals (Doctors Manitoba, 2023).
Variations in Physician Beliefs, Attitudes, and Skill Levels	The administrative burden of physicians is substantially impacted by their perceptions of and responses to shifts in healthcare, including technological advances and regulatory changes. Satisfaction and positive perceptions with IT support, EHR usability, work volume, and the time required for EHR tasks can influence administrative demands on healthcare professionals. Nguyen et al. (2021) noted that older physicians generally experience lower usability scores, less ease of use, decreased perceived productivity, and overall lower satisfaction with EHRs.
TOOLS	
Challenges with Design and Usability	The design and usability of digital tools significantly affect administrative burden, with poor design increasing cognitive effort and inefficiency. EHRs lacking user-centred design and intuitive interfaces contribute to this strain by disrupting workflows and requiring extensive manual data entry (Tutty et al., 2019). Issues like 'click fatigue', and the necessity for additional work after hours are common when the interface is difficult to navigate, requires extensive manual data entry, and is not intuitive (OMA, 2021). A study by Khairat et al. (2018) showed that clear information presentation and unambiguous prompts in EHRs are linked to increased ease of use and less perceived cumbersome. Similarly, Melnick et al. (2020) and Khairat et al. (2018) found that user-friendly interfaces are associated with lower perceived effort and higher usability scores. These improvements in EHR software usability are linked to better remote access, computer use, and reduced levels of burnout, emotional exhaustion, and depersonalization
Lack of Workflow Integration and Interoperability	When EHRs are not aligned with the natural flow of patient care, healthcare providers might have to navigate through multiple screens or enter the same information in different parts of the system, leading to frustration and wasted time (Erickson et al., 2017; Tsai et al., 2020; Tutty et al., 2019). The lack of customization and flexibility in EHR systems exacerbates this problem. Systems that do not allow for customization to the specific needs and workflows of a practice can introduce redundant or irrelevant steps in the documentation process (Tsai, 2020). This lack of adaptability fails to support the unique clinical processes of different practices, adding to the workload of healthcare providers. Interoperability issues between EHR systems and other healthcare technologies further contribute to the administrative burden (Nguyen et al., 2021; Thimbleby,

	2019; Erickson et al., 2017; DeChant et al., 2019; OMA, 2021; OMA, 2023). Without seamless information exchange with lab systems, pharmacy systems, and other EHRs, healthcare providers often face duplication of efforts, fragmented patient care, and increased administrative tasks. This lack of interoperability can manifest in manual data entry of lab results into the EHR, leading to inefficiencies and a higher risk of errors. Inefficient clinical decision support tools within EHRs can also add to the burden. When these tools are not well-integrated or generate excessive alerts, they can overwhelm healthcare providers with unnecessary information, leading to alert fatigue and a potential impact on patient care (Nguyen et al., 2021; Thimbleby, 2019; Erickson et al., 2017; DeChant et al., 2019; OMA, 2021; OMA, 2023.).
Lack of Organizational Support	The level of support and the environment provided by healthcare organisations significantly impact the effectiveness of EHRs and the associated administrative burden. Organisational policies, culture surrounding technology use, training, and availability of support staff all influence how well these tools are implemented and used (Tutty et al., 2019; Abid, 2021; OMA, 2021).
Lack of physician involvement in tool design and implementation	The lack of user (physician) involvement in the procurement, design, implementation, and ongoing optimization of digital health tools leads to misalignment with clinical needs and reduced usability, significantly increasing the administrative burden in healthcare settings. Physicians' expertise and insights are essential to ensure that these tools are intuitive, efficient, and effectively integrated into clinical workflows, thereby enhancing user satisfaction and reducing unnecessary workload (Tutty et al., 2019; OMA, 2021).
SYSTEMS	
Regulatory Compliance, Accreditation, and Performance Measurements	Medical regulatory bodies at the national, provincial, and territorial levels impose a variety of requirements on physicians. This includes maintaining a current license, completing continuing medical education requirements, and participating in quality control and improvement activities (OMA, 2021; The Physicians Foundation, 2018; Thomas Craig et al., 2021). Additionally, physicians must comply with a variety of quality and performance standards set by various insurance companies and regulatory agencies. While these are important functions, the inconsistency and occasional lack of clinical relevance of these standards can significantly increase physicians' administrative workload.
Billing and Insurance Processing	Navigating complex billing processes to collect payments from provincial and territorial insurance plans increases the administrative workload (Doctors NovaScotia, 2020; Alam, 2023; OMA 2021). For example, on any given day, the work equivalent to that of 59 physicians throughout Nova Scotia is dedicated solely to overseeing their practices and handling administrative tasks related to billing (Doctors NovaScotia, 2020). This includes complex tasks such as filing claims and coding for patient services. Additionally, in cases where services such as vision care, prescriptions, and dental care are not covered by public health insurance, healthcare providers in certain regions must deal with private insurers as well. This multi-layered billing process, which involves both the public and private sectors, adds to the administrative challenges that physicians face (Gee & Spiro, 2019; Downing et al., 2018).

2. Impact of administrative burden on healthcare providers

The impact of administrative burden on **physicians well-documented in literature** as a critical issue that affects various aspects of their professional lives. Several studies and surveys have shed light on the relationship between administrative **burden** and outcomes such as physician burnout, job satisfaction and mental health and quality of patient care.

2.1. Physician Burnout: Administrative burden, notably time spent on documentation and dealing with electronic health records (EHRs), have been closely linked to increased rates of physician burnout. Burnout is characterized by emotional exhaustion, depersonalization, and a diminished sense of accomplishment (OMA, 2021; Baxter et al., 2022; Kruse et al., 2022). The contributors suggested are multifaceted, involving loss of autonomy due to time consumed by administrative tasks, cognitive fatigue from managing electronic systems, and a subsequent lack of work-life balance. This state of burnout not only impacts physicians' personal well-being but also has broader implications for the healthcare system, including increased physician turnover and decreased patient safety and satisfaction (DiGiorgio, 2023; Hamdan & Hamra, 2017). The systemic nature of this issue calls for organizational changes to reduce administrative load and improve physicians' work conditions (OMA, 2021).

2.2. Physician Job Satisfaction and Mental Health: The administrative burden has a notable impact on physicians' job satisfaction and mental health. Excessive administrative tasks contribute to a sense of loss of control and autonomy, key factors in job dissatisfaction and mental health issues including depression and anxiety among physicians (OMA, 2021; CMA, 2021; Abid, 2021). The CMA's National Physician Health Survey highlighted that around 60% of physicians feel these duties significantly affect their mental health, with 75% believing their administrative workload impedes their ability to provide effective patient care (CMA, 2021). These factors contribute to a vicious cycle, where decreased job satisfaction and mental health issues can exacerbate the problems of burnout and reduced quality of care.

2.3. Quality of Patient Care The ripple effects of administrative burdens extend to the quality of patient care. Physician burnout, exacerbated by **administrative burden**, has been associated with an increased risk of medical errors and a general decline in the quality of care (Herd & Moynihan, 2021; Erickson et al., 2017). This involves both the direct effects of burnout, such as emotional exhaustion leading to reduced focus and empathy during patient interactions, and indirect effects, such as reduced time for patient care due to administrative tasks. Furthermore, "click fatigue" from EHR use can lead to inadequate patient documentation and hinder the physician-patient relationship, impacting **patient** health outcomes (Jamoom et al., 2016).

3. Addressing healthcare administrative burden.

With the average Canadian physician spending more than 10 hours/week outside of workdays on administrative tasks (CMA, 2021) and administrative burden's potential role in burnout, addressing this issue is key for the experience of physicians and their ability to contribute to the healthcare system. The goal of this section of the review is to provide a broad overview of interventions that have been used to address administrative burden, considerations for policymakers and implementation scientists when applying interventions, what is being done within other provinces regarding administrative burden, and digitization considerations for Ontario.

3.1 Categories of interventions used to address administrative burden.

Interventions addressing administrative burden typically function to improve workflow and can be separated into the following categories: (1) *simplification*, (2) *teamwork and human resources*, and (3) *digitization*. *System-level considerations* (4) applicable to all categories are also discussed.

Simplification: Interventions in this category focus on simplifying the processes, forms, and tasks that contribute to administrative burden. Relevant interventions seen in the literature include the removal of unnecessary forms and form regulations (Nguyen et al., 2023; Erickson, 2017; Ayer, 2023; Thimbleby, 2018; OMA, 2023), simplifying steps in documentation processes (Nguyen et al., 2023; Erickson, 2017; Ayer, 2023; Thimbleby, 2018), and deduplicating any work completed across multiple systems, tools, or forms (Nguyen et al., 2023; Erickson, 2017; Ayer, 2023; Thimbleby, 2018). These interventions ensure that healthcare professionals are not spending time on work that does not meaningfully contribute to health care or administrative processes. For example, one study evaluated the impact of introducing policies that lowered documentation requirements and found a decrease in documentation word counts each year post-policy change (Nguyen et al., 2023). The Nova Scotia Office of Regulatory Affairs and Service Effectiveness found that 14% of physician administrative work were unnecessary and could be eliminated (Office of Regulatory Affairs and Service Effectiveness, 2020), and the Ontario Medical Association has recommended that the province review document workflow to understand where elimination of work can occur here as well (OMA, 2023). Simplification can be considered as an important first step in addressing burden (Ayer, 2023) and the following categories can be used to address remaining burden that cannot be removed through revising unnecessary requirements.

Teamwork and human resources: This category focuses on interventions that leverage better use and integration of non-physician healthcare team-members to reduce the administrative burden experienced by physicians. Scribes were identified as important team-members for reducing administrative burden (DeChant et al., 2019; Ayer, 2023; OMA, 2021) and for reducing physician burnout through alleviating documentation burden (Nguyen et al., 2021). Under physician supervision, scribes are able to write appointment notes and other documents that physicians would typically be responsible for, reducing physician burden and improving workflow efficiency (DeChant et al., 2019; Ayer, 2023; OMA, 2021). Technology can also be leveraged for scribe roles to suit practice needs. Scribes can be a traditional in-person team-member, virtual through virtual conferencing technology (e.g., Zoom), or be fully digitised through artificial intelligence (AI) programming (Ayer, 2023). While there is limited literature on the implementation and evaluation of virtual and AI scribes, in-person scribes have shown to be successful for reducing physician administrative burden (DeChant et al., 2019; Ayer, 2023; OMA, 2021). A systematic review capturing the impact of scribes found that 7 out of 9 studies showed that the addition of scribes improved workflow efficiency (DeChant et al., 2019). Having other non-physician team-members, such as clerical staff, nurses, and care coordinators, be responsible for administrative tasks was also highlighted as a beneficial team-based approach to reducing physician administrative burden (Erickson et al., 2017; OMA, 2023; Cook et al., 2013) and burnout through better assignment of administrative burden and improved workflow (Nguyen et al., 2021; DeChant et al., 2019). These team-members can takeover responsibilities such as triaging messages and emails, writing notes and orders, billing, simple patient calls (e.g., normal test result notification), gathering patient history, updating information and checking for errors in EMR and other documents, and coordinating care across units and health systems to reduce duplication of work (e.g., care-coordinators within integrated Ontario Health Teams) (Nguyen et al., 2021; Erickson et al., 2017; OMA, 2023). A systematic review also highlighted EHR IT support teams as another way for team members to support physicians with their administrative burden by improving physician efficiency and their experiences when using EHRs (Nguyen et al., 2021). Improved teamwork and distribution of responsibilities can be an important way to make better use of the time and skills of those working within the healthcare system.

Digitization: Interventions in this category focus on improving usability of existing digital tools and implementing new tools that digitise burdensome processes, including those resulting from pre-existing digitised processes. Many interventions had the purpose of improving the use of EHR as a source of administrative burden, such as making EHRs interoperable with the assortment of tools physicians need to conduct their practice, integrating digital tool logins within EHRs, providing sufficient training and support for EHR use, and redesigning its use to actively support care delivery in a multitude of ways (Nguyen et al., 2021; Thimbleby, 2019; Erickson et al., 2017; DeChant et al., 2019; OMA, 2021; OMA, 2023). For example, a systematic review highlighted physician recommendations for interventions that redesign EHR processes, such as EHR integration with voice dictation tools, limiting unnecessary information in viewing screens, reducing number of clicks and typing needed for EHR-related tasks, consistent user-interface layout and design, placing important information at the top of notes, adding the

ability to adjust automated pop-ups and alarms, and designing specialty-specific EHR content (Nguyen et al., 2021). The review identified a lack of high-quality evaluation studies in the area of digitization interventions (Nguyen et al., 2021), a concern noted from others (Thimbleby, 2018); therefore, conclusions could not be drawn on the efficacy of these digital interventions. Another review focused on improving physician outcomes through implementing IT innovation for improving workflow efficiency and found that 5 out of 10 studies improved physician stress and satisfaction, with 3 of those studies focused on improving EHR use (DeChant et al., 2019). Digitization opportunities expand beyond improving EHR use as well, including interventions such as standardising inboxes, AI transcription (which can be used as scribes), prioritising ease-of-use and interoperability across all tools, implementing centralised electronic referrals, cloud-based systems, and automating appropriate processes such as billing (Cook et al., 2013; Ayer, 2023; OMA, 2021; OMA, 2023). For example, one study evaluated the impact of standardising inboxes for message contents related to appointments, care reviews, triaging, prescriptions, calls, laboratories and outside materials, therapy certificates, supervisory tasks, and document inquiry within a US internal medicine clinic (Cook et al., 2013). Standardising emails within these topics improved workflow efficiency through reducing steps and tasks, as well as enabling other team-members to take on roles that physicians were previously responsible for (Cook et al., 2013). It is also important to recognize that implementing digitization solutions may create opportunities that both add and reduce burden, such as AI transcription which both reduces typing but can add the burden of reviewing and correcting transcription errors to avoid potential harm due to errors (OMA, 2021). Digitising with the assumption that novel technology will improve workflows without critical assessment of the technology and how it will impact those who use it can add administrative burden (Thimbleby, 2018). Therefore, if this type of intervention is to be used, it must be paired with shifting the culture and environment surrounding the intervention to ensure that it is adequately supported (Thimbleby, 2019).

3.2 System-level considerations when implementing interventions.

Several papers have outlined actions to consider when implementing interventions for the purpose of reducing administrative burden (Nguyen et al., 2021; Nguyen et al., 2023; Erickson et al., 2017; Thimbleby, 2019; OMA 2021; OMA 2023). These actions can be taken to help identify and implement appropriate implementation plans that recognize the complex environments that interventions are situated in:

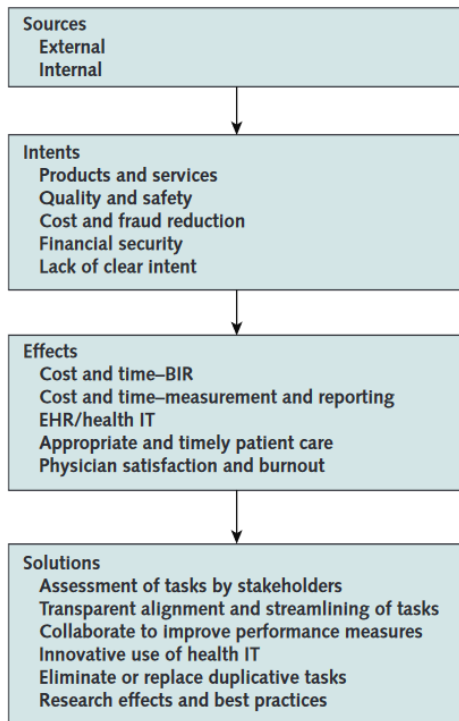
1. **Regulations:** Analyse and revise (where relevant) existing policy, laws, regulations, and supported interventions that interact with administrative burden and potential interventions.
2. **Resources:** Provide sufficient funding, training and guidance, supportive resources, and time for change-making to those who would be responsible for implementing and adopting interventions, relevant stakeholders, and system decision-makers.
3. **Evaluation:** Conduct high-quality research to provide sufficient evidence for interventions before implementation, continuous evaluation of implemented interventions, and revising interventions and systems it interacts with based on research and evaluation.
4. **Collaboration:** Collaborate across all relevant stakeholders who would interact with interventions and the systems they are implemented in with a particular focus on understanding and centring physician and end-user perspectives.

Interventions may operate on various system levels (e.g., policy, organisational, individual, technology) that decision-makers will need to recognize and plan for. There are often several stakeholders that should be involved in the designing, planning, and implementing of interventions to promote success as well, such as government policymakers, organisational and team leaders, vendors, physicians, healthcare staff, and patients.

This process of assessing administrative burden and potential solutions can be supported by the framework proposed by the American College of Physicians shared below (Figure 1), as well as their

policy recommendations that encompass many of the actions outlined in this section (Erickson et al., 2017).

Figure 1. Framework for analyzing administrative tasks.



BIR = billing and insurance-related; EHR = electronic health record; IT = information technology.

Figure 1. Framework for analyzing administrative tasks

Taken from: *Putting Patients First by Reducing Administrative Tasks in Health Care: A Position Paper of the American College of Physicians (Erickson et al., 2017)*

The tool-team-routine heuristic is another tool that acknowledges how tools interact with its environment to impact service delivery that can be leveraged by those planning a digital innovation (Shaw et al., 2018). This heuristic takes you through the process of identifying the value proposition of the tools and how its design interacts with existing tools and processes, how it will impact and be perceived by those who use the tool, and how the tool will coordinate with and impact current processes.

3.3 Learning from other provinces and international lessons.

Other provinces within Canada have attempted to address administrative burden in recent years. Their assessments, interventions, and preliminary results (if available) are described below:

- **Nova Scotia:** Nova Scotia physicians were surveyed, and it was found that the average physician spends 10.6 hours a week on administrative tasks, equivalent to an annual total of 1.73 million patients visits within Nova Scotia (Alegbeh & Jones, 2023). The

Nova Scotia Patients before Paperwork team are aiming to reduce red tape administrative burden by 10% by 2024 to give back physicians' time and allow them to focus on caring for patients (Alegbeh & Jones, 2023).

- **Their approach:** Working with physicians to identify and focus on “reducing or streamlining duplicative or overly complex forms, improving out-of-date processes, and working to ensure doctors were not doing tasks that could be completed by other staff” (Alegbeh & Jones, 2023). This multi-faceted approach leverages simplification, system considerations, teamwork, and human resources, and potentially digitization depending on solutions co-identified between the team and physicians going forward.
- **Their recommendations for other provinces and territories:** Measure physician administrative burden, the impact of burden, top sources of burden, set a quantitative target for reducing burden by a set time, and enlist an entity to be responsible for implementing strategies reducing the administrative burden (Alegbeh & Jones, 2023).
- **British Columbia:** British Columbia is recognizing the role of lack of interoperability of technology, poor communication, and fax technology workflows in clinician administrative burden. In particular, they aim to address safety and burden concerns regarding fax use and fax-based referral requests which are conducted approximately 3.7 million times per year in BC (Thompson & Lefebvre, 2022).
 - **Their approach:** Implementing eReferral, eDocument sharing (health information exchange), and eConsult digital tools that are interoperable with EMRs with the goal of improving workflows and experiences for general practitioners, specialists, pharmacists, nurses, and other allied health providers (Thompson & Lefebvre, 2022). This approach leverages digitization interventions and is best aligned with the current approach proposed within Ontario, Canada.
 - **Preliminary results:** Provider experience assessments show a perceived slight to moderate improvement in the following areas: document sharing workflow efficiency, amount of manual/paper steps needed, transferring documents, accessing information that informs clinical decision-making, security of information, attaching incoming documents to patient files, number of clicks to share document, and missing documents (Thompson & Lefebvre, 2022).
- **Manitoba:** Doctors Manitoba surveyed physicians and estimated that physicians spend 10.1 hours per week on administrative tasks, 44% of this time being unnecessary. They have also identified differences in administrative burden across practice types and physician characteristics (e.g., higher burden in family practice, rural settings, and for BIPOC women) as well as main sources of burden within their province (e.g., private insurers, digital tools and EMRs, Shared Health). Manitoba has an overall goal of reducing physician time spent on unnecessary administrative tasks by 10% in 2023 (Doctors Manitoba, 2023).
 - **Their approach:** 20 areas of opportunity have been identified to reduce unnecessary burden (e.g., orders and requisitions, sick notes, referrals, private insurance forms, digitization and EMRs). These sources of burden are owned and influenced by various organisations in their health system and the Manitoba joint task force plan to work these organisations to make collaborative changes. This multi-faceted approach has potential to leverage simplification, system considerations, teamwork and human resources, and digitization interventions based on the collaborative solutions they develop (Doctors Manitoba, 2023).

Previous Axe the Fax Current reports have also outlined similar international initiatives to reflect on (Deloitte, 2022; Gerritsen, 2020). In particular, lessons learned from the United Kingdom

(UK) National Health Service (NHS) Axe the Fax initiative and in Estonia's ePrescription rollout may offer considerations for Ontario's next steps.

- **United Kingdom:** In 2018, the UK government announced the goal of eliminating faxes within the NHS by 2020 (Deloitte, 2022; Practice Business; 2020; Department of Health and Social Care, 2018). Limited information is available regarding the current state of fax use but some reports suggest that Trusts have had varying success and fax use may persist in some areas (Adams, 2022; Deloitte, 2022).
 - **Their approach** (Deloitte, 2022): Set the goal and prohibit the purchase of new fax machines, allow trusts to identify their own implementation strategy, establish an advisory group with stakeholders, and provide a guideline document with suggested approaches (NHS, 2020). This approach leverages digitization.
 - **Potential lessons:** Varying success of trust may have occurred due to limited involvement of physicians and health system leaders in decision-making and goal setting beyond advisory group whose inputs are not well described, lack of system-level supportive mechanisms for Trusts to map efforts onto, and limited solutions and guidance offered to Trusts and users. Because some Trusts were successful, it may be beneficial to understand their localized implementation strategies leading to their success.
- **Estonia:** Estonia developed a centralized ePrescription tool over a 3-year period to encompass all national prescriptions that launched in 2010 and was fully embedded into the system to cover 84% of all national prescriptions within 1-year of launch and 99% as of 2022 (Deloitte, 2022; Helmes, n.d.).
 - **Their approach** (Deloitte, 2022; Helmes, n.d.): Work with existing prescription systems to integrate with national ePrescription system launched, stakeholders (e.g., physicians, government bodies, pharmacies) were involved in the system development, and connecting all health system sites to the central system. This approach leverages digitization and system-level considerations.
 - **Potential lessons:** The successful integration of the nation-wide ePrescription system may have been supported through integrating the intervention with existing processes and solutions, involving stakeholders in the development of the system, and having a centralized and standardized process across the nation. While not focused on bundle 1 tools, this emphasizes the importance of system-level considerations such as working with stakeholders and analyzing existing system policies and solutions. The nation-wide system also enables opportunities to implement user-centred changes that impact many users. Now that the ePrescription system has been established, initiatives such as this have been initiated to determine what digitization strategies would support user experiences and promote better provision of care, such as embedded decision-making language and prescription management features (Parv et al., 2015).
- **Denmark:** Denmark, with its 5.6 million population, is a leader in digital healthcare, ensuring interoperability through over 50 national databases covering various health aspects. Unique identification numbers allow for seamless patient tracking, aiding in clinical research. The country has implemented a comprehensive e-prescription system accessible through the National Health Portal, sundhed.dk, which also offers patients access to their medical referrals (Gerritsen, 2020; Kushniruk et al., 2010).
 - **Their approach** (Gerritsen, 2020) emphasizes the importance of public-private partnerships, which bring together government, healthcare organizations, and technology firms to create systems tailored to national healthcare demands. It advocates for data format standardization and the creation of a centralized body

to oversee digital systems, ensuring interoperability and efficient governance. A patient-centred design philosophy guides the development of systems that increase transparency and provide patients with complete access to their health records, prescriptions, and referrals. Furthermore, the strategy includes dynamically tailoring digital solutions to the changing needs of healthcare units while maintaining a commitment to accountability and a patient-centred ethos across all initiatives.

- **Potential lessons:** Potential lessons include the critical need for a centralized, neutral oversight body to manage digital healthcare systems and promote stakeholder consensus on standards. Success is dependent on establishing clear digital standards and realistic timelines to ensure initiatives run smoothly. Emphasizing patient accountability requires remaining responsive to patient needs and feedback, fostering continuous improvement of digital healthcare services. Furthermore, adaptability and customization are essential; dynamically adjusting digital solutions to meet the specific needs of different healthcare units improves system effectiveness and user satisfaction.

3.4 Considerations for digitization and Ontario interventions (eReferral, eConsult, OLIS, HRM).

Within the Ontario context, various digital tools are being considered for implementation and evaluation to understand their role in addressing administrative burden for physicians and other care providers. The digital tools of interest are:

- **eConsult:** eConsult enables the ability for primary care physicians to directly consult specialists regarding patient care, reducing the need for referrals or identifying most appropriate cases for specialist referrals. This web-based tool can simplify the process of communicating with available specialists and remove the need for faxes.
- **eReferral:** eReferral enables electronic referral requests between primary care physicians and specialists. This web-based tool can simplify the process of connecting patients with available specialists and remove the need for faxes.
- **OLIS:** OLIS is a health information exchange technology that allows electronic transfer of lab test orders and results between primary care and hospitals, community labs, and public health labs. This web-based tool can improve efficient access to lab results and other reports and remove the need for faxing documentation.
- **HRM:** HRM is a health information exchange technology that allows the electronic transfer of medical reports directly within primary care EMRs (when interoperable) from sending facilities. This web-based tool can improve efficient access to reports and remove the need for faxing documentation.

As outlined within the literature included in this review, digitization is not guaranteed to reduce administrative burden and there has been a lack of high-quality work in the evaluation of digital healthcare interventions (Nguyen et al., 2021; Thimbleby, 2019). Implementation of digitization interventions must carefully consider the context it is being applied within and how it will interact with its environment to facilitate changes. Investigating enabling contexts and mechanisms that support efficient and effective use of our tools of interest will be necessary if we are to promote the use of them.

An approach to considering and evaluating the use of digitization is outlined in Thimbleby (2019). Through discussion of digitization, it recognizes the need to challenge tendencies to automatically consider digital innovation as improvement to older systems and, in turn, the

reduced drive to critically evaluate such innovations (Thimbleby, 2019). It also recognizes that innovations do not exist in isolation; therefore, the culture and environments surrounding interventions must also shift and be addressed to ensure that they are suitable for the innovation and do not cause greater burdens (Thimbleby, 2019). Among other important considerations, they discuss the frustration of using digital forms that were originally built for paper use, the common lack of interoperability across different systems, and the security risks that digitization can bring (Thimbleby, 2019). This discussion results in the proposal of 3 laws for paperless interventions that we can consider when evaluating our digital tools:

- **“Keep in sight the goal of improving healthcare”** (Thimbleby, 2019): When implementing digitization, or paperlessness as the paper describes it, the goals of healthcare cannot be forgotten (e.g., improving patient care, patient outcomes, patient experience and satisfaction, and physician and staff experiences and satisfaction). If digitization detracts from this, it should be revised or reconsidered.
- **“Only implement evidence-based change”** (Thimbleby, 2019): Ensuring that scientific evidence of the benefit of the intervention is available is necessary for implementation. The paper also highlights that successful interventions are dependent on user-centred approaches and the quality of implementation strategies.
- **“Plan for cultural change and moving goal posts”** (Thimbleby, 2019): Culture, or contexts and environments, have to adapt with digitization for successful implementation. Paperless interventions will require monitoring, evaluation, revision, and if necessary, removal from systems if they become outdated or do not suit the needs of users. Being able to adjust will be necessary when working with the fast pace of digital innovation, technology, and AI development.
- Relevant to Law 3, the emerging field of artificial intelligence (AI) in primary care anticipates a significant shift in healthcare delivery, with potential benefits ranging from improved diagnostic accuracy and patient care to the optimization of administrative tasks. Scholars such as Lin et al. (2019), Upshaw et al. (2020), Kueper et al. (2020), Nayak et al. (2023), Rahimi et al. (2020), and Schulman et al. (2023) have conducted research that highlight both the promising applications and the multifaceted challenges associated with incorporating AI into primary care settings. One of the most significant benefits of AI, as highlighted by Lin et al. (2019) and Upshaw et al. (2020), is its ability to transform patient care through improved diagnostic tools and clinical decision support systems. These AI applications can sift through large datasets to identify patterns and insights that humans may miss, allowing for early disease detection and tailoring treatment plans to individual patient needs. Furthermore, Nayak et al. (2023) introduce the concept of Large Language Models (LLMs), which can help physicians manage patient communications and clinical documentation, potentially reducing administrative burdens that detract from patient care. However, integrating AI into primary care presents systemic challenges. Kueper et al. (2020) emphasises the importance of developing AI systems in close collaboration with primary care providers to ensure they effectively address the healthcare sector's specific needs. This collaborative approach ensures that AI tools are not only technologically advanced, but also practical and easy to use for healthcare workers. The complexity and inefficiency of the healthcare system, particularly in the United States, pose significant barriers to the seamless implementation of AI. Schulman et al. (2023) conduct a critical analysis of the US healthcare system's billing and insurance-related complexities, arguing that without significant reforms to standardise and simplify these processes, AI's effectiveness in reducing administrative burdens remains limited. The current state of the healthcare system, which is characterised by a lack of standardisation and significant variability in insurance plan benefits, documentation standards, and payment processes, creates an environment in which technology, even advanced AI, may exacerbate rather than alleviate existing challenges.

Furthermore, Rahimi et al. (2020) emphasise the significance of including primary care professionals in the development and implementation phases of AI systems. This inclusion ensures that the technologies developed are in line with the practical realities and challenges of providing care, thereby increasing their adoption and effectiveness in real-world scenarios. To summarise, while AI has significant promise for transforming primary care by improving diagnostic accuracy, personalising patient care, and reducing administrative burdens, realising its full potential will require a concerted effort to address systemic inefficiencies in the healthcare infrastructure. This necessitates a collaborative effort among technologists, healthcare providers, policymakers, and other stakeholders to foster an environment in which AI can thrive and contribute to the advancement of primary care.

With these laws in mind, we will need to critically reflect on the tools we are implementing within our context to ensure that they improve healthcare (i.e., through reducing administrative burden and improving access and safety), that we have sufficient evidence to support its use (i.e., future evaluation), and recognize that these tools will need to adapt to changing contexts and mechanisms. A rapid realist review is uniquely positioned to address this.

A realist review is an evidence-based approach to understanding how and why complex interventions work (or do not work) in specific contexts (Pawson et al., 2005). It is especially well-suited for understanding the multifaceted issue of administrative burden because it allows for a nuanced exploration of the various factors influencing the success and challenges faced when implementing interventions (Duddy & Wong, 2023). Conducting a rapid realist review will allow us to capture how digitising clinical processes with tools like eConsult, eReferral, HRM, and OLIS can affect this burden, as well as capture other important healthcare outcomes that may be simultaneously affected when implementing interventions for reducing burden (e.g., patient safety, access to care).

Appendix D

Rapid Realist Review Results

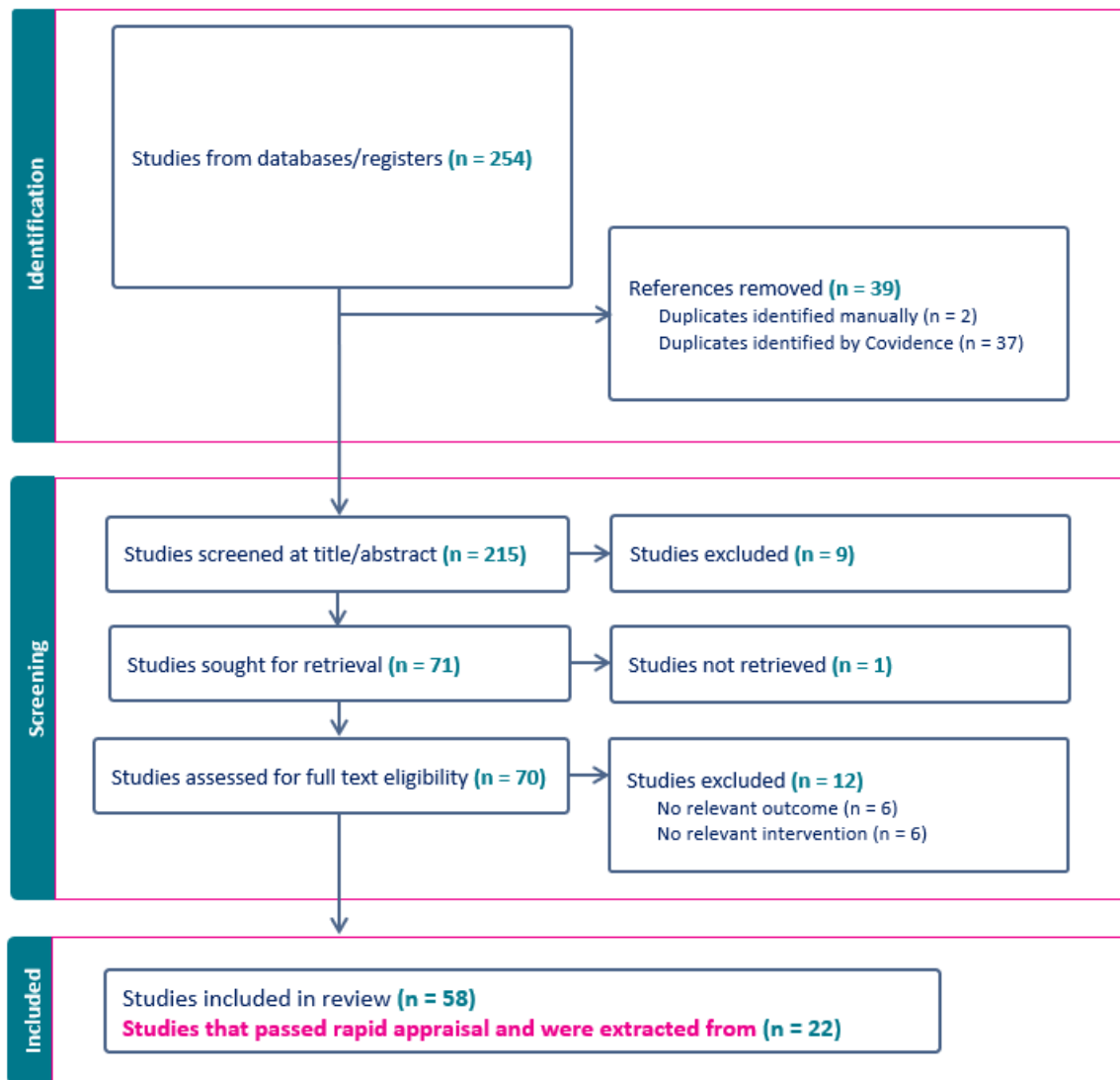


Figure 2. PRISMA flow diagram of rapid realist review investigating the relationship between eConsult, eReferral, OLIS, & HRM with administrative burden, patient safety, and access to care.

Studies were conducted in Canada (n=11), USA (n=4), Scotland (n=1), global/multiple nations (n=6), and 1 was not reported. Publications consisted of peer-reviewed publications (n=19) and white papers (n=3). Studies captured 1 or more bundle 1 tool intervention of interest: 9 studies included eConsult, 9 included eReferral, 9 included OLIS, and 9 included HRM.

Table 8. Included study information.

#	First Author, Year	Title	Study Design
1	Unertl, 2012	Health information exchange technology on the frontlines of healthcare: workflow factors and patterns of use	Qualitative study
2	Kierkegaard, 2014	How could health information exchange better meet the needs of care practitioners?	Qualitative study
3	Campion, 2012	Push and Pull: Physician Usage of and Satisfaction with Health Information Exchange	Observational study
4	Alarakhia, 2019	Axe the Fax: What Users Think of Electronic Referral.	Observational study
5	Huebner, 2019	Using Digital Health to Support Best Practices: Impact of MRI Ordering Guidelines Embedded Within an Electronic Referral Solution	Observational study
6	Liddy, 2015	The Current State of Electronic Consultation and Electronic Referral Systems in Canada: an Environmental Scan	Environmental scan
7	Witherspoon, 2017	Improving access to urologists through an electronic consultation service	Observational study
8	Bello, 2017	Patient and provider perspectives on the design and implementation of an electronic consultation system for kidney care delivery in Canada: a focus group study	Qualitative study
9	Walker, 2020	Electronic Consultation Between Primary Care Providers and Radiologists	Observational study
10	eHealth, 2013	The Adopters Guide to Implementing OLIS	Report
11	OMD, 2023	HRM Task Force - EMR Usability Report.	Report
12	Thompson, 2022	The Journey to Interoperability in BC Healthcare	Report
13	Vest, 2020	The complementary nature of query-based and directed health information exchange in primary care practice	Observational study, qualitative study
14	Seyyedi, 2020	The Effect of Information Technology on the Information Exchange between Laboratories and Ambulatory Care Centers: A Systematic Review.	Systematic review
15	Dobrow, 2019	Interoperable Electronic Health Records and Health Information Exchanges: Systematic Review	Systematic review
16	Liddy, 2021	Primary Care Providers Perspectives on the Ontario eConsult Program	Observational study
17	Greenwood-Lee, 2018	A categorisation of problems and solutions to improve patient referrals from primary to specialty care	Narrative review
18	Hersh, 2015	Outcomes From Health Information Exchange: Systematic Review and Future Research Needs	Systematic review

19	Bouamrane, 2014	A qualitative evaluation of general practitioners' views on protocol-driven eReferral in Scotland	Qualitative study
20	Osman, 2019	Barriers and facilitators for implementation of electronic consultations (eConsult) to enhance access to specialist care: a scoping review	Scoping review
21	Seyed-Nezhad, 2021	Factors affecting the successful implementation of the referral system: A scoping review.	Scoping review
22	Mehmood, 2023	Usability Evaluation of Interoperability Interfaces in Electronic Medical Record Systems.	Usability simulation

CAUSAL PATHWAYS

The following are a high-level program theory causal pathway for bundle 1 tools and outcomes of interest. Figures 3-6 show the proposed S/ICMO causal pathways within the final program theories for each intervention. Program theory configurations are listed in Table 9.

CONTEXT

STRATEGY (eConsult)

MECHANISMS

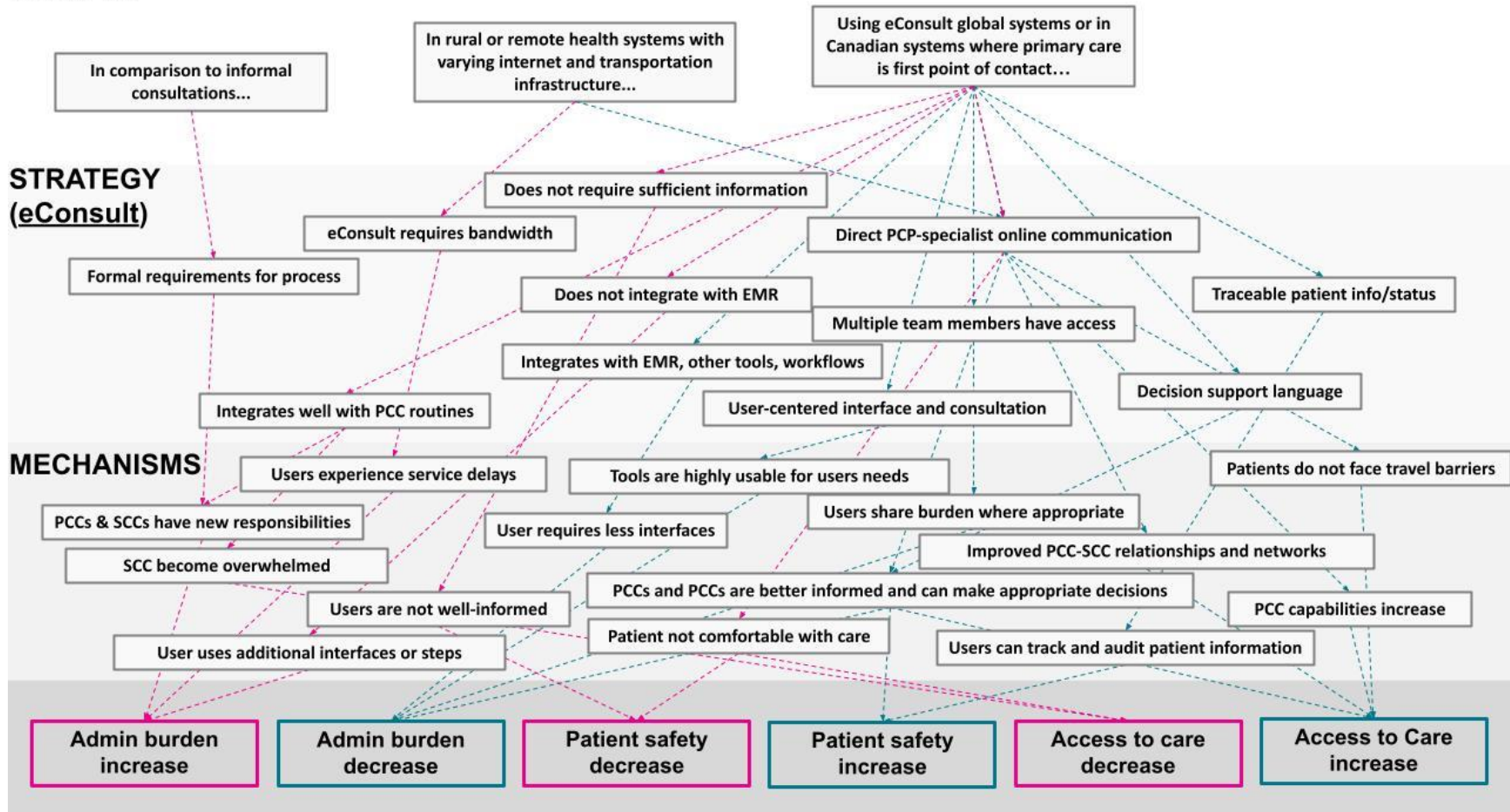


Figure 3. Program theory of the causal pathways between eConsult and administrative burden, patient safety, and access to care.

CONTEXT

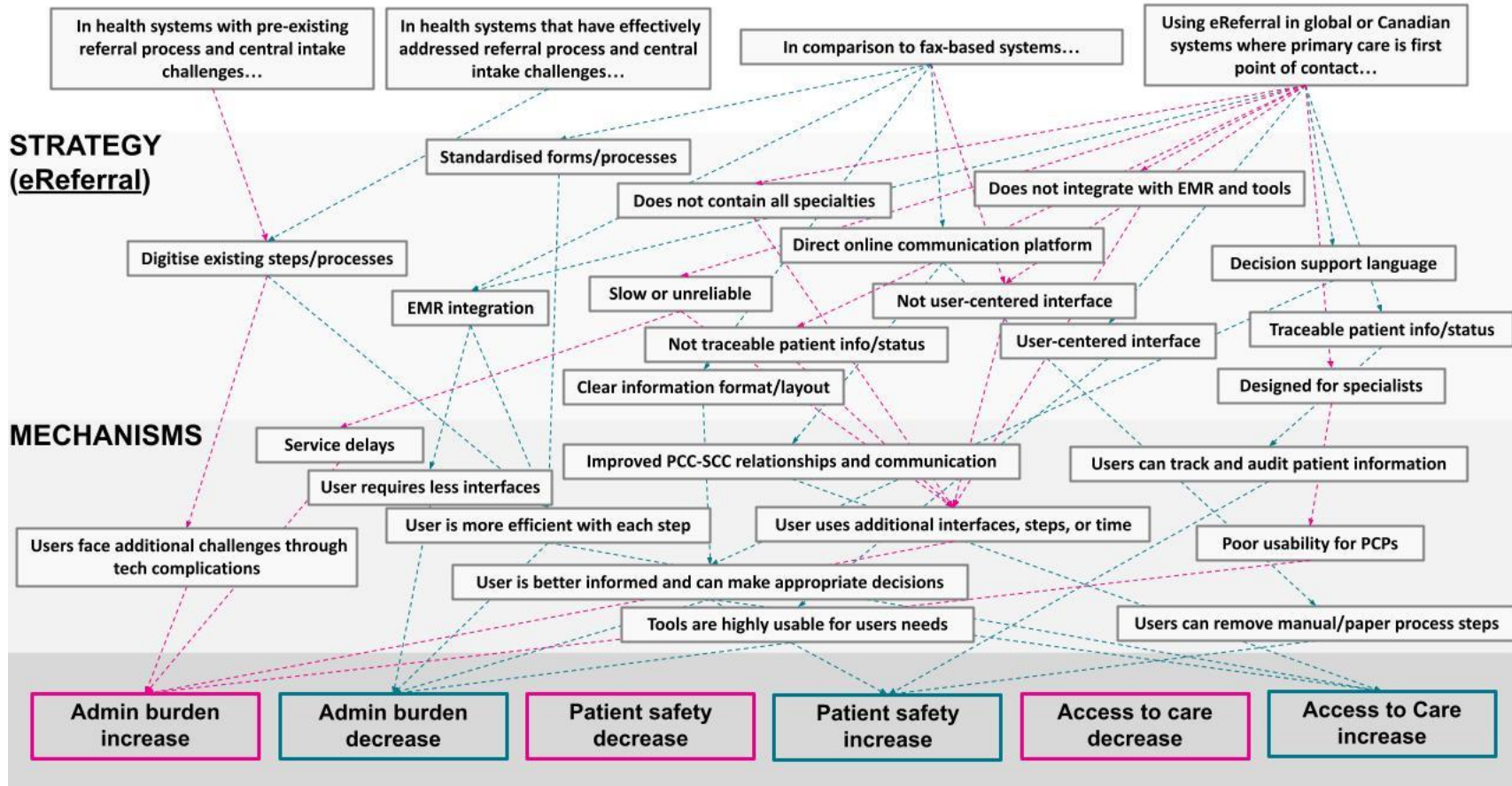


Figure 4. Program theory of the causal pathways between eReferral and administrative burden, patient safety, and access to care.

CONTEXT

STRATEGY (OLIS)

MECHANISMS

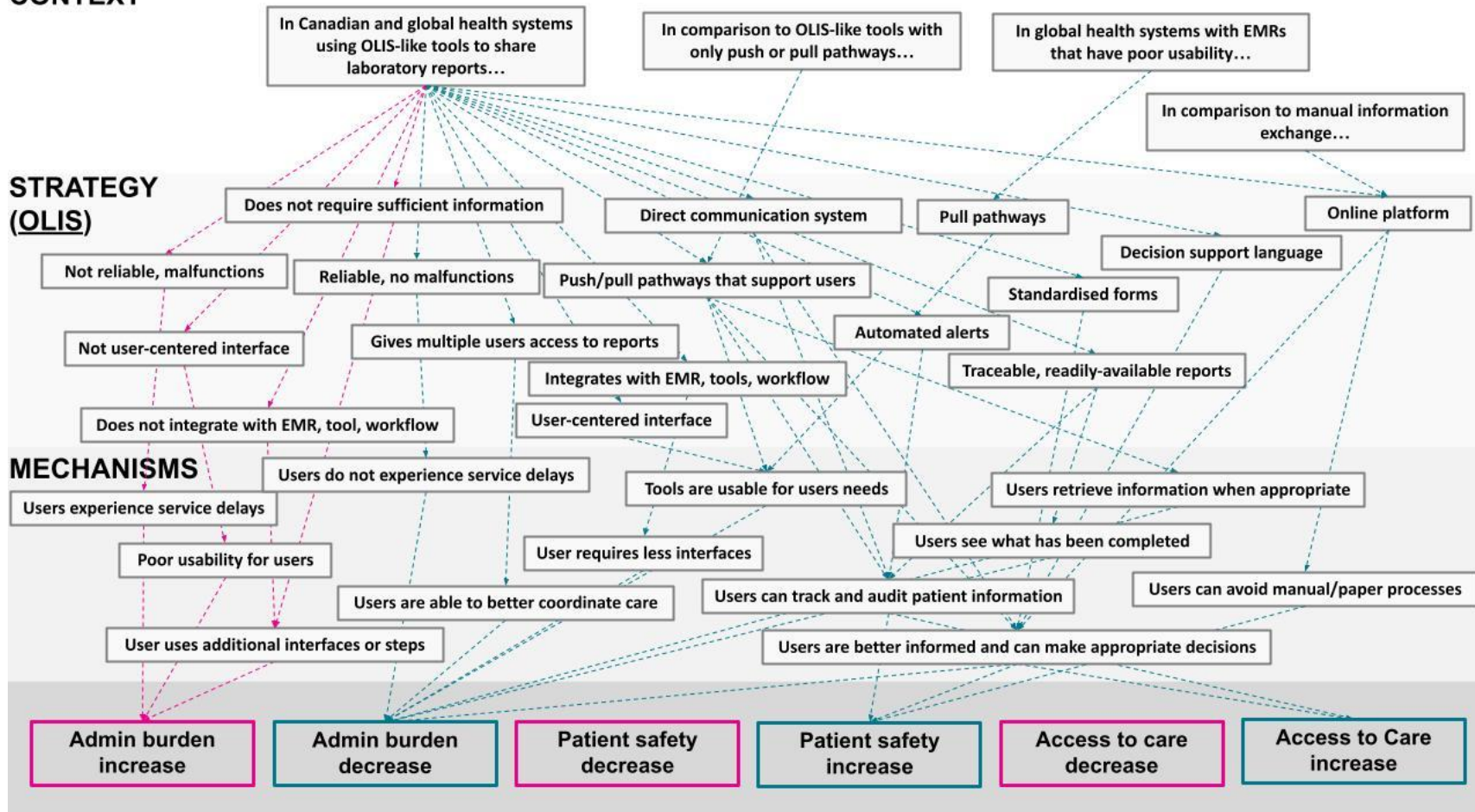


Figure 5. Program theory of the causal pathways between OLIS and administrative burden, patient safety, and access to care.

CONTEXT

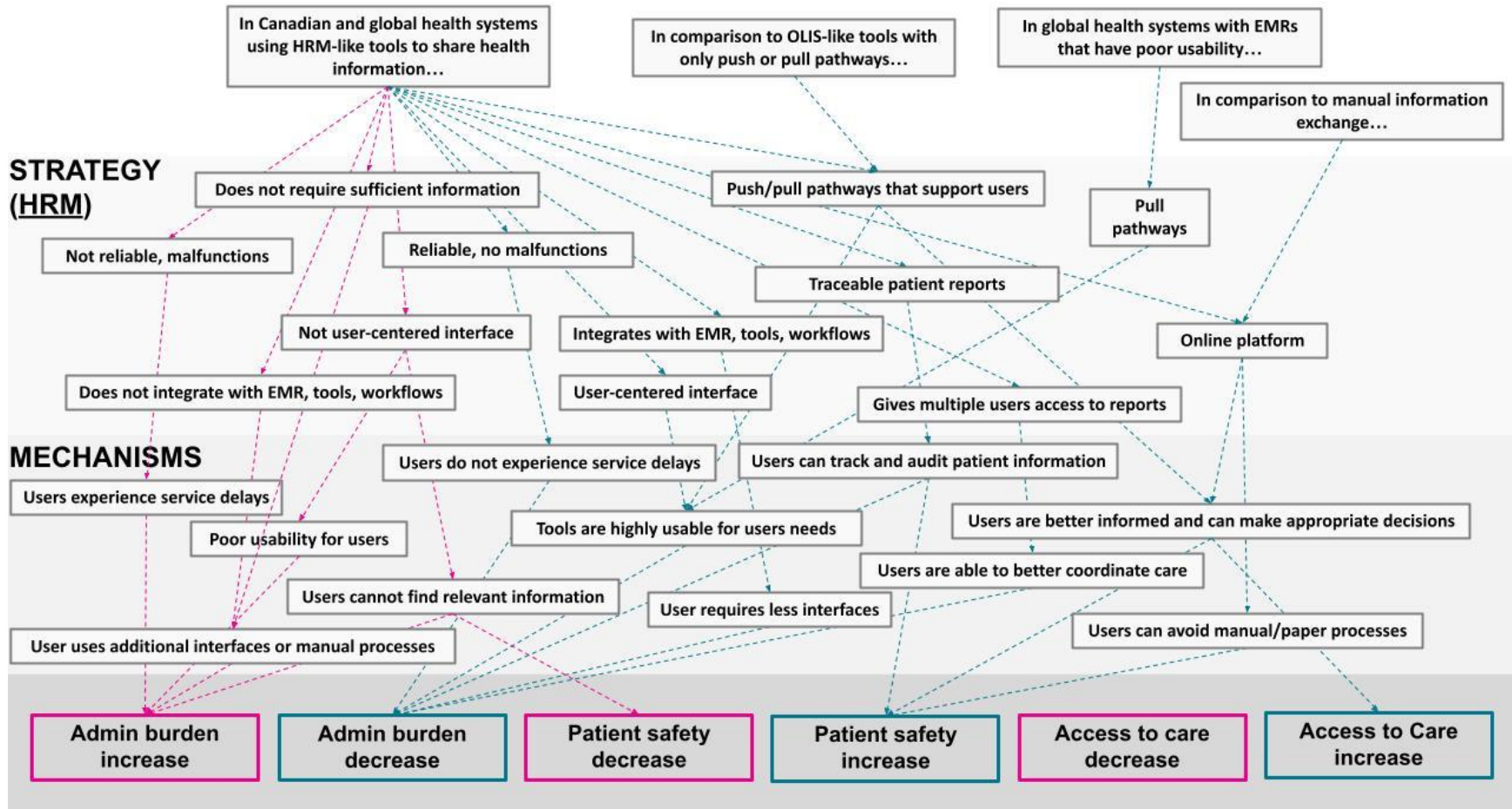


Figure 6. Program theory of the causal pathways between HRM and administrative burden, patient safety, and access to care.

Table 9: Program theory of S/ICMO configurations between eConsult, eReferral, OLIS, & HRM with administrative burden, patient safety, and access to care.

eConsult		
Outcome	S/ICMO	Reference
Decreased Administrative Burden (Gain/ Opportunity)	<p>In global and Canadian health systems, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to eConsult services [c]...</p> <ol style="list-style-type: none"> 1. That contain guidance and decision-making language [s/i] can support PCPs to make more appropriate referral decisions [m] that reduce unnecessary referrals for PCPs to request and for specialists to conduct to reduce their administrative burden overall [o]. 2. That were built with user-centredness in mind (e.g., consulted users, more easily send/transfer/access documents) [s/i], improves the usability and experience for providers to make their eConsult work more efficient [m] and reduce their administrative burden when using the tool [o]. 3. That were built to integrate with EMRs and other existing tools [s/i], reduced the amount of interfaces needed to complete their eConsult work [m] and reduced their administrative burden when using the tool [o]. 4. That enables asynchronous, direct communication between PCPs and specialists [s/i], can improve the referral decision-making of PCPs to reduce unnecessary referrals sent by PCPs and completed by specialists to reduce administrative burden for users [o]. 5. That is designed to be fast for specialists (user centred interface) [s/i], specialists can then complete eConsults faster than in-person visits [m], decreasing their administrative burden [o]. 6. That is designed to seamlessly integrate with workflows [s/i], eConsult system usability is high and efficient [m], decreasing administrative burden [o]. 7. That provide access to case managers [s/i], allow teamwork with case managers to improve flow and efficiency of patient care, decreasing administrative burden on clinicians [o]. 	1, 6, 7, 8, 9, 12, 16, 19, 20
Increased Administrative Burden (Pain point)	<p>In global health systems and in Canada, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to eConsult services [c]...</p> <ol style="list-style-type: none"> 1. That do not integrate with EMRs that PCPs are using [s/i], it causes them to take additional steps outside of the EMR to write, track, and complete the eConsult and the care they feel their patient needs [m] which decreases process efficiency and increases their time spent on administrative burden [o]. 2. That are well integrated into user routines [s/i], it adds a new type of task to both PCP and specialist workloads and increases their responsibilities [m] to increase administrative burden [o]. 3. That are not reliable or malfunctions [s/i], users experience delays or use multiple tools to complete care [m], increasing time spent and administrative burden [o]. <p>When users accessing eConsult system work within rural areas that may have inconsistent internet service [c]...</p> <ol style="list-style-type: none"> 1. eConsult may require too much bandwidth [s/i] and the use of the tool may be impacted by service delays [m] that increases the amount of user time spent on administrative burden [o]. <p>In comparison to informal consultations between PCPs and specialists [c]...</p> <ol style="list-style-type: none"> 1. eConsult process has formal requirements, causing PCPs and 	1, 8, 16, 19, 20

	specialists to have more steps to complete, increasing time spent and increasing administrative burden [o].	
Increased Patient Safety (Gain/ Opportunity)	<p>In global and Canadian health systems, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to eConsult services [c]...</p> <ol style="list-style-type: none"> 1. That enables asynchronous, direct communication between PCPs and specialists [s/i], or contains decision-making language [s/i], it supports PCPs to become more informed and confident in their referral and care decision-making ability [m], leading them to determine most appropriate referral decisions and care management for patients to improving patient safety [o]. 2. That enables asynchronous, direct communication between PCPs and specialists [s/i], or contains decision-making language [s/i], it better informs specialists with increased information prior to any resulting necessary referral visits and gives them more confidence [m] in determining most appropriate care for patients to improve patient safety [o]. 3. That provides an online, electronic system that can track patient information [s/i] allows an easier tracking of patient information and removal of manual processes to reduce occurrences of missing documents, increasing information security and patient safety [o]. 	1 6, 7, 8, 9, 12, 16, 20
Decreased Patient Safety (Pain point)	<p>In global and Canadian health systems, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to eConsult services [c]...</p> <ol style="list-style-type: none"> 1. That enables asynchronous, direct communication between PCPs and Specialists [s/i], delays in specialist responses can slow PCPs ability to provide care [m], decreasing patient safety [o]. 2. That does not require specialists to include sufficient information for practice [s/i], causing PCPs to not be well-informed by process [m], reducing patient safety [o]. 3. That does not require PCPs to include sufficient information to inform consultation purpose [s/i], causing specialists to not be well-informed by process and unable to provide a quality consultation [m], reducing patient safety [o]. 4. That removes direct patient and specialist contact [s/i] will cause patients who do not trust their PCP to not be comfortable with care provided [m], reducing patient safety [o]. 5. That do not have sufficient privacy infrastructure [s/i], may cause information privacy protection concerns, reducing patient safety [o]. 	9, 20
Increased Access to Care (Gain/ Opportunity)	<p>When PCPs and Specialists working in Canada, where primary care is the backbone of healthcare and the first contact-point for patients, have access to eConsult services [c] that enables asynchronous, direct communication between PCPs and Specialists [s/i]...</p> <ol style="list-style-type: none"> 1. It supports PCPs to better manage and provide care for a broader array of diagnoses, without patients needing specialist appointments, [m] to improve patient access to care that they need [o]. 2. It fosters PCP and SCP relationships to increase PCP specialist referral networks [m] to support broader access to specialist care for patients seeing the PCP [o]. <p>When PCPs accessing eConsult system serve rural or remote patient populations [c]...</p> <ol style="list-style-type: none"> 1. eConsult enables asynchronous, direct online communication between PCPs and Specialists [s/i], which allows patients to access SCP services without travel-based barriers [m] and improve their access to specialist care [o]. 	7, 8, 9, 16, 20

<p>Decreased Access to Care (Pain point)</p>	<p>In global and Canadian health systems, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to eConsult services [c]...</p> <ol style="list-style-type: none"> 1. That are well integrated into PCP routines [s/i], may cause specialists to become overwhelmed with the influx of new tasks needed within the eConsult system [m] to reduce their capacity to provide care and reduce access to care [o]. 2. That removes direct patient and specialist contact [s/i] will cause patients who do not trust their PCP to not be comfortable with care provided [m], reducing access to acceptable care [o]. 	<p>8, 20</p>
<p>eReferral</p>		
<p>Outcome</p>	<p>S/ICMO</p>	<p>Reference</p>
<p>Decreased Administrative Burden (Gain/ Opportunity)</p>	<p>In comparison to health systems struggling with organizing and tracking manual and fax referral information, health systems with established eReferral systems [c]...</p> <ol style="list-style-type: none"> 1. That integrate with EMRs and standardize communication and other referrals processes [s/i] can provide a standardized process for users to consistently follow, organize, and track [m] to improve flow and efficiency from submission to scheduling and reduce administrative burden [o]. <p>In global and Canadian health systems, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to an eReferral service [c]...</p> <ol style="list-style-type: none"> 1. With decision support language embedded in the eReferral tool [s/i], allows PCPs to easily access and use DS language to make better informed referral request decisions [m] to reduce the amount of inappropriate requests specialists receive and PCPs have to redo to reduce administrative burden [o]. 2. That was created with usability in-mind (e.g., reduced manual and overall steps in process, reduced clicks, more easily send/transfer/access documents) [s/i], will have higher usability for users [m] to improve process efficiency and reduce administrative burden [o]. 3. That integrates with EMRs [s/i], allows integration of incoming information with EMR and auto-population, reducing interfaces users need to use to conduct care [m] to reduce administrative burden [o]. 4. That contains standardized forms and protocols [s/i], PCPs are familiar with systems and can efficiently complete the eReferral process [m], reducing administrative burden [o]. <p>When digitizing existing referral processes through a novel eReferral system [s/i] ...</p> <ol style="list-style-type: none"> 1. In a Canadian health system that has previously analyzed and addressed system referral challenges [c], eReferrals can reduce the time spent on necessary individual steps through well-functioning, efficient digitization [m] to reduce administrative burden of users [o]. 2. In a Canadian health system that has implemented an established centralized intake system [c], eReferrals can more efficiently direct referrals to most appropriate and available specialists in real-time [m] to reduce unnecessary referrals and reduce administrative burden on users [o]. 	<p>5, 6, 12, 17, 18, 19, 21</p>
<p>Increased Administrative Burden (Pain point)</p>	<p>In health systems with pre-existing manual referral process challenges (e.g., fragmentation, poor coordination) [c]...</p> <ol style="list-style-type: none"> 1. Digitizing existing referral processes through an eReferral system [s/i] would add additional technological complications to already 	<p>6, 18, 1, 19</p>

	<p>burdensome processes (that may not be compatible with digitization) in users' routines [m], and PCPs are often forced to take on the burden of a fragmented health system to ensure their patients receive care [m], increasing administrative burden [o].</p> <p>In global health systems and in Canada, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to eReferral services [c]...</p> <ol style="list-style-type: none"> 1. That do not integrate with EMRs and other tools used in care [s/i], it causes them to take additional steps outside of the EMR to write, track, and complete the eReferral [m] which decreases process efficiency and increases their time spent on administrative burden [o]. 2. That are slow or not reliable/malfunctions [s/i], users experience delays or use multiple tools to complete care [m], increasing time spent and administrative burden [o]. 3. That has standardized forms with many mandatory requirements (not user-centred interface) [s/i], users need to fill out unnecessary or duplicative information [m], increasing time spent and administrative burden [o]. 4. That includes protocols with large amount of information and poor formatting (not user-centred interface) [s/i] users find it difficult to find relevant information they need [m], increasing time spent and administrative burden [o]. 5. That contains standardized forms are built for specialists [s/i], creates poor usability for PCPs [m], increasing administrative burden [o]. 6. That do not track patient status [s/i], PCPs have to do extra work to stay updated regarding patient care, increasing administrative burden [o]. 7. That do not contain all types of specialists [s/i], PCPs have to use multiple tools or manual processes to access the correct specialist and complete referral, increasing administrative burden [o]. <p>In comparison to systems using fax-based referrals...</p> <ol style="list-style-type: none"> 1. eReferrals that introduce complex technology [s/i] has poor usability for users [m], increasing time spent in system and increasing administrative burden [o]. 	
<p>Increased Patient Safety (Gain/Opportunity)</p>	<p>In comparison to health systems using manual fax referral processes, health systems with established eReferral systems [c]...</p> <ol style="list-style-type: none"> 1. Have access to referral information formatting and layout [s/i] that is easier to use and find important information to inform patient care for PCPs [m] which improves information continuity and patient safety [o]. 2. That integrate with EMRs and standardize communication and other referrals processes [s/i] ensures that all necessary information is available for PCPs and Specialists to make well-informed decisions regarding patient care [m], increasing patient safety [o]. 3. That provide an online communication and referral organization system [s/i] allows PCP and SCP offices to communicate and establish referrals through non-paper/manual processes that can pose a risk for being physically lost [m] which improves information security and patient safety [o]. 4. That provides a direct, online communication system [s/i] can improve PCP and SCP relationships to allow them to better communicate [m] and increase patient safety through better informed care [o]. <p>In global and Canadian health systems, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to an eReferral service [c]...</p>	<p>4, 17, 21, 5, 6, 12, 19</p>

	<p>1. With decision support language embedded in the eReferral tool [s/i], it allows PCPs to easily access and use DS language to make better informed referral request decisions [m] that can improve patient safety [o].</p> <p>2. That allows the tracking and auditing of patient information and status [s/i] or sends PCPs push notifications, PCPs and other users can keep better track of their patients' information to improve patient safety [o].</p>	
Decreased Patient Safety (Pain point)	Not reported.	
Increased Access to Care (Gain/Opportunity)	<p>In comparison to health systems using manual fax referral processes, health systems with established eReferral systems [c]...</p> <p>1. That integrate with EMRs and standardize communication and other referrals processes [s/i] improves overall process efficiency and leads to reduce wait times in between user steps [m] to facilitate more timely access to care [o].</p> <p>2. That provides a direct, online communication system [s/i] can improve PCP and SCP relationships and allow them to more efficiently and effectively communicate regarding patient care [m] to support improved access and timeliness [o].</p> <p>In global and Canadian health systems, where primary care is the backbone of healthcare and the first contact-point for patients, that have access to eReferral services [c]...</p> <p>1. With clinical decision support language embedded in the eReferral tool [s/i], allows PCPs to easily access and use DS language to make better informed referral request decisions [m] that reduces inappropriate services rendered and facilitates access to more appropriate services [o].</p> <p>2. That allows the tracking and auditing of patient information and status [s/i] or sends PCPs push notifications, can allow PCPs to track patient status and follow-up with relevant parties to increase timeliness of care where appropriate [o].</p>	5, 6, 17, 19, 21
Decreased Access to Care (Pain point)	Not reported.	
OLIS		
Outcome	S/ICMO	Reference

<p style="text-align: center;">Decreased Administrative Burden (Gain/ Opportunity)</p>	<p>Global health systems that embed health information exchange tools sharing the OLIS function within their health service processes [c]...</p> <ol style="list-style-type: none"> 1. That prioritize user-centred processes, training, and design (i.e., provide users the ability to organize and manage information received and sent, has supportive training and technical support, and has stakeholders/users engaged in the technology development process) [s/i] improves the perceived and actualized usability for users [m] to improve process efficiency and reduce administrative burden [o]. 2. That integrates with existing practice tools, clinic workflows, and EMRs [s/i] to allow users to communicate and coordinate care easier across less interfaces [m] to improve process efficiency and reduce administrative burden [o]. 3. That is reliable without technical bugs [s/i] allow users to effectively without delays [m] to improve process efficiency and reduce administrative burden [o]. 4. That allow multiple users to access lab information [s/i] can allow task delegation and teamwork opportunities between physicians and non-physician staff (e.g., medical scribes, clerks, case managers, and assistants gather, revise, and summarize information) [m] to reduce administrative burden on physicians [o]. 5. That make lab histories readily available and traceable [s/i] so users are able to see what has been completed [m], reducing duplicate or unnecessary tests and administrative burden on users [o]. 6. That provides an electronic, online system for laboratory information [s/i] can remove paper/manual processes and additional tool interfaces [m] to reduce administrative burden on users [o]. 7. That contains standardized forms [s/i] can enable PCPs to easily find information and make better informed request decisions [m] that can reduce inappropriate requests and reduce administrative burden [o]. 8. That contains clinical decision support language [s/i] can enable PCPs to use DS language to make better informed request decisions [m] that can reduce inappropriate requests and reduce administrative burden [o]. 9. That relies on pull/query-based information exchange [s/i] allows users to be able to retrieve information when best for them and their patients [m], reducing administrative burden from excess notifications [o]. 10. That enables direct communication between laboratories and other users [s/i] allows more organized, efficient gathering of information for users [m], reducing administrative burden [o]. <p>In comparison to global health systems that utilize health information exchange tools sharing the OLIS function within their health service processes that only have either push or pull pathways, [c]...</p> <ol style="list-style-type: none"> 1. HIE tools with both push and pull pathways which automatically sends a portion of information and houses other portions in a centralized location for retrieval [s/i] allow users to have more flexibility to receive information through pathways that work for them [m], increasing administrative efficiency and reducing burden [o]. <p>In global health systems using EMRs with poor usability [c]...</p> <ol style="list-style-type: none"> 1. HIE tools with pull pathways [s/i] allow users to bypass EMR system with faster pull HIE paths [m] to reduce time spent and administrative burden [o]. 	<p>1, 2, 3, 10, 14, 15, 18, 22</p>
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<p>Increased Administrative Burden (Pain point)</p>	<p>Global health systems that embed health information exchange tools sharing the OLIS function within their health service processes [c]...</p> <ol style="list-style-type: none"> 1. That do not prioritize user-centred interfaces (i.e., does not provide the ability to organize and manage information, logic errors for results/communication paths occur, difficulty collecting or resending lost results in paths, cannot resolve errors easily or at all, additional logins, slow system responses, many pages, high volume of push reports) [s/i] reduces the perceived and actualized usability for users [m] to reduce process efficiency and increase administrative burden [o]. 2. That is not integrated with existing practice tools, clinic workflows, and EMRs [s/i] creates the need for users to use and log in to multiple tools and manual processes [m] to increase administrative burden [o]. 3. That contains technical bugs or is slow and does not perform reliably [s/i] does not allow users to effectively use it without delays [m], reducing process efficiency and increasing administrative burden [o]. 4. That do not require laboratories to provide sufficient information in directed/push HIE for the care of patient in primary care setting [s/i], causing PCPs to seek additional necessary information from pull/query-based HIE [m], increasing their time spent and steps when using HIE tool to increase administrative burden [o] 	<p>1, 2, 13, 14, 15, 18, 22</p>
<p>Increased Patient Safety (Gain/Opportunity)</p>	<p>Global systems that embed health information exchange tools sharing the OLIS function within their health service processes [c]...</p> <ol style="list-style-type: none"> 1. That make lab histories readily available and traceable [s/i] can reduce lab errors by users [m] to increase patient safety [o]. 2. That provides an electronic, online system for laboratory information [s/i] can remove paper/manual processes and additional tool interfaces that can pose security risks [m] to improve security and patient safety [o]. 3. That contains standardized forms [s/i] can enable PCPs to easily find information to make better informed decisions [m] to increase patient safety [o]. 4. That contains clinical decision support language [s/i] can enable PCPs to use DS language to make better informed request decisions [m] to increase patient safety [o]. 5. That enables direct, asynchronous communication between laboratories and other users [s/i] improves communication, access to information, and ability for tracking patient information [m] to increase patient safety [o]. 6. That integrates with EMRs and automatically updates [s/i] ensures that users have updated information and are able to make better informed decisions during care [m] to improve patient safety [o]. 7. That have automated alerts and notifications for timely action [s/i] can improve users' ability to track patient needs [m] to increase patient safety [o]. 8. That contains both direct/push and query/pull-based HIE pathways [s/i] allows PCPs to access query-based exchange to become better informed and provide most appropriate care for patients when they feel that they did not receive sufficient information from directed exchange [m], improving patient safety [o]. <p>In comparison to global health systems that utilize health information exchange tools sharing the OLIS function within their health service processes that only have either push or pull pathways, [c]...</p> <ol style="list-style-type: none"> 1. HIE tools with both push and pull pathways which automatically sends a portion of information and houses other portions in a centralized location for retrieval [s/i] makes users feel that information is more secure [m] and 	<p>1, 2, 3, 10, 13, 14</p>

	<p>accurate [m], increasing patient safety [o].</p> <p>2. HIE tools with both push and pull pathways which automatically sends a portion of information and houses other portions in a centralized location for retrieval [s/i] makes users feel that they are more informed and can provide higher quality and safer care [m], increasing patient safety [o].</p> <p>In comparison to global health systems with manual HIE processes [c]...</p> <p>1. Health systems that have online HIE tools [s/i] allow users to access more complete and timely information to be better informed for care decisions [m] and enables them to feel they can provide higher quality and safer care [m], increasing patient safety [o].</p>	
Decreased Patient Safety (Pain point)		
Increased Access to Care (Gain/ Opportunity)	<p>Global systems that embed health information exchange tools sharing the OLIS function within their health service processes [c]...</p> <p>1. That enables direct communication between laboratories and other users [s/i] to improve communication and tracking regarding screening and prescription needs [m], improving timeliness of care [o].</p> <p>In comparison to global health systems with manual HIE processes [c]...</p> <p>1. Health systems that have online HIE tools [s/i] allow users to access more complete and timely information to be better informed for care decisions [m] to increase access to timely care [o].</p>	3, 14
Decreased Access to Care (Pain point)		
HRM		
Outcome	S/ICMO	Reference
Decreased Administrative Burden (Gain/ Opportunity)	<p>Global and Canadian health systems that embed health information exchange tools sharing the HRM function within their health service processes [c]...</p> <p>1. That prioritize user-centred interfaces (e.g., reduced manual and paper-based steps, more easily transferred information, reduced clicks, easily send and access documents, lower volumes of documents, filter and search capabilities, autocategorization) [s/i] improves the perceived and actualized usability for users [m] to improve process efficiency and reduce administrative burden [o].</p> <p>2. That integrates with existing practice tools, clinic workflows, and EMRs [s/i] to allow users to communicate and coordinate care easier across less interfaces [m] to improve process efficiency and reduce administrative burden [o].</p> <p>3. That is reliable without technical bugs [s/i] allow users to effectively without delays [m] to improve process efficiency and reduce administrative burden [o].</p> <p>4. That allow multiple users to access information [s/i] can allow task delegation and teamwork opportunities between physicians and non-physician staff (e.g., medical scribes, clerks, case managers, and assistants gather, revise, and summarize information) [m] to reduce administrative burden on physicians [o].</p> <p>In comparison to global health systems that utilize health information exchange tools sharing the OLIS function within their health service processes that only have either push or pull pathways, [c]...</p>	1, 2, 3, 11 12, 15, 18, 22

	<p>1. HIE tools with both push and pull pathways which automatically sends a portion of information and houses other portions in a centralized location for retrieval [s/i] allow users to have more flexibility to receive information through pathways that work for them [m], increasing administrative efficiency and reducing burden [o].</p> <p>In global health systems using EMRs with poor usability [c]...</p> <p>1. HIE tools with pull pathways [s/i] allow users to bypass EMR system with faster pull HIE paths [m] to reduce time spent and administrative burden [o].</p>	
<p>Increased Administrative Burden (Pain point)</p>	<p>Global and Canadian health systems that embed health information exchange tools sharing the OLIS function within their health service processes [c]...</p> <p>1. That do not prioritize user-centred interfaces and design (i.e., does not provide the ability to organize and manage information, and did not engage stakeholders/users in the technology development process, additional logins, slow system responses, many pages, high volume of push reports, poor searchability, poor autocategorization, poor filters, duplication of reports) [s/i] reduces the perceived and actualized usability for users [m] to reduce process efficiency and increase administrative burden [o].</p> <p>2. That is not integrated with existing practice tools, clinic workflows, and EMRs [s/i] creates the need for users to log in to and use multiple tools and manual processes [m] to increase administrative burden [o].</p> <p>3. That contains technical bugs or is slow and does not perform reliably [s/i] does not allow users to effectively use it without delays [m], reducing process efficiency and increasing administrative burden [o].</p> <p>4. That do not require specialists to provide sufficient information in directed/push HIE for the care of patient in primary care setting [s/i], causing PCPs to seek additional necessary information from pull/query-based HIE [m], increasing their time spent and steps when using HIE tool to increase administrative burden [o].</p>	<p>1, 2, 11, 13, 15, 18, 22</p>
<p>Increased Patient Safety (Gain/Opportunity)</p>	<p>Within global and Canadian health systems that embed health information exchange tools sharing the HRM function within their health service processes [c]...</p> <p>1. That provide an online, readily available electronic system [s/i] that can remove paper/manual processes that can pose a risk for being physically lost [m] and allow easier access to information to inform care [m] which improves information security and patient safety [o].</p> <p>2. That allows the tracking and auditing of patient information and status [s/i], PCPs and other users can keep better track of their patients' information to improve patient safety [o].</p> <p>3. That contains both direct/push and query/pull-based HIE pathways [s/i] allows PCPs to access query-based exchange to become better informed and provide most appropriate care for patients when they feel that they did not receive sufficient information from directed exchange [m], improving patient safety [o].</p> <p>4. That enables direct, asynchronous communication between in-patient and out-patient settings [s/i] improves communication, access to information, and ability for tracking patient information [m] to increase patient safety [o].</p> <p>In comparison to global health systems that utilize health information exchange tools sharing the OLIS function within their health service processes that only have either push or pull pathways, [c]...</p>	<p>1, 2, 3, 11, 12, 13</p>

	<p>1. HIE tools with both push and pull pathways which automatically sends a portion of information and houses other portions in a centralized location for retrieval [s/i] makes users feel that information is more secure [m] and accurate [m], increasing patient safety [o].</p> <p>2. HIE tools with both push and pull pathways which automatically sends a portion of information and houses other portions in a centralized location for retrieval [s/i] makes users feel that they are more informed and can provide higher quality and safer care [m], increasing patient safety [o].</p> <p>In comparison to global health systems with manual HIE processes [c]...</p> <p>1. Health systems that have online HIE tools [s/i] allow users to access more complete and timely information to be better informed for care decisions [m] and enables them to feel they can provide higher quality and safer care [m], increasing patient safety [o].</p>	
Decreased Patient Safety (Pain point)	<p>Ontario health systems that embed health information exchange tools sharing the OLIS function within their health service processes [c]...</p> <p>1. That produce high volumes of reports (not user-centred interface) [s/i] makes it difficult for PCPs to identify relevant information to inform practice [m], reducing patient safety [o].</p>	11
Increased Access to Care (Gain/ Opportunity)	<p>In comparison to global health systems with manual HIE processes [c]...</p> <p>1. Health systems that have online HIE tools [s/i] allow users to access more complete and timely information to be better informed for care decisions [m] to increase access to timely care [o].</p>	3
Decreased Access to Care (Pain point)	Not reported.	

Appendix E

Qualitative Interviews Guide

Patients Before Paperwork (PB4P): Interview Guide

Thank you for taking the time to speak with me. My name is [interviewer name] and the goal of our conversation today is to help us **understand the current state of administrative burden in different clinical contexts, and the ways in which tools such as 1) eReferral, 2) eConsult, 3) HRM, and 4) OLIS can impact workflow and alleviate/reduce administrative burden.** I will be asking you question to learn about your experience using any/all of four different tools, 1) eReferral, 2) eConsult, 3) HRM, and 4) OLIS.

Before going into specific questions about your experience with the four different tools, we would like to ask you a few questions about you and the practice you work at. This will help us understand who is using/not using these tools. Only people working on the PB4P evaluation will be able to see this information. If used in the research, your information will be combined with information from the other participants in the evaluation so that your information cannot be linked to you.

Our discussion should take about 30-40 minutes. With your permission, I would like to record our conversation. Do you have any questions before we begin?

Section 1: Gender and Practice information

a. What is your self-identified gender?

- Female
- Male
- Transwoman
- Transman
- Intersex
- Non-binary
- Gender Neutral
- Prefer to self-describe: _____

b. How many years have you been in practice?

c. What type of practice do you work in?

Prompts:

- Solo Fee for Service
- Family Health Group
- Family Health Organization
- Family Health Team

d. Does your practice include different clinical team members (i.e. nursing, PT, specialists etc). If yes, please describe briefly: _____

e. Do you practice in any other areas aside from primary care:

Prompts:

- Emergency department
- Intensive care unit
- General medical unit
- Specialist medical unit (i.e., oncology, orthopedic, cardiology, geriatrics)
- Surgical unit
- Other (please specify): _____

f. What area of the province do you work in? How would you characterize the practice you work in?

Prompts:

- Geographic area (region, city etc): _____
- Urban
- suburban
- Small town
- 1. Rural
- 2. Geographically isolated/remote

g. Which EMR system do you use?

Prompts:

- Practice Solution
- Oscar (type: Oscar pro vs other)
- Accuro
- Other? Please specify: _____

h. Do you have any leadership positions with PC or digital health?

Part 2: Process (referrals, consult, hospital reports, lab testing) and Associated Tools (eReferral, eConsults, HRM, OLIS)

***note for interviewer: if participant does not have experience with tool, skip to question e*

We will now ask questions about your experience with 4 tools available for different processes in your practice.

i. Referrals

a. Describe your current experience when referring patients to other healthcare providers?

Prompt: What do you use to support the referral process (fax/efax/eReferral/ECHIN) and why?

Prompt: How are your other team members (i.e., admin) involved in this referral process?

Prompt: Are there specific pain points in your referral process?

Prompt: What could help make the referral process better?

If they use eReferral:

- b.** How often do you use eReferral? [adoption/usage]

Prompt: How long have you been using eReferral? [adoption/usage]

Prompt: Have you ever stopped using it? If so, why? [meaningful adoption]

Prompt: How do you access the tool (i.e., EMR integrated, OCEAN eReferral etc)?

- c.** How does using eReferral compare to faxing referrals?

Prompt: Does it result in time saved or added? Why?

Prompt: How does workflow while using eReferral compare to other methods you currently or previously used?

- d.** What impact does using eReferral have on your practice? [value/impact]

Prompt: Has it had any impact on how quickly/effectively you can get through your day?

Prompt: Has it had any impact on the quality of care you provide, such as safety, timeliness etc?

Prompt: Has it had any impact on your staff or other team members and how they work?

Prompt: Are there any improvements you would make to eReferrals to improve its efficiency and value to you and your practice?

If they do NOT use eReferral

- e.** Describe why you have not used eReferral for this process.

Prompt: specific pain points/barriers to use

Prompt: integrating into clinical workflow

ii. Consult (Tool eConsult)

If they use eConsult:

- a.** How often do you use eConsult? [adoption/usage]

Prompt: How long have you been using eConsult? [adoption/usage]

Prompt: Have you ever stopped using it? If so, why? [meaningful adoption]

- b. How do you access the tool (i.e., OTN Hub, EMR integrated etc)?
- c. What impact does using eConsult have on your practice? [value/impact]
 - Prompt: Has it had any impact on how quickly/effectively you can get through your day?*
 - Prompt: Has it had any impact on the quality of care you provide, such as safety, timeliness etc?*
 - Prompt: Has it had any impact on your staff or other team members and how they work?*
 - Prompt: Are there any improvements you would make to eConsult to improve its efficiency and value to you and your practice?*

If they do NOT use eConsult

- d. Describe why you have not used eConsult for this process.
 - Prompt: specific pain points/barriers to use*
 - Prompt: integrating into clinical workflow*

iii. Hospital Reports (Tool HRM)

- a. Describe your current experience with receiving and reviewing documents from other parts of the healthcare system (e.g., discharge summaries)?
 - Prompt: What is your process for receiving and reviewing hospital reports (HRM/centralized viewers/fax/mail)?*
 - Prompt: How are your other team members (i.e., admin) involved in this process?*
 - Prompt: Are there specific pain points in the process of receiving and reviewing these documents? [pain points]*
 - Prompt: What could help make it easier to receive/review documents from other parts of the health care system? [opportunities]*

If they use HRM:

- b. How do you access HRM? (i.e. EMR integrated, Clinical Connect, Connecting Ontario)?
- c. How does using HRM compare to receiving faxed documents?
 - Prompt: Does it result in time saved or added? Why?*
- d. What impact does using HRM have on your practice? [value/impact]
 - Prompt: Has it had any impact on how quickly/effectively you can get through your day?*
 - Prompt: Has it had any impact on the quality of care you provide, such as safety, timeliness etc.?*
 - Prompt: Has it had any impact on your staff or other team members and how they work?*
 - Prompt: Are there any improvements you would make to HRM to improve its efficiency and value to you and your practice?*

If they do NOT use HRM

- e. Describe why you have not used HRM?
Prompts: specific pain points/barriers to use
Prompts: integrating into clinical workflow

iv. Lab testing (Tool OLIS)

- a. Describe your current experience receiving and reviewing lab results for your patients?
Prompts: What is your process for receiving and reviewing lab results (OLIS/centralized viewers/fax/mail)?
Prompts: How are your other team members (i.e., admin) involved in this process?
Prompt: Are there specific pain points in the process of receiving and reviewing these documents?
Prompt: What could help make it easier to receive/review documents from other parts of the health care system?

If they use OLIS:

- b. How do you access OLIS and the electronic laboratory results (i.e., EMR integrated, Connecting Ontario, Clinical Connect etc.)?
- c. How does using OLIS compare to reviewing faxed lab test results?
Prompt: Does it result in time saved or added? Why?
Prompt: How does workflow while using OLIS compare to other methods you currently or previously used?
- d. What impact does using OLIS have on your practice? [value/impact]
Prompt: Has it had any impact on how quickly/effectively you can get through your day?
Prompt: Has it had any impact on the quality of care you provide, such as safety, timeliness etc?
Prompt: Has it had any impact on your staff or other team members and how they work?
Prompt: Are there any improvements you would make to OLIS to improve its efficiency and value to you and your practice?

If they do NOT use eReferral

- e. Describe why you have not used eReferral for this process.
Prompt: specific pain points/barriers to use
Prompt: integrating into clinical workflow

Part 3: Overall questions (about process and tools)

- a) Are there other tools, processes or policy changes that you feel would make a positive impact on reducing administrative burden in your clinic?
- b) Anything else you want to comment on from our discussion today?

Appendix F

Demographics of Interviewees

Table 10. Demographics of Semi-Structure Interviewees (n=13)

	Interviews n=19 (%)	N	%
Gender	Female	6	46%
	Male	7	54%
Provider type	Physician	12	92
	Nurse Practitioner	1	8
Years in Practice	0-5 years	3	23%
	5-10 years	0	0%
	11-15 years	5	38%
	16-20 years	0	0%
	21-25 years	3	23%
	26+ years	2	15%
Practice Type	FHO	2	15%
	FHT/FHO	8	62%
	FFS	2	15%
	FHG	1	8%
Practice Location	Greater Toronto Area	7	54%
	Ottawa	2	15%
	Sudbury	1	8%
	Kitchener-Waterloo	1	8%
	Guelph	1	8%
EMR	PS Suite	7	54%
	Accuro	3	23%
	Oscar	2	15%
	EPIC	1	8%

Appendix G

Summary of Themes with Quotes

Table 11. Quotes from Clinician Interviews

		Theme	Quotes
HRM	Process	Volume of information	<p>“So, the one that comes from the emerge has literally down to the vitals that were taken in emerge by the nurse. And the urine test results, and everything embedded in the note. And then I get each of those things separately from the lab as an HRM. So, the urine test and the blood test and the chest X ray and everything. But then at the very bottom will be the plan from the emerge Doc about what to do next. And that will often have, you know, follow up with your family doctor in one to two weeks. I leave it in their capable hands to take care of XYZ. And that then I will get like 5 copies of the of the hospitalist note each with a separate addendum like they went in, they saw the patient at the first time, then they went in again and followed up. So, I'll have the whole first note and then I'll have what they did the second time and then the resident made a change. So, then there's an addendum to that, and then their preceptor went and reviewed the residence notes so that there's an addendum with that. And literally I'll get the same note five times.” (P06)</p> <p>“The only thing I would say is that when you get deluged with that much information, you do stop reading it at a point, and so things can get missed that way. But also, when there's 200 things in my inbox, then there's no way for me to tell what's important and what's not important.” (P06)</p> <p>“It's sending too much like it needs to be more, you know, kind of oriented around the fact that like as the primary care doctor, this is what I actually need to be pushed to my EMR and the rest of the stuff if I need it, I can always pull it myself.” (P09)</p> <p>“And then for, HRM...really decrease and improve the clarity across the board of like what are the appropriate things to send to primary care, again mostly being like an admission note, discharge note and imaging results.” (P01)</p> <p>“They're trying to send you information about what's going on, but they'll send it in highly piece meal manner. So, when you enter emerge, there will be a flag that you went to emerge, but that's it. But there's no chief complaint. Sometimes there's no C task. It's just like you, [patient] went to emerge. That means nothing to me.” (P03)</p>

	Information is fragmented	<p><i>"I'm getting separate faxes for the X ray and the ultrasound and then the HRM of the X ray and ultrasound." (P06)</i></p> <p><i>"So, no other than I mean I think there are still plenty of hospitals for instance that don't put their stuff on to HRM and that means we have to get faxes and couriered stuff..." (P07)</i></p>
	Ongoing management of both HRM and fax	<p><i>"...we still receive fax documents, plenty of our specialists still send faxes instead of [HRM]" (P07)</i></p>
People	Diffusion of responsibility	<p><i>"there is a bit of like diffusion of responsibility that, I know the CPSO has addressed that a little bit in the latest statements that they've said about, like if you've ordered the test, it's your responsibility like family docs, it's not your responsibility at all to follow up on this unless you have reason to believe that the specialist isn't following up on it." (P01)</i></p> <p><i>"So that's admin burden, like a specialist asking me to do these tests or [say] this is what I recommend and then it kind of behooves me, since they didn't do it. It is either I'm gonna do it - or I have to call them up and say no, you do your own work which is difficult... So anyways, that's a biggie - downloading specialist jobs onto the GP." (P07)</i></p>
	Variation with staff delegation	<p><i>"...that was one of his biggest gripes was about just the time-consuming aspects of downloading [in] HRM, so that is one of the we have essentially delegated the vast majority of HRM downloads to the staff, sorting them out... They'll change the category, cause the categories are often miscategorized" (P07)</i></p> <p><i>"No, you can't. You can't. I have to..." (P06)</i></p> <p><i>"In in our model we don't have a person to delegate that show" (P03)</i></p>
	Legal and medical responsibilities to review information	<p><i>"It's just primary care is the data dumping ground for everything that happens in the healthcare system and we feel like we're medically legally responsible for reviewing everything." (P03)</i></p>

	Digitization	<p>Categorization and formatting</p> <p>“...like the reports are obviously not standardized in structure. They're not necessarily correctly labeled when they come in, so I may have to relabel the report like in terms of categorizing it like is it a urology consult or is it like a CT scan like sometimes they just don't, they just get these things wrong...” (P02)</p> <p>“Honestly, I would say it would make a big difference to me if there were subject headings that were bolted, because right now it's all one font and there's really no way to like you have to scroll through the entire thing to find the important bit of information. And there's no actual standardized way of that being set up, whereas in the actual faxes at least, it's bolded impression like final impression.” (P06)</p> <p>“It [HRM] has a mostly undifferentiated inbox...and so basically I just have a giant inbox...”(P08)</p>
		<p>Routing of information</p> <p>“One of the main issues with HRM is that if you work in more than one place you can't get reports sent to those different places like it's hmm doesn't know that you work like it wasn't built with this concept that like a doctor might work in three places.” (P02)</p> <p>“...Like I said, sometimes I work in the ER and [rural location]. I don't wanna get [rural location] reports sent to my family practice in Toronto, but hmm does that anyway. They send all those reports to Toronto...So then what I have to do is like take those reports and basically shred them or delete them if I need to get them to go to the other place that I work, and I have to figure out how to do that...” (P02)</p>
	Comparison to Fax	<p>Benefits:</p> <p>(+) Improves quality of care through quick access to information</p> <p>(+) More reliable</p> <p>Drawbacks:</p> <p>(-) Many PCPs using both fax and HRM</p> <p>(-) Described as big source of</p> <p>“I can reliably get, umm more of the big information like the big important test results or discharge and admissions summaries and things like that.” (P07)</p> <p>“...like the PDFs for faxes like they go through waves where it's like the fax fails or they're partially complete and then we got to follow up to say, you know, we got all of this, and you identified a problem, and we can't read your plan. So, we don't know what you did. Because it's almost always like the end of the faxes that get cut off or changed in some way when they're in transmission. So, I do like the that part of it that it's like it's pretty reliable that if it's if there's something coming through it's coming through.” (P01)</p> <p>“So I do love the fact that, like my patient can be seen in the emerge and as soon as the emerge doc signs off on their note, it pops up in my EMR and then that's great from a patient perspective because before like when I was a resident of before HRM was broadly used or before Epic was being used at our hospital, you would get emerged notes that these like triplicate copies which were eligible, that they would send to you. They were handwritten. Oftentimes, those notes would arrive like weeks after the emerged visit.” (P09)</p>

		admin burden currently	
eReferral	Process	Lack of standardization of forms	<p><i>“They require their individual form and that creates a lot of administrative burden and hassle because, as you can imagine, you know there is a city like Mississauga or a city like Toronto. I work in Mississauga, like there are hundreds of clinics that have its own form. Like, that's hundreds of different permutations of the same document, and if they're refusing to accept them, that creates a big problem for my patients, my staff, myself, and it's also just not an easy workflow.” (P09)</i></p> <p><i>“I would have the forms standardized.... That would be that those would be that that would help, right? There really needs to be a way to...If I send an eReferral and it gets declined, there needs to be somewhere where I could just forward it to somebody else rather than needing to redo it all.” (P04)</i></p> <p><i>“I think we need centralized referrals and I think that you should have ways to triage those referrals based on you know, first available versus preferred specialists versus where they are. Like something like what they have in Alberta, which they've had for, I don't know more than a decade you know.” (P08)</i></p> <p><i>“So, like for referrals specifically, like really having more central intakes, I think is important like that would reduce so much administrative burden across the board because then I'm not shopping around referrals.” (P01)</i></p> <p><i>“They won't tell you who is available instead, so it becomes this very game of whack a mole essentially, where you're trying to just fire off these referrals to different places, hoping at some point you'll get a different result, and someone will accept that.” (P09)</i></p>
		Declined referrals adding time	<i>“That's like one of the biggest things that I see with specialists lately is that gets sent back to me and then I have to send it to a new specialist. Sometimes that new specialist has a different referral form, so I have to redo the whole referral E umm so that can be so I would say, and I probably spend or send like anywhere from like one to maybe 4 referrals a day.” (P01)</i>
	People	Inadequate adoption from specialists	<p><i>“So, the main thing in our community is that for the eReferral system most the specialists have not taken it up, so I'm not limited by my own desire. It's actually limited by the number of specialists that have chosen to use the platform.” (P07)</i></p> <p><i>“The other challenge as well to in our region is that we don't have a lot of specialists on eReferral anyway. So, like we were still very much like a community that relies on fax. And so that's the other issue was like, why sign up for our system where you're not even going to have access to all the consultants because everyone is in on it.” (P09)</i></p>

		Navigating specialist directory	<p>"You know, there's a long list, but most of them aren't actually on eReferral, so I don't know why they are even [listed] there. So that's a problem...So that is just a waste of time trying to find someone who's actually on eReferral" (P04)</p> <p>"Ohh, that's the other thing that would help. You know, if you have orthopedics for example, and it may be in there, I don't know list what they do. If they only do knees and hips, then I'm not gonna send them feet." (P04)</p> <p>"There's a huge pain of the frustrations being that because you don't have a sense of their [specialists] wait time often, often depending on the specialties, some you know they'll decline the referral, and it might take you two or three or even four tries before you find somebody who's accepting a patient." (P08)</p>
	Digitization	Variation in integration with EMR	<p>"I think the challenge for us with eReferral is that the Acurro integration piece hasn't been like fully developed with eReferral to my understanding and so when we looked into it as a team like there's just not interested in using another system, right? Like already, there's so many different silos and challenges with toggling different systems and profiles and logins and stuff. So, I think that's been the challenge, right? Because if you're patient, demographics don't auto populate and you're having to fill out all of these fields. I think it almost creates that same form, a hassle and at the end of the day, like in terms of what's like the most efficient in terms of workflow, really it is that efax referral letter because that's built into the EMR. (P09)</p> <p>"If I send her referral and it gets declined, there needs to be somewhere where I could just forward it to somebody else rather than needing to redo it all." (P04)</p>
	Comparison to Fax	<p>Benefits:</p> <ul style="list-style-type: none"> (+) More reliable than fax (+) Notifies patients when referral sent/received <p>Drawbacks:</p> <ul style="list-style-type: none"> (-) Most common method is still fax or efax 	<p>"...the benefits of like the patient knows that the referral has been sent and they get details about like where to go if there are any specific instructions in advance [of specialist visit] ...So that appointment, they get those by email as well." (P01)</p> <p>"That we can check to see that they've made the notification of the patient. That's the biggie, right?" (P07)</p> <p>"it's been very clear like the loop has been closed. I've seen that the referral was accepted." (P08)</p> <p>"So, I think that reliability is really nice. And then I can always go back into ocean and see like, oh, yeah, I sent it on that day and it's been sent." (P10)</p>

		(-) Adding time compared to fax	
OLIS	Process	Lack of standardized nomenclature across labs	"So, I've noticed for example like some labs will say vitamin D level, otherwise others will say like 25 hydroxy vitamin D level and when they do that, even though it's the same task, it comes up as like a different category of lab within our EMR... And then it will look like sometimes, like, oh, your vitamin D hasn't been done in like 3 years. But then when I look closer, I'm like, oh, wait, no, it was flagged as 25 hydroxy vitamin D and it was done last year, but it's because there's not a consistent language between the labs for some tasks, so that can be a bit annoying if they're going to different labs." (P09)
	People	Diversion of responsibility	"It's just more that, like responsibility of like when I get documents coming through, like blood tests coming through, like making it very clear that like, if you're the specialist and you ordered this like, you do need to be responsible for following up on it." (P01)
	Digitization	Slow download speed	"I mean, sometimes if the patient is the if there's a lot of documents in the search I've done, like if I go back too far or if I have to go back too far, it takes a while...there's a bit of [a] download speed issue." (P07)
		Manually requesting labs	"It's very hit or miss like I find that sometimes it works and sometimes I have to manually like go request data which I find frustrating. It doesn't always actually often doesn't send it to me like lab data that I've ordered directly to me. I have to go and like request it so it's that I find is a big problem because yeah, but once I once I make the request for the data it works very well." (P13)
	Comparison to Fax	<p>Benefits:</p> <ul style="list-style-type: none"> (+) High adoption (+) Much preferred to fax (+) Improves quality of care (+) Fast reliable access to test results <p>Drawbacks:</p> <ul style="list-style-type: none"> None when comparing to fax 	<p>"Like I can't look at like, you know, for diabetes management, what is there a 1C bin over the over the years, I can't show the patient that either because I'll often show them like here's your A1C and I'll put their weight on the same graph. So, I can show them like you know, you're waiting down. Your A1C went down, your weight went up, your A1C went up. So having those coming in in a very standardized way is super helpful." (P01)</p> <p>"It for sure impacts quality of care because I have patients test results available to me that I might not have otherwise." (P04)</p> <p>"...I don't have to ask my staff to chase down some test result that was done elsewhere." (P07)</p>

eConsult	Process	None described	n/a
	People	None described	n/a
	Digitization	EMR Integration	<p>“So, it goes like EMR to one ID to OTN- if anything in that pathway breaks like the one ID login fails which happens probably like one in five times or more frequent like it happens all the time that it just gives an error that breaks the like data transfer and then nothing shows up in OTN” (P01)</p> <p>“...it's a bigger pain cause I gotta log in separately and then I have to cut and paste it into my EMR and then I got to log back in to see the results and all that.” (P04)</p> <p>“Again, I if it was on my EMR 100% I would be using it tons more tons because then it would be easy to ask those quick questions that you know maybe troubled me more now.” (P08)</p> <p>“...but thankfully eConsult eventually did get fully integrated and it's like interesting to see the chefs right now amongst my group like people use it all the time, especially me. I probably use it at least a couple times a week because of the fact that it's so easy to use. But before, when it was a separate system that I have to log on to separately, I was plus part less likely to use that.” (P09)</p>
	Comparison to Fax	n/a	n/a
System-Level	Process	PCP representation on governance structure	<p>“...And the reason we went with this [EMR] despite it not being Ontario certified is because of its governance structure. So, its governance structure includes physician users, and it means that we have a lot more say into what features get put into the EMR, whereas our feeling with the other established vendors and what we've constantly heard from our colleagues in the, in the Community is that they want a feature.” (P03)</p> <p>“The docs fundamentally want the tool, but the benefits of governance and decision making for an electronic medical record system in the long run is a bigger driver and more important to us than the immediate needs of using OLIS and HRM.” (P03)</p>
	People	Optimizing team-based care	<p>“...then I think some of the other issues that I have related to admin burden are just probably related to not optimizing team-based care which is quite common throughout all team-based practices in Ontario. Everyone still needs to see me first for the most part, for whatever reason, even though there's no reason why they couldn't just go to the dietitian directly to talk about their, you know, they're prediabetes, the family doctors still like, a strange bottleneck, right? Whereas I think [it would] be better for people to access not the doctor 1st and then come to the doctor if they need to right. So that would probably be optimizing the use of doctors in our system.” (P02)</p>

	Clarifying Roles and Responsibilities	<p><i>"The second thing is it's really easy for the specialist to just say copy to the family Doctor, but if it's not relevant to me, I really shouldn't get it" (P06)</i></p> <p><i>"...now that that specialists basically tells me how to take care of the patient and a lot of that stuff, you know, you don't get paid for, it takes up time in your life and you're probably doing it with less expertise than really should be applied to the thing. So that's admin burden..." (P07)</i></p>
	Relationships with pharmacy	<p>MedsCheck Program</p> <p><i>"The biggest thing, and this has been in the media and everything, but like [with the] pharmacy - you know faxes and clarification with [the] pharmacy. It's always clunky and like they don't see what we're seeing, we don't see what they're seeing - so that I think is a big issue, definitely like the, you know, the endless faxes from the meds check referrals is like a huge a huge administrative burden that I find it very hard." (P10)</i></p>
Digitization	EMR considerations	<p><i>"It's not our tools like we if we, but the EMR is down we the clinic shuts down. So, if we [physicians] don't have some say and control over that tool as physicians and as users of it, you know, like I, I think that's a huge barrier to all of the change we want to see drive out from primary care." (P03)</i></p> <p><i>"I think Ontario Health needs to look very closely as to what, if they're truly trying to help primary care, they need to make adjustments to the certification and using that as stick to drive change at the EMR level, they can do it right?" (P03)</i></p> <p><i>"I would say a unified EMR that can be accessed remotely if you ask me what my dream is, I would say unified EMR that works in multiple settings that I can use AI on for voice recognition would be ideal." (P12)</i></p>
Comparison to Fax	Generally, PCPs described benefits of moving away from traditional fax processes but underscored that digitization can both decrease and increase administrative burden.	<p><i>"No, no, it's all better than the fax. I think it the issue is more just all these different deficiencies in terms of incompleteness or just that you can't access them at the point of care in an efficient way like that's the problem with you know, that's the problem with eConsult or you know that's the cumbersomeness of ocean like it's much faster for me to fax the consult for my system than use ocean." (P08)</i></p>