McMaster University | Health Forum

Rapid evidence synthesis appendices

Artificial intelligence tools for reducing administrative burden among front-line healthcare providers

30 May 2025

[MHF product code: RES 129]

Appendices

Appendix 1: Methodological details

Background to the rapid evidence synthesis

This rapid evidence synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid evidence synthesis summarizes evidence drawn from existing evidence syntheses and from single research studies in areas not covered by existing evidence syntheses and/or if existing evidence syntheses are old or the science is moving fast. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies, and to synthesize data from the included studies. The rapid evidence synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

The Forum produces timely and demand-driven contextualized evidence syntheses such as this one that address pressing health and social system issues faced by decision-makers (see our website for more details and examples). This includes evidence syntheses produced within:

- days (e.g., rapid evidence profiles or living evidence profiles)
- weeks (e.g., rapid syntheses that at a minimum include a policy analysis of the best-available evidence, which can be requested in a 10-, 30-, 60-, or 90-business-day timeframe)
- months (e.g., full evidence syntheses or living evidence syntheses with updates and enhancements over time).

This rapid evidence synthesis was prepared over a 30-business-day timeframe and involved five steps:

1) submission of a question from a policymaker or stakeholder (in this case, the Canadian Medical Association)
2) engaging members of a working group, based at the Canadian Medical Association, focused on reducing administrative burden, and building on previous work completed by this working group and its partners (e.g., in refining the research questions and developing the organizing framework)
3) identifying, selecting, appraising, and synthesizing relevant research evidence about the question
4) conducting and synthesizing a jurisdictional scan of experiences about the question from other countries and Canadian provinces and territories
5) drafting the rapid evidence synthesis in such a way as to present concisely and in accessible language the research evidence

6) finalizing the rapid evidence synthesis based on the input of at least two merit reviewers.

Identification, selection, quality appraisal, and synthesis of evidence

For this rapid evidence synthesis, we searched Health Systems Evidence and PubMed for:
1) evidence syntheses
2) protocols for evidence syntheses that are underway
3) single studies (when no guidelines or evidence syntheses were identified or when they are older).

We developed and refined our search strategies using terms related to AI (e.g., machine learning, large language model etc.), terms related to administrative burden (e.g., workload, paperwork etc.), terms related to different 'use cases' for the application of AI in reducing administrative burden (e.g., scribing tools) and related to healthcare providers (e.g., doctors, nurses), ultimately determining that a streamlined approach centring on AI-related keywords and those related to administrative burden led to an appropriate balance between specificity and sensitivity. In Health Systems Evidence, we searched for evidence syntheses using the following strategy, and in PubMed, we searched using the following strategy: (((((((("Artificial Intelligence"[Mesh]) OR ("Algorithms"[Mesh])) OR ("Support Vector Machine"[Mesh])) OR ("Machine Learning"[Mesh])) OR ("Deep Learning"[Mesh])) OR ("Neural Networks, Computer"[Mesh])) OR ("Pattern Recognition, Automated"[Mesh])) OR ("Large Language Models"[Mesh])) OR ("Natural Language Processing"[Mesh])) OR ("artificial intelligence"[Title/Abstract] OR AI[Title/Abstract] OR "A.I."[Title/Abstract] OR "machine learning"[Title/Abstract] OR "deep learning"[Title/Abstract] OR "large language model"[Title/Abstract] OR LLM[Title/Abstract] OR "natural language processing"[Title/Abstract] OR NLP[Title/Abstract] OR "predictive analytics"[Title/Abstract] OR "Neural Networks"[Title/Abstract] OR "Pattern Recognition"[Title/Abstract]) AND ("administrative burden"[Title/Abstract] OR "documentation"[Title/Abstract] OR "administrative tasks"[Title/Abstract] OR "administrative workload"[Title/Abstract] OR "administrative work"[Title/Abstract] OR "office management"[Title/Abstract] OR "paperwork"[Title/Abstract] OR "Documentation Burden"[Title/Abstract] OR "administrative efficiency"[Title/Abstract] OR "clinical documentation"[Title/Abstract] OR "medical documentation"[Title/Abstract]OR "Clerical Burden"[Title/Abstract] OR "clerical task*"[Title/Abstract] OR "documentation time"[Title/Abstract] OR "time saving"[Title/Abstract] OR "time reduction"[Title/Abstract] OR "time burden"[Title/Abstract] OR "time management"[Mesh]) AND ("physician*"[Title/Abstract] OR "doctor*"[Title/Abstract] OR "nurse*"[Title/Abstract] OR "dentist*"[Title/Abstract] OR "practitioner*"[Title/Abstract] OR "clinician*"[Title/Abstract] OR "team*"[Title/Abstract] OR "anesthetist*"[Title/Abstract] OR "cardiologist*"[Title/Abstract] OR "dentist*"[Title/Abstract] OR "dermatologist*"[Title/Abstract] OR "gastroenterologist"[Title/Abstract] OR "gp"[Title/Abstract] OR "geriatrician*"[Title/Abstract] OR "gerontologist*"[Title/Abstract] OR "gynaecologist*"[Title/Abstract] OR "gynecologist*"[Title/Abstract] OR "hematologist*"[Title/Abstract] OR "haematologist*"[Title/Abstract] OR "intensivist*"[Title/Abstract] OR "neurologist*"[Title/Abstract] OR "obstetrician*"[Title/Abstract] OR "oncologist*"[Title/Abstract] OR "paediatrician*"[Title/Abstract] OR "pediatrician*"[Title/Abstract] OR "psychiatrist*"[Title/Abstract] OR "radiologist*"[Title/Abstract] OR "rheumatologist*"[Title/Abstract] OR "surgeon*"[Title/Abstract] OR "urologist*"[Title/Abstract] OR "Pharmacist*"[Title/Abstract] OR "Optometrist*"[Title/Abstract]). A total of 1,035 records were reviewed for eligibility by 22 April 2025.

A final inclusion assessment is performed both by the person who did the initial screening and the lead author of the rapid evidence synthesis, with disagreements resolved by consensus or with the input of a third reviewer on the team. The team uses a dedicated virtual channel to discuss and iteratively refine inclusion/exclusion criteria throughout the process, which provides a running list of considerations that all members can consult during the first stages of assessment.

For each evidence synthesis we included, we documented the dimension of the organizing framework (see Appendix 2) with which it aligns, key findings, living status, methodological quality (using AMSTAR), last year the literature was searched (as an indicator of how recently it was conducted), availability of GRADE profile, and equity considerations using PROGRESS PLUS.

Two reviewers independently appraise the methodological quality of evidence syntheses that are deemed to be highly relevant using the first version of the AMSTAR tool. Two reviewers independently appraise each synthesis, and disagreements are resolved by consensus with a third reviewer if needed. AMSTAR rates overall methodological quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. High-quality evidence syntheses are those with scores of eight or higher out of a possible 11, medium-quality evidence syntheses are those with scores between four and seven, and low-quality evidence syntheses are those with scores less than four. It is important to note that the AMSTAR tool was developed to assess evidence syntheses focused on clinical interventions, so not all criteria apply to those pertaining to health-system arrangements or implementation strategies. Furthermore, we apply the AMSTAR criteria to evidence syntheses addressing all types of questions, not just those addressing questions about effectiveness, and some of these evidence syntheses addressing other types of questions are syntheses of qualitative studies. While AMSTAR does not account for some of the key attributes of syntheses of qualitative studies, such as whether and how citizens and subject-matter experts were involved, researchers' competency, and how reflexivity was approached, it remains the best general quality-assessment tool of which we're aware. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, an evidence synthesis that scores 8/8 is generally of comparable quality to another scoring 11/11; both ratings are considered 'high scores.' A high score signals that readers of the evidence synthesis can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the evidence synthesis should be discarded, merely that less confidence can be placed in its findings and that it needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1): S8.)

For primary research (if included), we documented the dimension of the organizing framework with which it aligns, publication date, jurisdiction studied, methods used, a description of the sample and intervention, declarative title and key findings, and equity considerations using PROGRESS PLUS. We then used this extracted information to develop a synthesis of the key findings from the included syntheses and primary studies.

During this process we include published, pre-print and grey literature. We do not exclude documents based on the language of a document. However, we are not able to extract key findings from documents that are written in languages other than Chinese, English, French, Portuguese, or Spanish. We provide any documents that do not have content available in these languages in an appendix containing documents excluded at the final stages of reviewing. We excluded documents that did not directly address the research questions and the relevant organizing framework. All of the information provided in the appendix tables was taken into account by the authors in describing the findings in the rapid evidence synthesis.

Identifying experiences from other countries and from Canadian provinces and territories

For each rapid evidence synthesis, we work with the requestors to collectively decide on what countries (and/or states or provinces) to examine based on the question posed. For other countries, we search relevant government and stakeholder websites. In Canada, a similar approach was used. While we do not exclude content based on language, where information is not available in English, Chinese, French, Portuguese or Spanish, we attempt to use site-specific translation functions or Google Translate. A full lit of websites and organizations searched is available upon request.

Appendix 2: Detailed data extractions from evidence syntheses about AI tools for reducing administrative burden among front-line healthcare providers

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
  ○ Communication supports
  ○ Patient-discharge supports
• Sectors
  ○ Primary care
  ○ Specialty care
  ▪ Emergency care
  ▪ Outpatient specialty care
  ▪ Inpatient specialty care
• Healthcare providers
  ○ Physicians
  ▪ Generalists
  ▪ Specialists
  ○ Nurses
  ○ Pharmacists
  ○ Allied health professionals
• Settings
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Time available for patient care
	The scoping review found that artificial intelligence (AI) technologies (e.g., natural language processing, speech recognition, and machine learning) can significantly reduce clinicians' documentation burden while improving efficiency and accuracy, though challenges remain regarding error management, electronic health record (EHR) integration, and ethical/legal considerations that must be addressed for safe implementation (1)
	• Speech recognition and large language models (LLMs) reduced documentation time and improved workflow by automating transcription and summary generation, allowing clinicians to spend more time on patient care
	• AI-powered ambient scribes decreased clerical workload during ward rounds, improving clinician-patient interactions
	• Patient-friendly discharge summaries created using LLMs showed improved readability and understandability, potentially enhancing patient health literacy and treatment adherence
	• Studies comparing AI-generated clinical documentation with those produced by senior medical residents found comparable quality levels
	• Implementation barriers included the need for human oversight to catch errors (hallucinations, omissions, fabricated information), technical integration challenges with EHRs systems, and unresolved questions about liability and data privacy
		No	3 of 9	Review began: 23 October 2024	No	Not reported

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations

• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
• Barriers to adoption and scaling up
  ○ System-level barriers
  ○ Organizational-level barriers
  ○ Provider-level barriers
• Facilitators of adoption and scaling up
  ○ System-level facilitators
  ○ Provider-level facilitators						

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Home and community care
  ○ Specialty care
  ▪ Inpatient specialty care
• Healthcare providers
  ○ Nurses
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Health outcomes
	This scoping review explored the use of artificial intelligence to enhance clinical nursing care, including documentation, nursing diagnoses, care plans, patient monitoring, and prediction of outcomes such as falls and wound management, highlighting its potential to improve care quality through various use cases and underlying mechanisms (2)
	• Most studies were conducted in community, hospital, and laboratory ward settings
	• Five common AI techniques identified to improve nursing care were machine learning, deep learning, expert systems, fuzzy logic, and natural language processing (NLP)
	• Machine learning was found to increase the speed and efficacy of patient monitoring, greatly reducing the constant need for nurses to collect vital signs and freeing up time for other tasks
	• Machine learning can predict certain medical problems, such as falls and pressure ulcers, by analyzing past datasets, enabling quicker identification and prioritization of comorbidities, which aids nursing assessments and allows for more accurate care plans and improved patient care quality
	• Deep learning was used to enhance nursing care by generating quicker and accurate diagnoses, more efficient physiological monitoring, and fall predictions
	• Expert systems were used to improve nurses' quality of wound care, pressure ulcer management, nursing diagnoses, and to predict pressure injuries
	• Fuzzy logic was used to enable nurses to monitor intravenous transfusion and vital signs
	• NLP was used on clinical nursing shift notes recorded in the electronic health records systems
		No	5 of 9	20 December 2020	No	Not reported

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Healthcare providers
  ○ Physicians
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
	The systematic review found that current AI tools improve clinical documentation by structuring data, annotating notes, evaluating quality, identifying trends, and detecting errors, while other AI-enabled tools assist clinicians in real-time during office visits, though moderate accuracy limits their broad implementation (3)
	• AI tools can bridge the gap between free-text notes and structured data by organizing text and automatically populating fields, saving clinicians time
	• AI systems linking medical terms to lay definitions can improve patient comprehension, adherence, and reduce nonadherence costs
	• AI-based speech recognition (AI-SR) programs show promise in reducing documentation time, though high error rates persist; NLP tools are improving error detection, and clinician interest in adoption is growing
	• AI real-time documentation assistants improve efficiency by transcribing audio, supporting decisions, and suggesting codes, but accuracy issues may hinder clinical implementation
	• AI tools assess clinical note quality by identifying missing domains and redundant information, with NLP improving clarity and timeliness, though challenges remain in tracking changes and protocol adherence
	• AI tools identify documentation trends by analyzing meta-data, enabling form standardization, efficiency improvement, and EHR optimization
		No	3 of 9	July 2024	No	Not reported

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
  ○ Scribing and documentation tools
  ○ Communication supports
• Sectors
  ○ Specialty care
  ▪ Emergency care
• Healthcare providers
  ○ Physicians
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
• Barriers to adoption and scaling up
	The scoping review found LLMs have the potential to fundamentally transform emergency medicine, enhancing clinical decision-making, optimizing workflows, and improving patient outcomes (4)
	• LLMs play a pivotal role in clinical decision-making and support by enabling real-time triage, early recognition of patient urgency, advising the public before arrival, assisting in ED triage, and augmenting physician activities in diagnostics and predicting resource use
	• LLMs have the potential to enhance operational efficiency in efficiency, workflow, and information management, particularly through automating patient record synthesis, reducing administrative burden, and improving patient-centric care
	• Education and communication possibilities emphasize LLMs' potential to enhance medical training, particularly through simulated patient interactions that foster improved communication skills
	• Risks, ethics, and transparency were identified as concerns, particularly regarding the reliability of LLM outputs, with studies highlighting challenges in ensuring unbiased decision-making due to potentially flawed training data, emphasizing the need for thorough validation and ethical oversight
		No	3 of 9	August 2023	No	None identified

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations
○ System-level barriers ○ Patient-level barriers						
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools ○ Communication supports ○ Patient-discharge supports • Sectors ○ Specialty care • Healthcare providers ○ Physicians ▪ Specialists • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Health outcomes • Barriers to adoption and scaling up ○ System-level barriers ○ Provider-level barriers ○ Patient-level barriers	The systematic review found that LLMs have the potential to enhance healthcare delivery by assisting in diagnosis, treatment guidance, patient triage, physician knowledge augmentation, and administrative tasks in clinical settings, as well as supporting surgeons with documentation, surgical planning, and intraoperative guidance; however, concerns regarding accuracy, bias, and patient privacy remain (5) • Commonly identified LLM applications included diagnosis, generating differential diagnoses, guiding treatment decisions and further workup, augmenting physician knowledge, and interpreting laboratory and imaging results • LLMs offer various applications in surgical settings, including managing documentation, creating perioperative materials, improving discharge instructions, enhancing communication during informed consent, and supporting clinical decision-making by guiding surgical intervention choices and assessing preoperative risks • Non-clinical applications of LLMs in healthcare include enhancing medical education through interactive tools, improving patient comprehension and communication, supporting virtual healthcare assistants, and assisting in medical research • LLMs in healthcare face limitations including accuracy issues, biased outputs, lack of patient-specific context, potential job displacement, inability to replicate empathy, and privacy concerns, requiring further development, oversight, and regulatory compliance	No	3 of 9	14 September 2023	No	Not reported
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Sectors ○ Specialty care • Healthcare providers ○ Physicians ▪ Specialists • Outcomes	This literature review indicated that AI tools can be used to support supportive and palliative care (SPC) clinicians in decision-making and reduce manual workload, leading to potentially improved care and outcomes for cancer patients (6) • Machine learning for predictive modelling and NLP for text screening are two commonly researched applications of AI in SPC • Machine learning techniques can be used to predict clinical outcomes, especially mortality, with high accuracy, which may facilitate improved decision making and personalized care • NLP for text screening can rapidly identify relevant keywords and documents, improving efficiency and care quality	No	3 of 9	Not reported (published between 2020 and 2022)	No	Not reported

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations
○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ○ Other equity-centred quadruple aim metrics ▪ Health outcomes	• Despite significant potential, more rigorous clinical validation through prospective and multicenter studies is needed before these AI technologies can be routinely used in clinical setting					
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Healthcare providers ○ Nurses • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Health outcomes • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers ○ Patient-level barriers	The umbrella review highlighted AI's potential in clinical decision support, patient monitoring, nursing education, and workflow optimization, while also noting challenges such as data privacy risks, biases, and ethical concerns, which require addressing through proper training, data governance, and policy frameworks for successful integration into nursing practice (7) • AI enhances clinical decision-making by analyzing data, predicting patient deterioration, optimizing treatment plans, with integration into EHRs, enabling real-time monitoring and early intervention • AI-driven imaging tools assist in wound care by assessing severity, monitoring healing, and recommending treatments, while predictive analytics help identify high-risk patients, enabling more effective preventive strategies • AI has been widely utilized to streamline nursing workflows and reduce administrative burdens • AI improves remote monitoring with wearable devices, enhances virtual consultations through machine learning, and supports early detection in long-term care, improving patient safety and care efficiency • AI in nursing faces ethical and legal challenges, including data privacy concerns, AI bias, liability issues, and inconsistent regulations across regions, compounded by limitations in training data affecting model reliability and generalizability • Technological barriers to AI adoption in nursing include limited AI literacy, high costs, infrastructure compatibility issues, and conflicts between nurses' judgment and AI recommendations, necessitating clear guidelines and ethical frameworks	No	5 of 9	Not reported (published between 2015 and 2024)	No	Not reported
• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools • Sectors ○ Home and community care ○ Specialty care	The rapid review highlighted the potential of AI systems across various nursing care settings, focusing on applications such as image and signal processing, activity tracking, health monitoring, care coordination, communication, and fall detection (8) • In nursing care, AI streamlines care processes by tracking and monitoring health data, supporting care coordination and communication, assisting with nurse scheduling, and helping to detect, classify, and prevent falls, manage alarms, and predict pressure ulcers • Hospitals are the primary research setting, followed by independent living at home, while nursing homes, ambulatory long-term care, and outpatient healthcare are less frequently explored.	No	5 of 9	June 2020	No	Not reported

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations
▪ Outpatient specialty care ▪ Inpatient specialty care ○ Long-term care • Healthcare providers ○ Nurses • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ○ Other equity-centred quadruple aim metrics ▪ Health outcomes • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers ○ Patient-level barriers	• Various clinical and organizational outcomes were reported, with AI applications improving efficiency in nursing care, reducing monitoring time, lowering emergency visits, and enhancing patient outcomes such as reduced pressure ulcers, shorter intensive care unit (ICU) stays, and decreased mortality • Requirements for AI in nursing care include compliance with data protection regulations, usability preferences, accurate data inputs, and involvement of caregivers and older adults in development • Reported challenges and barriers target accuracy of recognition, integration with sensor networks, privacy, security, human–machine interaction, and cognition impairment of users, acceptance, and costs • The ethical, legal, and social aspects of AI in nursing care include consent, data privacy, workforce impact, and fears of nurse replacement					
• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Communication supports • Sectors ○ Primary care • Healthcare providers ○ Physicians ○ Generalists	The scoping review found that the application of machine learning to automate administrative tasks in general practice primarily focuses on scheduling tasks using supervised learning methods, with limited general practitioner involvement (9) • General practice issues include appointment scheduling, teleconsultation, care management, communication, healthcare recommender systems, EMR interaction, and resource management, with appointment scheduling being the most common problem • Administrative tasks in general practice primarily focus on scheduling, including predicting missed appointments, reducing no-shows, and improving scheduling based on patient needs, with other tasks involving teleconsultation support, disease management, communication, and data entry, most of which are considered fully automatable • Machine learning methods in administrative tasks varied, with most studies using supervised learning (mainly regression), and evaluations commonly relying on traditional metrics like accuracy and precision	No	2 of 9	20 April 2022	No	Not reported

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Primary care
  ○ Specialty care
• Outcomes
  ○ Provider experiences
• Accuracy of outputs
	The scoping review found that while the digital scribe field is in its early stages, promising results have been achieved using context-sensitive word embeddings and attention-based neural networks (10)
	• All studies on automatic speech recognition (ASR) used physician-patient dialogs, with non-clinically trained systems achieving word error rates (WERs) up to 65%, while systems trained on clinical conversations had WERs as low as 18%
	• The NLP tasks performed were categorized into three types: entity extraction, classification, and summarization
	• Although the digital scribe field is still emerging, the techniques presented show promising results, with the most promising models using context-sensitive word embeddings combined with attention-based neural networks
		No	3 of 9	25 December 2020	No	Not reported

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
• Sectors
  ○ Specialty care
  ▪ Emergency care
• Healthcare providers
  ○ Nurses
• Outcomes
  ○ Provider experiences
• Accuracy of outputs
	The systematic review found that triage nurses in the emergency department can utilize artificial intelligence as a supportive tool to aid in the triage process (11)
	• Most studies applied machine learning to triage, with only one using fuzzy logic, and all but one study employed a five-level triage classification system
	• In terms of model performance, the feed-forward neural network achieved 33% precision in level 1 classification, while the fuzzy clip model achieved 99% specificity and sensitivity
	• Triage prediction showed accuracy between 80.5% and 99.1%
	• Five studies examined triage reliability and outcomes, with findings including a kappa coefficient of 78.13% for the Naive Bayes model, AI reducing triage time by 27 seconds but with incomplete documentation, overtriage and undertriage rates, and factors like arrival mode, age, and vital signs influencing mistriage, as well as the relationship between urgency classification and patient treatment outcomes
		No	6 of 9	18 April 2023	No	Not reported

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
  ○ Scribing and documentation tools
  ○ Communication supports
  ○ Prior authorization supports
  ○ Patient-discharge supports
• Healthcare providers
  ○ Physicians
  ▪ Generalists
  ▪ Specialists
	Integrating AI in healthcare spaces has ethical barriers, technological barriers, liability and regulatory barriers, workforce barriers, patient safety concerns, and social barriers (12)
	• Identified ethical barriers include privacy, data ownership, and consent to use and store data; lack of trust from providers stemming from lack of training or understanding of AI technology; and conflicts of interest for providers who are involved in AI development
	• Technological barriers were related to data quality, accuracy, and dataset size, in addition to questions of variability in interpretations of data from experts, leading to potential embedded biases in the AI; practical technological concerns related to interoperability, usability, integration into workflow, data security, and infrastructure were also identified
	• Liability and regulatory barriers include establishing a process of accountability for outcomes of decisions provided by AI; additionally, regulation that aims to protect commissioners and patients can be a barrier for developers and innovators
		No	3 of 9	2021	No	Not reported

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations
○ Nurses • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers ○ Patient-level barriers	• Workforce barriers include training for clinicians, willingness to engage, fears of job displacement, funding limitations, and time required for training and implementation of the AI technology • Patient safety concerns include distributional shift (i.e., lack of reliability in recognizing changes from curated datasets to the complexity of real clinical environments), automation bias (i.e., physician complacency with AI decisions), and AI algorithms that develop to provide the best short-term results rather than long-term patient benefits • Social barriers include the underrepresentation of demographic groups in the training of an AI model leading to reduced accuracy when treating these patients, unequal access to AI-augmented healthcare, and lack of social acceptance from patients					
• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools ○ Communication supports • Sectors ○ Primary care ○ Specialty care ○ Public health • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Health outcomes ▪ Costs • Barriers to adoption and scaling up ○ System-level barriers	Artificial intelligence in healthcare has the potential to reduce administrative burdens (e.g., by assisting with documentation and diagnostic screening) and improve patient care (e.g., through more accurate diagnoses and better clinical decision-making) (13) • Key barriers to AI adoption include concerns about data privacy (e.g., the protection of patient data), the need for better physician understanding and training (e.g., integration of AI into clinical workflows), and a lack of robust evidence proving AI's effectiveness in real-world healthcare settings	No	1 of 9	Not reported	No	• Occupation • Education

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations
○ Organizational-level barriers ○ Provider-level barriers ○ Patient-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Organizational-level facilitators ○ Provider-level facilitators ○ Patient-level facilitators						
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools ○ Communication supports • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Organizational-level facilitators ○ Provider-level facilitators	Digital scribes (i.e., AI-powered systems that automatically transcribe physician-patient conversations) reduce administrative burden, improve documentation accuracy (e.g., by capturing more detailed and reliable records), and free up more time for patient care (i.e., allowing providers to focus more on direct interactions with patients) (14) • Despite challenges such as technical limitations (i.e., issues with medical language complexity) and concerns about data privacy (e.g., the need for secure handling of patient information), digital scribes have the potential to improve overall healthcare efficiency and provider satisfaction	No	5 of 9	November 2022	No	• Race/ ethnicity • Gender/sex • Occupation • Education • Socio-economic status • Social capital
• Types of AI tools for reducing administrative burden	AI translation tools are being used in healthcare to improve communication and reduce administrative burdens (e.g., aiding in patient discharge instructions and medical documentation), while facing challenges related to accuracy (i.e., limitations	No	6 of 10	July 2024	No	• Place of residence

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations
○ Scribing and documentation tools ○ Communication supports ○ Patient-discharge supports • Sectors ○ Specialty care ▪ Emergency care ○ Public health • Settings ○ Rural/remote communities (vs. urban communities) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Health outcomes ▪ Costs • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Organizational-level facilitators ○ Provider-level facilitators ○ Patient-level facilitators	in translating complex medical language) and adoption (e.g., concerns from clinicians about reliability and respect) (15) • Clinicians show reluctance to fully rely on AI tools due to concerns about trust, respect, and the quality of translations (e.g., fears of miscommunication in high-stakes settings), preferring human interpreters for more detailed or emotionally charged discussions					• Race/ ethnicity • Occupation

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
  ○ Scribing and documentation tools
• Sectors
  ○ Primary care
  ○ Specialty care
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Time available for patient care
• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
• Barriers to adoption and scaling up
  ○ System-level barriers
  ○ Organizational-level barriers
  ○ Provider-level barriers
  ○ Patient-level barriers
• Facilitators of adoption and scaling up
  ○ System-level facilitators
  ○ Organizational-level facilitators
  ○ Provider-level facilitators
  ○ Patient-level facilitators
	AI tools reduce administrative burdens in healthcare (e.g., scribing, documentation, and patient scheduling), improve patient care by enhancing efficiency and decision-making (i.e., better diagnosis and treatment), and face adoption barriers (e.g., resistance to change, high costs, and integration challenges with existing systems like electronic health records), with facilitators like interdisciplinary collaboration and training for healthcare providers (16)
	• Facilitators for successful AI adoption include training programs for healthcare providers (e.g., helping nurse managers manage AI applications), interdisciplinary collaboration (e.g., AI developers working with nurse managers), and coordinated efforts from policymakers and researchers to support AI integration
		No	8 of 10	April 2024	No	• Occupation
						• Education

• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports	AI tools in nursing, such as process automation and predictive models, reduce administrative burden (e.g., optimizing scheduling and documentation), improve patient care (e.g., early detection through monitoring systems), help prevent burnout, and address ethical challenges (e.g., data privacy risks and clinician apprehension) (17)	No	9 of 10	November 2024	No	• Place of residence • Occupation • Education

Dimension of organizing framework	Declarative title and key findings	Living status	Quality (AMSTAR)	Last year literature searched	Avail-ability of GRADE profile	Equity considerations
○ Scribing and documentation tools • Sectors ○ Home and community care ○ Specialty care ▪ Emergency care ○ Rehabilitation care • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Health outcomes ▪ Costs • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Organizational-level facilitators ○ Provider-level facilitators	• Ethical concerns (e.g., data privacy risks and the potential for over-reliance on AI) pose challenges to widespread adoption, requiring clear guidelines and interdisciplinary collaboration (i.e., partnerships between nurses, data scientists, ethicists, and IT professionals)					

Appendix 3: Detailed data extractions from single studies about AI tools for reducing administrative burden among front-line healthcare providers

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
• Settings
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
• Barriers to adoption and scaling up
  ○ Organizational-level barriers
  ○ Provider-level barriers
	An initial assessment of the Pragmatic Trial Operations (PTOps) playbook to support the integration of artificial intelligence (AI) into electronic health records found that the weighted median of average provider utilization of the AI system was 65.4%, and that diagnostic entries were similar to pre-intervention levels after addressing some initial workflow issues that caused discrepancies (18)
	• To evaluate the impact of a playbook on the uptake of an AI program used to improve clinical note generation and provider burden, difference-in-differences analyses were used to assess utilization, accuracy, work outside of work, and time in notes
	• The alpha phase initially experienced workflow issues that led to discrepancies between International Classification of Diseases-10 (ICD-10) diagnosis entries compared to note content, which reduced accuracy from 79% to 35% ($p > 0.01$)
	• After addressing these issues with a new note template and provider training, accuracy issues were fully resolved
	• Difference-in-differences analyses did not detect significant changes in work outside of work or time in notes after implementing a new note template and provider training
		High	Publication date: 2024
			
			Jurisdiction studied: United States
			
			Methods: Quasi-experimental study using difference-in-differences
				None identified

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
  ○ Scribing and documentation tools
  ○ Communication supports
• Sectors
  ○ Specialty care
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
	A pre-post study on an ambient artificial intelligence documentation platform found that physicians' across specialties perceived their efficiency and overall experience as having improved following implementation (19)
	• The study aimed to evaluate the impact of an ambient AI documentation platform (Abridge) on documentation burden, after-hours work, burnout risk and job satisfaction
	• Response rate for pre-implementation was 51.9% and response rate for post-intervention was 74.4%
	• Ease of documentation workflow (OR = 6.91, 95% CI: 3.90–12.56, $p < .001$) and completing notes associated with the usage of the AI too (OR = 4.95, 95% CI: 2.87–8.69, $p < .001$) were improved significantly after implementation of the ambient AI tool
		High	Publication date: 2025
			
			Jurisdiction studied: United States
			
			Methods: Pre-post-study
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	• Physicians also reported decreased documentation burden, time spent documenting outside clinical hours, and risk of burnout due to documentation • It also increased perceived satisfaction at work • Although the study's findings are promising the lack of validated measures and short-term evaluation times limit the overall certainty of the findings, highlighting the need for additional research			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
  ▪ Inpatient specialty care
• Settings
  ○ Rural/remote communities (vs. urban communities)
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
	Using a structured template for surgical note writing, ChatGPT-4 was found to be just as accurate (4.44 vs. 4.33, $p = 0.512$) and organized (4.54 vs. 4.24, $p = 0.064$) as surgeons' notes, but was less comprehensive (3.73 vs. 4.42, $p < 0.0001$), highlighting the potential of large language models to increase the efficiency of neurosurgical documentation (20)
	• 144 surveys with notes prepared by either surgeons or AI were assessed by three surgeons to evaluate the accuracy, comprehensiveness, and organization on a 5-point scale
	• The readability of the notes, evaluated through Flesch-Kincaid Grade Level (FKGL) and Flesch Reading Ease (FRE) scores, identified that AI notes tended to use more complex language
	• Results are likely to vary to some extent across specialties
	• The study highlights that large language models have the potential to help increase the efficiency of neurosurgical notes by providing at minimum a starting point for notes in less than a minute, whereas another study found that surgeon's notes take on Yuval average over seven minutes to complete
		High	Publication date: 2024
			
			Jurisdiction studied: United States
			
			Methods: Comparative evaluation study
				None identified

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
  ▪ Emergency care
• Outcomes
  ○ Provider experiences
	For more intricate clinical documentation tasks, ChatGPT-4 helped clinicians achieve a 40% reduction in time and 33% reduction in effort for supervisory notes, while no change was found in simpler notes (21)
	• The study used a comparative analysis of clinical documentation in paediatric emergency medicine with and without assistance of ChatGPT-4 across four clinical scenarios with different levels of complexity
		High	Publication date: 2024
			
			Jurisdiction studied: United States
			
			Methods: Mixed methods with comparative evaluation and thematic analysis
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs • Barriers to adoption and scaling up o Provider-level barriers	• ChatGPT summaries were scored 7.6/10 for completeness, 8.6/10 for accuracy, 8.2/10 for efficiency, and 8.7/10 for readability • Participants had some concerns that included the absence of important negatives in the history of present illness and physical examination, the use of nonspecific action plans, infusing ChatGPT's interpretation into the text without being explicit, and odd wording choices at times • ChatGPT also occasionally omitted important details, highlighting the need for clinicians to validate ChatGPT produced documentation • Overall, clinicians were satisfied and expressed interest in adopting ChatGPT in their clinical practice			
• Types of AI tools for reducing administrative burden o Scribing and documentation tools • Outcomes o Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Facilitators of adoption and scaling up o Provider-level facilitators	In this before-and-after study the integration of a large language model based on ChatGPT was found to save 23.3% (CI 95%: 13.8%–32.8%) of time spent on Pharmacovigilance documentation (22) • The study tested whether a large language model (MyGenAssist) based on ChatGPT could improve Pharmacovigilance documentation processes, and found a reduction of about five minutes (22.25 minutes versus 16.97 minutes) per case • Implementation only required two-hour training of the Pharmacovigilance Team, with no major difficulties identified, and could potentially save an average of 10.7 working days (eight hours) each year	High	Publication date: 2024 Jurisdiction studied: United States Methods: Before-and-after study using multiple linear regression	None identified
• Types of AI tools for reducing administrative burden o Scribing and documentation tools • Sectors o Primary care • Settings o Academic- or research-oriented care settings (vs. community settings) • Outcomes o Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care	A qualitative evaluation found that most primary care physicians found that a generative AI-facilitated clinical documentation tool reduced time spent documenting and anxieties about retaining important clinical details, allowing physicians to be more engaged during patient appointments (23) • The study evaluated physician's experiences with a generative AI clinical documentation tool (DAX Copilot – DAXC) in a multi-setting academic learning health system • The tool has the potential to mitigate administrative burden, and involves beginning a recording after obtaining verbal consent from the patient and generating a preliminary clinical note after the visit that	High	Publication date: 2024 Jurisdiction studied: United States Methods: Qualitative evaluation using semi-structured interviews	

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Accuracy of outputs
• Barriers to adoption and scaling up
  ○ Provider-level barriers
  ○ Patient-level barriers
	can then be finalized on the electronic heath record (EHR) or via the physician's mobile phone
	• Physicians differed in perceptions about which types of clinical encounters the tool was most useful for
	• Given DAXC's difficulty dictating notes in chronological order, physicians often found they often had to reorganize notes chronologically instead of the order described in the patient's narrative
	• Physicians reported concerns related to 1) that DAXC transcripts could sometimes include errors, 2) that implementing DAXC might mean they would be asked to increase patient volume, and 3) that the notes could sometimes be overwhelming
	• DAXC reduced the time spent on clinical documentation for most physicians, alleviating cognitive burden and improving engagement during patient encounters
	• The technology allowed for more personable provider-patient interactions but had limitations such as errors in patient details and inappropriate diagnoses			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
  ▪ Inpatient specialty care
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
• Barriers to adoption and scaling up
  ○ Provider-level barriers
• Facilitators of adoption and scaling up
  ○ Provider-level facilitators
	An open-source AI model for radiotherapy image segmentation (OSAIRIS) was found to provide significant time savings for prostate and head and neck contouring, and demonstrated industry-leading accuracy, highlighting potential to reduce administrative burden in clinical practice despite the need to address potential bias (24)
	• Compared to manual approaches, OSAIRIS was found to save an average of 5.4 minutes (95% CI: +/– 2.1) on prostate contouring, representing 36% of the total time spent segmenting contours
	• OSAIRIS-assisted head and neck contouring saved an average of 30.3 minutes (95% CI: +/– 8.7), representing 67% of the time spent segmenting contours
	• Compared time to manually segment the contours versus the time to edit contours generated by OSAIRIS
	• Comparing OSAIRIS with a senior radiation oncologist using geometric scoring found that OSAIRIS outperforms other state-of-the-art systems at 0.88 for prostate and 0.94 for head and neck
		High	Publication date: 2025
			
			Jurisdiction studied: United Kingdom
			
			Methods: Comparative evaluation
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	• These results demonstrate a small non statistically significant increase in accuracy for prostate segmenting and a large statistically significant improvement for head and neck segmenting • Despite clinicians checking outputs from OSAIRIS and editing where necessary, judgments and decisions may have had potential bias introduced due to clinicians trusting the AI system (anchor bias) • This potential bias was mitigated by clinicians with varying rates of success across disciplines, highlighting the need to implement AI systems with caution and with proper training			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
  ▪ Outpatient specialty care
• Healthcare providers
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Time available for patient care
• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
  ▪ Health outcomes
	Ambient scribing can reduce mental effort and time needed for documentation, leading to better provider and patient satisfaction; however, accuracy verification is needed (25)
	• This study aimed to investigate the association between ambient scribing and perceived burden of clinical documentation
	• A total of 46 clinicians from 17 different specialists in an outpatient setting were surveyed
	• Clinicians completed both a pre and post questionnaire
	• Participants were trained to use the ambient scribe tool named DAX copilot, a flexible mobile application with an audio recording feature
	• The application produces interpretations of the conversation and was able to segment the conversation in categories of patient history, physical assessment, and future treatment plans
	• The average time to produce a report was less than a minute
	• The use of ambient scribing tool was associated with 20.4% less time needed for documentation in outpatient settings, leading to an overall of 30% less after-hours' time needed for work
	• Generally, participants found the tool easy to use, with a score of 74/100
	• Appointment closure rate was 9.3% greater compared to baseline
	• The percentage of clinical documentation completed by the physician was 29% lower compared to baseline
		High	Publication date: 19 February 2025
			
			Jurisdiction studied: United States
			
			Methods: Prospective study
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	• The use of the tool was associated with less distraction and mental overload • Qualitatively participants reported greater efficiency, less time spent on documentation, and better patient engagement • Participants noted that the tool did not eliminate documentation burden, but decreased the mental effort needed • Mixed feedback was seen regarding the length and quality of documents, and participants noted that editing and proofreading was needed			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Healthcare providers
• Settings
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Time available for patient care
	Ambient listening tool is associated with increased productivity and provider satisfaction on clinical documentation in an urban academic medical institution (26)
	• The purpose of this study was to examine the impact of an ambient listening tool on clinician documentation in an urban academic medical institution
	• A total of 117 clinicians participated in this study and 55 completed the post survey
	• Approximately 71% of participants felt that the tool met their documentation needs, and 48% felt that it was easy to use
	• The type and name of ambient listening tool was not specified
	• Negative impacts of documentation on well-being decreased from 71 to 38%
	• Participants generally reported satisfied experiences with the tool, with 35% likely to recommend it to a peer, 58% stated that it increased their productivity, and 29% attended to use it for the majority of notes
		High	Publication date: October 2024
			
			Jurisdiction studied: United States
			
			Methods: Survey
				None identified

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
• Healthcare providers
  ○ Physicians
  ▪ Specialists
  ○ Nurses
	Generative AI can produce discharge summaries similar in quality to psychiatrists, but with less time and greater conciseness, in a psychiatric clinic (27)
	• This study explored the use of AI in generating discharge summaries in a psychiatric clinic
	• The authors generated two fictional patients using clinical experience, medical history, and treatment outcomes
		Medium	Publication date: May 2025
			
			Jurisdiction studied: United States
			
			Methods: Exploratory
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Settings
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ○ Time available for patient care
• Accuracy of outputs
	○ A total of three physicians and three psychotherapists were given the document summaries of the fictional patients and asked to generate discharge reports
	○ ChatGPT-4 was also asked to generate a discharge report
	○ All reports were coded and evaluated by four physicians, on a scale of one to three, who were not aware of the purpose of the study
	○ The evaluation criteria focused on clarity and conciseness of writing, flow, coherence, structure, completeness, accuracy, and time taken to prepare report
	• The highest-ranking summary was completed by a psychologist, followed by the AI-generated report (4-point difference)
	• The AI-generated report was faster and more concise, but lacked emotion			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
  ▪ Outpatient specialty care
• Healthcare providers
  ○ Physicians
  ▪ Specialists
• Outcomes
  ○ Provide experiences
  ▪ Time available for patient care
• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
	An AI scribing platform was associated with better treatment attendance, greater symptom reduction, and overall patient satisfaction in patients in an outpatient therapy for depressive or anxiety disorder (28)
	• This study determined the feasibility, acceptability, and efficacy of an AI platform for clinical outcomes in outpatient therapy
	• A total of 47 participants in an outpatient clinic for depressive or anxiety disorder were included in this study
	• The use of the AI platform was to summarize and transcribe therapy sessions, provide feedback on evidence-based practices, and integrate data with standardized questionnaires
	• The comparison group was usual care
	• Participants in the AI session were 67% more likely to attend their healthcare sessions and showed greater symptom reduction
	• Participants in both groups were satisfied with their treatments
	• Depression symptoms were reduced by 34% with Eleos, compared to 20% for TAU, and anxiety
		High	Publication date: 10 July 2023
			
			Jurisdiction studied: United States
			
			Methods: Exploratory
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	symptoms were reduced by 29% with Eleos, compared to 8% for TAU • Participants in the AI group attended 67% more sessions than those in TAU, and therapists submitted progress notes 55 hours earlier on average			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
  ▪ Emergency care
• Healthcare providers
  ○ Physicians
  ▪ Generalists
  ▪ Specialists
  ○ Nurses
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Time available for patient care
• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
	Digital tools documentation and synthesizing patient history led to better communication, patient-clinician rapport, and decreased time; however, some physicians did not believe it would be useful for all specialities (29)
	• The purpose of this study was to explore the association of a digital tool with rapport building, documentation, and time efficiency, in an emergency department setting
	• The tool has two components: a patient and healthcare professional facing component
	  ○ Patient facing for patients in the waiting room to document their history
	  ○ Healthcare professional facing to display assessment to emergency department staff in an accessible and efficient way
	• A total of 81 participants completed this survey, including patients, physicians, and nurses
	• Patients reported positive comments on the engagement of the tool, its comprehension, usability, and rapport with healthcare professionals
	• Nurses also had positive reports with improved understanding, patient rapport, helpfulness of medical information, and time saving, and all stated they would recommend to their peers
	• Some physicians found the tool helpful, but only for certain specialities, such as surgery
		High	Publication date: 7 February 2022
			
			Jurisdiction studied: United States
			
			Methods: Exploratory
				None identified

• Types of AI tools for reducing administrative burden
  ○ Prior authorization supports
  ○ Communication supports
• Sectors
  ○ Specialty care
  ▪ Inpatient specialty care
• Healthcare providers
  ○ Physicians
	A qualitative study indicated a significant opportunity to use robotic systems to perform noncomplex tasks in intensive care units (ICUs), thereby potentially improving efficiency and reducing staff burden (30)
	• A total of 78 distinct tasks were identified as potentially suitable for robotic assistance, with 50 tasks related to direct patient care (e.g., repositioning patients, assisting with procedures), 19 tasks focused on indirect patient care (e.g., delivering supplies, cleaning), six tasks involving administrative duties (e.g., answering
		Medium	Publication date: 28 March 2025
			
			Jurisdiction studied: United States
			
			Methods: Qualitative study
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
▪ Specialists ○ Nurses • Outcomes ○ Provider experiences ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Health outcomes • Barriers to adoption and scaling up ○ Patient-level barriers	call lights), and three tasks classified as a combination of direct and indirect care (e.g., sitting with a patient to provide comfort) • Most participants supported automating routine, non-critical tasks (e.g., responding to nurse calls and measuring glucose levels) as a means to reduce workload and improve efficiency, while high-complexity tasks requiring clinical judgment (e.g., adjusting ventilator settings) were considered unsuitable for full automation • Ethical and safety concerns about using robots in ICU care include ensuring patient privacy and security, maintaining human judgment in direct care, addressing potential technology access disparities, and preserving human connection to prevent emotional isolation			
• Sectors ○ Specialty care ▪ Outpatient specialty care ○ Public health • Settings ○ Academic- or research-oriented care settings (vs. community settings) • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers • Facilitators of adoption and scaling up ○ Provider-level facilitators ○ Patient-level facilitators	A survey of dental professionals across India on AI use in dental practice revealed that technical concerns were the most significant perceived barrier to AI adoption, while perceived utility and ease of use were the most significant factors affecting AI adoption decisions (31) • The study aimed to assess familiarity with AI tools among dental professionals, as well as their perceived barriers, attitudes, and usage patterns influencing decisions to adopt AI • Dental professionals were recruited from different geographical areas and practice settings, including public health clinics, private practice, and academic institutions • Among the perceived barriers to AI adoption, technical concerns were more significant than financial considerations, ethical and legal issues, and organizational and cultural factors • The extent of AI use varied, with more professionals reporting AI use in diagnostic and administrative support, and less in planning treatments and managing patients • Among the factors influencing AI adoption, regression analysis found “perceived utility” and “ease of use” to be statistically significant, while “compatibility with workflows,” “peer influence,” “training and support,” and “patient acceptance” were not statistically significant	High	Publication date: February 2024 Jurisdiction studied: Pan-India Methods: Cross-sectional study	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
  ○ Scribing and documentation tools
  ○ Communication supports
  ○ Prior authorization supports
  ○ Patient-discharge supports
• Sectors
  ○ Primary care
  ○ Specialty care
  ▪ Emergency care
  ▪ Outpatient specialty care
  ▪ Inpatient specialty care
• Healthcare providers
  ○ Nurses
• Settings
  ○ Rural/remote communities (vs. urban communities)
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
  ▪ Health outcomes
• Barriers to adoption and scaling up
  ○ System-level barriers
  ○ Organizational-level barriers
  ○ Provider-level barriers
  ○ Patient-level barriers
• Facilitators of adoption and scaling up
  ○ System-level facilitators
  ○ Organizational-level facilitators
  ○ Provider-level facilitators
	Nurses identify key barriers (lack of understanding, technical infrastructure), and facilitators (training and timing) to implementing AI in healthcare environments (32)
	• Barriers to implementing AI identified by nurses include lack of understanding of AI technologies, concerns of AI bias impacting decision-making, and technical challenges including a stable network, computer infrastructure, and additional training for nurses
	• Nurses expressed the importance of adequate training and optimal timing for smooth implementation of AI tools
	• Nurses expressed different attitudes toward the potential for adoption of AI in healthcare ranging from optimism regarding improved workflow, efficiency, and patient outcomes, to fear of losing patient-provider connections and human care
	• Younger nurses and nurses who were less resistant to change were significantly more likely to express positive attitudes towards AI in healthcare
		Medium	Publication date: 2025
			
			Jurisdiction studied: Alexandria, Cairo, and Aswan in Egypt
			
			Methods: Mixed methods involving semi-structured interviews and a cross-sectional survey
				None identified

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
  ○ Scribing and documentation tools
	Clinicians involved in multidisciplinary teams supporting breast cancer treatment expressed optimism regarding the potential for clinical decision support systems to increase	High	Publication date: 2024
			
			Jurisdiction studied: Netherlands
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
○ Communication supports • Sectors ○ Specialty care ▪ Outpatient specialty care ▪ Inpatient specialty care • Healthcare providers ○ Physicians ▪ Generalists ▪ Specialists ○ Nurses • Settings ○ Rural/remote communities (vs. urban communities) ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Health outcomes • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers ○ Patient-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Organizational-level facilitators ○ Provider-level facilitators ○ Patient-level facilitators	efficiency and streamline current workflow, though they cautioned against several potential drawbacks (33) • The main benefit of clinical decision support systems (CDSSs) identified by clinicians is the time-saving ability to streamline tedious tasks in current workflow • Providers identified multiple ways that CDSS can be useful in streamlining their workflow in multidisciplinary team meetings (MDTMs) including: ○ supporting the time-consuming task of preparing patient information for MDTMs ○ facilitating efficient discussions by providing a clear, integrated, visual overview ○ simplifying gathering patient information from multiple departments and electronic medical records ○ simplifying clinical trial matching ○ supporting clinical decision making by comparing individual patient data to clinical guidelines • Providers identified potential drawbacks to implementing CDSSs including: ○ potentially inaccurate or unreliable information ○ workflow disruptions as providers switch between multiple electronic programs ○ lack of flexibility outside of established guidelines to support individual patient needs ○ clinicians becoming too reliant on CDSS technology ○ potential impacts of privacy laws • Providers additionally expressed the importance of being included in CDSS development to ensure functionality in clinical practice		Methods: Qualitative, semi-structured interviews	
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Sectors ○ Specialty care ▪ Emergency care ▪ Outpatient specialty care ▪ Inpatient specialty care • Healthcare providers	The majority of physicians and physician trainees examining surgical reports for functional endoscopic sinus surgery created by a natural language processing tool estimated the tool would reduce workload and have time-saving benefits (34) • Physician and physician trainee participants provided an average of 23.25 corrections to functional endoscopic sinus surgery reports made by a natural	High	Publication date: 2023 Jurisdiction studied: Germany Methods: Development and evaluation (using a questionnaire) of a natural language processing tool in a clinical setting	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
○ Physicians ▪ Specialists • Settings ○ Rural/remote communities (vs. urban communities) ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Accuracy of outputs	language processing (NLP) tool before they were considered adequate • 66.67% of participants estimated using the NLP to make surgical reports would save 30 to 60 minutes of time each day; 61.11% estimated 16–30 minutes saved; 27.78% estimated 1–15 minutes saved; 5.56% estimated 31–45 minutes saved • 61.11% of participants stated they expected a workload to be reduced when using the NLP surgical report tool • 66.66% of participants expected to see clinical benefits when using the NLP surgical report tool • 33.33% of participants found the NLP-generated reports (with physician corrections) to be similar to conventionally generated reports in content • 27.78% of participants found the NLP-generated reports (with physician corrections) were similar in form to conventionally generated reports • 11.11% of participants strongly agreed, and 55.56% agreed, that they would use this tool in the future			
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Sectors ○ Specialty care ▪ Emergency care ▪ Outpatient specialty care ▪ Inpatient specialty care • Healthcare providers ○ Physicians ▪ Specialists • Settings ○ Rural/remote communities (vs. urban communities) ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Accuracy of outputs	Pediatric ENT physicians reported an average satisfaction of 4.64 out of 5 when using an AI speech recognition technology, though timeliness received a score of 4 out of 5 (35) • An AI speech recognition technology (Speaknosis) was evaluated for the purpose of medical documentation among paediatric ENTs • Semantic relevance and accuracy of Speaknosis reports was given a score of 96.50% • Physicians reported an average satisfaction of 4.64 on a 5-point Likert scale, with satisfaction increasing with the amount of time spent using the Speaknosis technology • Instances of error (omissions, introducing non-existent conditions, formatting errors) demonstrate the need for continued human oversight in refining the Speaknosis technology • Timeliness of the technology received a mean score of 4 out of 5 using the Physician Document Quality Instrument (PDQI-9)	High	Publication date: 2025 Jurisdiction studied: Spain Methods: Quasi-experimental design	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Barriers to adoption and scaling up
  ○ System-level barriers
  ○ Organizational-level barriers
  ○ Provider-level barriers				

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Primary care
  ○ Specialty care
  ▪ Emergency care
  ▪ Outpatient specialty care
  ▪ Inpatient specialty care
• Healthcare providers
  ○ Physicians
  ▪ Generalists
  ▪ Specialists
• Settings
  ○ Rural/remote communities (vs. urban communities)
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
	The DAX Copilot ambient AI scribe tool was rated favourably by physicians and produced time saving effects when embedded into the electronic health record (36)
	• DAX Copilot ambient AI scribe was embedded
	• A statistically significant reduction in the physician task-load and burnout scores was observed after a three-month trial with the DAX Copilot tool
	• The usability of the DAX Copilot tool was found to be a moderate statistically significant improvement over current clinical documentation tools
	• Physicians expressed increased positive perceptions of the DAX Copilot's ease of use and the level of training they received after the three-month trial
	• Physicians reported improved efficiency in documentation tasks (65%), quality of records (52%), and user-friendliness (98%) with the DAX Copilot tool
	• Physicians reported often using the DAX Copilot tool in their practice (65%) and that they would use it long-term (78%)
	• An estimated 20 minutes/half day was saved when using the DAX Copilot tool in clinical practice
		High	Publication date: 2025
			
			Jurisdiction studied: Northern California, United States
			
			Methods: Prospective quality improvement study
				None identified

• Types of AI tools for reducing administrative burden
  ○ Communication supports
• Sectors
  ○ Specialty care
  ▪ Emergency care
  ▪ Outpatient specialty care
  ▪ Inpatient specialty care
• Healthcare providers
  ○ Physicians
  ▪ Generalists
  ▪ Specialists
  ○ Nurses
  ○ Pharmacists
  ○ Allied health professionals
	Non-ophthalmologist health professionals receiving standard ophthalmology communication notes positively rated AI-generated plain language summaries for increased understanding and clearer guidance regarding the patient's ophthalmological condition (37)
	• Non-ophthalmologist health professionals receiving standard ophthalmology notes (SONs) with AI-generated plain language summaries (PLSs) versus those receiving SONs without the PLS were 9% more likely to report that the SON increased their understanding of the patient's diagnosis, 21.5% more likely to say they were happy with the level of detail, 12.1% more likely to be happy with the conciseness of the SON, and 23% more likely to report that the SON clearly explained the patient's condition
		High	Publication date: 2025
			
			Jurisdiction studied: Rochester, Minnesota, United States
			
			Methods: Randomized quality improvement study
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Settings
  ○ Rural/remote communities (vs. urban communities)
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
• Accuracy of outputs
	• Among non-ophthalmological health professionals receiving SONs with an AI-generated PLS 85% reported that the PLS gave clearer guidance than the SON with no PLS, 88% found the SON with the PLS easier to understand, and 85% reported that they preferred the SON with the PLS overall
	• Compared to those receiving standard SONs, non-ophthalmologist health professionals receiving SONs with the PLS who reported a lower baseline comfort with ophthalmology notes were more likely to approve of the clarity of the notes, have increased understanding of unfamiliar terms, and strongly prefer the PLS with the SON
	• 75.5% of ophthalmologists were very satisfied with the PLS, the majority reported that PLSs were reflective of the SON content, and 63.2% found reviewing the PLSs was no added burden
	• Prior to editing, 4% of PLSs were missing information and 26% contained incorrect information; most ophthalmologists reported these to have no risk of harm, but only 42.1% said the errors had no clinical significance			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Primary care
  ○ Specialty care
  ▪ Emergency care
  ▪ Outpatient specialty care
  ▪ Inpatient specialty care
• Healthcare providers
  ○ Physicians
  ▪ Specialists
• Settings
  ○ Rural/remote communities (vs. urban communities)
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
	Medical students reported positive aspects of using Autoscriber software to automatically summarize patient encounters, though improvements are still necessary (38)
	• The median time medical students spent manually summarizing a patient consultation was 202 seconds, while the median time spent editing summaries automatically generated by the Autoscriber software was 152 seconds
	• Overall, medical students had positive experiences using Autoscriber and reported the technology was easy to use, interesting, and had potential for use
	• Some students reported negative experiences with Autoscriber due to the number of errors and the time spent waiting for technology to load
	• 12 out of 18 students reported that they would use Autoscriber in their work
		High	Publication date: 2024
			
			Jurisdiction studied: Netherlands
			
			Methods: Quasi-experimental usability study
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
▪ Time spent on administrative tasks (e.g., documentation) • Accuracy of outputs				
• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools ○ Communication supports ○ Prior authorization supports ○ Patient-discharge supports • Sectors ○ Primary care • Healthcare providers ○ Physicians ▪ Generalists ○ Nurses ○ Pharmacists ○ Allied health professionals • Settings ○ Rural/remote communities (vs. urban communities) ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Health outcomes • Barriers to adoption and scaling up ○ Provider-level barriers	Healthcare professionals expressed mixed views towards a natural language processing tool that could automate clinical documentation with some professionals viewing it as a potentially useful tool, while other expressed concerns about negative impacts on clinical skills and physicians' ability to critically reflect on patient interactions (39)	Medium	Publication date: 2020 Jurisdiction studied: England Methods: Mixed methods design	None identified
• Types of AI tools for reducing administrative burden ○ Communication supports ○ Patient-discharge supports • Sectors ○ Primary care ○ Specialty care ▪ Outpatient specialty care ▪ Inpatient specialty care	Discharge summaries from an inpatient Infectious Diseases service written by ChatGPT 3.5 performed well in summarizing patient demographics and medical history, describing patient medical issues during hospitalization, and communicating follow-up plans after patient discharge (40)	Medium	Publication date: 2025 Jurisdiction studied: Singapore Methods: Quasi-experimental design	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations

• Healthcare providers
  ○ Physicians
  ▪ Generalists
  ▪ Specialists
• Settings
  ○ Rural/remote communities (vs. urban communities)
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Health outcomes				

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Primary care
• Healthcare providers
  ○ Physicians
  ▪ Generalists
• Settings
  ○ Rural/remote communities (vs. urban communities)
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
  ○ Other equity-centred quadruple aim metrics
  ▪ Patient experience
  ▪ Health outcomes
• Barriers to adoption and scaling up
  ○ System-level barriers
  ○ Organizational-level barriers
	AI offers many opportunities to support general practitioners, particularly in administrative work, but must preserve professional autonomy and employ a bottom-up approach to development (41)
	• In considering the potential impact of AI in healthcare, general practitioners (GPs) emphasized the importance of preserving professional autonomy in their ability to provide care in an individualized manner and expressed concerns regarding the authority of human GPs versus AI in a clinical scenario, as well as the potential for automation bias
	  ○ GPs emphasized bottom-up technology design and the importance of adapting AI to physician preferences, to preserve their autonomy
	• GPs expressed some concerns regarding potential bias within AI models, personal time they must invest in training the AI, limitations of AI systems (e.g., dealing with complex cases), the potential for AI to act as an auditing tool, and the potential of AI fully replacing human physicians
	• GPs identified desired features of AI systems including the ability to adapt to personal work styles, data security, recreating the writing experience, speech-based communication, and writing patient summary letters
		Medium	Publication date: 2020
			
			Jurisdiction studied: Australia
			
			Methods: Co-design workshops
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
○ Provider-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Organizational-level facilitators ○ Provider-level facilitators				
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Sectors ○ Primary care ○ Specialty care ▪ Outpatient specialty care • Healthcare providers ○ Physicians ▪ Generalists ▪ Specialists ○ Allied health professionals • Settings ○ Rural/remote communities (vs. urban communities) ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience • Barriers to adoption and scaling up ○ Provider-level barriers • Facilitators of adoption and scaling up ○ Provider-level facilitators ○ Patient-level facilitators	Introducing an AI tool to write clinical notes and letters during patient consultations had positive results including reducing perceived burden on clinicians and allowing clinicians to focus more on the patient interaction (42) • Clinical notes and letters written by AI and uploaded to the EHR following simulated consultations were scored higher in quality of documentation than those inputted into the EHR following standard practice • Consultations conducted with the assistance of the AI documentation tool were found to be significantly shorter • Clinicians stated the AI tool functioned well with multiple speakers, and appreciated the tool's ability to filter out irrelevant information from the conversation • Clinicians reported reduced computer disruption, increased ability to focus fully on their patients (100%), and an overall positive experience (94%) • Clinicians reported improvements in perceived workload, particularly in feeling less hurried during patient consultations • Parent actors in simulated paediatric consultation scenarios reported increased attention from the clinician with the use of the AI tool (87% vs. 75%) • AI-produced documentation achieved higher Sheffield Assessment Instrument for Letters (SAIL) scores, with consultations 26.3% shorter on average, without impacting patient interaction time • Clinicians expressed some concerns in regard to the potential for errors with the AI tool and recommended that the tool should be individualized to the need of each department for optimal performance • Though clinicians expressed initial hesitation to the AI tool, this decreased with exposure	High	Publication date: 2024 Jurisdiction studied: London, England Methods: Mixed methods	None identified
• Types of AI tools for reducing administrative burden	Clinicians reported that the Dragon Ambient eXperience (DAX) digital scribe tool improved the quality of patient	High	Publication date: 2024	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
○ Scribing and documentation tools • Sectors ○ Specialty care ▪ Outpatient specialty care • Healthcare providers ○ Physicians ▪ Specialists ○ Allied health professionals • Settings ○ Rural/remote communities (vs. urban communities) ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Costs	consultations while saving time and decreasing stress associated with documentation (43) • Clinicians using the DAX digital scribe tool reported positive experiences, with 83.3% reporting they would be "very disappointed" if the DAX tool was unavailable for future use, and that the tool "significantly improved" their patient encounters • Clinicians using DAX expressed satisfaction with the regards to time saved, decreased stress, and improved quality of patient interactions • Patients additionally reported positive experiences attending consultations where DAX was used • The DAX tool may offer some cost saving benefits compared to in-person scribes		Jurisdiction studied: Wisconsin, United States Methods: Mixed methods	
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Costs • Barriers to adoption and scaling up ○ Provider-level barriers • Facilitators of adoption and scaling up ○ Provider-level facilitators	The Gemini AI chatbot evaluated its ability to reduce administrative burden by generating accurate billing codes for patient encounters in a hand surgery clinic (e.g., assigning Current Procedural Terminology codes from medical documentation) (44) • The Gemini AI chatbot showed 68% overall agreement with the hand surgeon's billing recommendations (i.e., 68% of the time, the chatbot's CPT code matched the surgeon's) and a moderate interrater reliability (Cohen's kappa coefficient of 0.586) • The chatbot performed best for post-operative encounters (98% agreement) and least accurately for new patient visits (48% agreement) (e.g., the chatbot's agreement was highest for follow-up care and lowest for initial consultations) • The chatbot recommended higher billing levels than the surgeon 31 times and lower billing levels 10 times (i.e., suggesting more complex or less complex visits than the surgeon's assessment), with four wrong encounter	High	Publication date: 2024 Jurisdiction studied: United States Methods: Retrospective analysis	• Occupation

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	type codes (e.g., misclassifying a return visit as a new patient encounter)			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Home and community care
  ○ Primary care
  ○ Specialty care
  ▪ Inpatient specialty care
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
• Barriers to adoption and scaling up
  ○ Provider-level barriers
• Facilitators of adoption and scaling up
  ○ Provider-level facilitators
	A machine learning-based speech recognition system was implemented to reduce the documentation burden for nurses in a psychiatric ward (e.g., improving transcription accuracy from 87.06% to 95.07%) and enhance efficiency, allowing more time for patient care (45)
	• The system processed 30,112 words in 32,456 seconds (i.e., 0.928 words per second), showing similar speed to manual typing, with no significant difference in overall time spent on documentation (P > 0.05)
	• Barriers to adoption included voice recognition quality issues (e.g., unclear pronunciation, inconsistent speaking pace) and initial unfamiliarity with the system, but familiarity and pre-training led to improved accuracy and user comfort over time (e.g., recognition accuracy improved as nurses adapted to the system)
		High	Publication date: 2023
			
			Jurisdiction studied: Taiwan
			
			Methods: Pilot study design with pre- and post-intervention evaluations
				• Occupation

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Primary care
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
  ▪ Time available for patient care
• Barriers to adoption and scaling up
  ○ System-level barriers
  ○ Organizational-level barriers
  ○ Provider-level barriers
• Facilitators of adoption and scaling up
  ○ Provider-level facilitators
	Clinicians using an AI-powered clinical documentation tool experienced reduced time on EHR tasks (e.g., 47.1% reported less time on EHR at home) and decreased frustration with documentation (e.g., 44.7% reported less frustration), though not all clinicians saw the expected benefits (e.g., some did not find time-saving advantages or improved EHR experience) (46)
	• Despite positive outcomes for some, a significant subset of clinicians (e.g., 18.2% in the intervention group) did not experience time-saving benefits or improved EHR experience
		High	Publication date: 2024
			
			Jurisdiction studied: United States
			
			Methods: Non-randomized clinical trial design
				• Occupation
				• Gender
				• Education

• Types of AI tools for reducing administrative burden
  ○ Patient-scheduling and triage supports
  ○ Scribing and documentation tools
• Sectors
	The use of AI-assisted programs in outpatient speciality services can decrease queuing time and increase patient satisfaction (47)
	• The study assessed the use of an AI-assisted program called Smart-doctor to traditional outpatient internal
		High	Publication date: August 2022
			
			Jurisdiction studied: Shanghai, China
				None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
○ Specialty care ▪ Outpatient specialty care • Healthcare providers ○ Physicians ▪ Generalists ▪ Specialists • Settings ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care ○ Other equity-centred quadruple aim metrics ▪ Patient experience	medicine care at a children's research hospital in Shanghai, China ○ Smart-doctor uses a deep learning-driven NLP model to model itself on doctor's reasoning and decision-making, which allows it to prescribe tests and treat many patients simultaneously • The primary outcome assessed was queuing time, as well as secondary outcomes of consulting time, test time, total time, and patient satisfaction score, using an electronic questionnaire administered to patient's parents • 720 patients were recruited into either the AI-assisted group or the conventional human physician group (114 withdrew) • The study found that the median queuing time in minutes was lower in the AI-assisted group (8.78 IQR 3.97,33.88) compared to the conventional group (21.81 IQR 6.66, 73.10) with $p < 0.01$ • The consulting time in minutes was shorter in the AI-assisted group (0.35 IQR 0.18, 0.99) compared to the conventional group (2.68 IQR 1.82, 3.80) with $p < 0.01$ • The total time in minutes was shorter in the AI-assisted group (40.20 IQR 26.40, 73.80) compared to the conventional group (110.40 IQR 68.40, 164.40) with $p < 0.01$ • The overall satisfaction score showed an increase in the AI-assisted group by 17.53% with $p < 0.01$		Methods: Randomized control trial	
• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Sectors ○ Primary care ○ Specialty care ▪ Outpatient specialty care • Healthcare providers ○ Physicians • Settings ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes	The use of AI scribe technology in ambulatory settings decreased EHR documentation times in a variety of clinical specialties (48) • The study assessed the use of a language model-powered ambient AI scribe (DAX Copilot, Nuance Communications, Inc.) on utilization for EHR and documentation time per note in ambulatory settings at an academic medical centre in Stanford, California, United States ○ Secondary measures included the amount of daily documentation time, after hours documentation time, and total documentation time	High	Publication date: December 2024 Jurisdiction studied: United States Methods: Prospective quality improvement study	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation)	• The study took place over three months (October 2023–January 2024) and included 45 physicians in the analysis representing eight medical specialities • DAX Copilot was utilized in 55.25% of encounters (9629/17428) with a median 52.5% utilization at the individual physician level (IQR 17.86% to 80.97%) ○ There was significant heterogeneity in utilization between users • The median change in documentation time per note was –0.57 minutes (IQR –1.3 to –0.13) and was statistically significant (P < 0.01) • The median change in documentation time per day was –6.89 minutes (IQR –22.37 to –0.65) which was statistically significant (p < 0.01) • There was statistically significant differences in daily afterhours documentation time (–5.17 IQR –21.32 to 3.82) and daily total documentation time (–19.95 IQR –39.34 to –3.64) (p < 0.01)			
• Types of AI tools for reducing administrative burden ○ Prior authorization supports • Sectors ○ Specialty care ▪ Inpatient specialty care • Healthcare providers ○ Physicians ▪ Specialists • Settings ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences • Accuracy of outputs	AI-generated plastic surgery consent forms show no significant difference in completeness or accuracy compared to consent forms created by plastic surgeons, and are significantly shorter and easily readable (49) • The study compared plastic surgery informed consent forms generated by an AI chatbot (ChatGPT-4) to surgery consent forms created by plastic surgeons for five commonly performed plastic surgeries • 10 informed consent forms developed by plastic surgeons (from the American Association of Plastic Surgeons (ASPS)) were compared to forms generated by the AI chatbot for each of the five types of plastic surgery ○ Consent forms were compared on the length, reading level, accuracy, and completeness • The average length (by word count) was lower in the AI chatbot forms compared to the ASPS forms (1,023 vs. 2,901, p = 0.01) • The average reading level in the AI chatbot forms was lower than the ASPS forms (11.2 vs. 12.5, p = 0.02) • The study found no significant difference in accuracy and completeness between the AI chatbot forms and the ASPS forms	High	Publication date: October 2024 Jurisdiction studied: United States Methods: Cross-sectional study	None identified

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
	• The AI chatbot forms scored higher for descriptions of expected pain (1.80 vs. 1.40, p = 0.02) and recovery time (1.64 vs. 1.24, p = 0.02) within the forms, whereas the ASPS forms scored higher for describing potential surgery complications (2.88 vs. 2.48, p = 0.002)			

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Specialty care
  ▪ Inpatient specialty care
• Settings
  ○ Academic- or research-oriented care settings (vs. community settings)
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
• Accuracy of outputs
	AI-based voice information systems perform significantly better in ICU settings for documentation, resulting in increased efficiency and fewer errors compared to paper based and information systems (50)
	• The study compared paper-based documentation, patient data management systems (PDMSs) and new AI-based voice information and documentation systems (VIDSs) in an ICU setting
	• The methods were assessed on performance, accuracy, mental workload, and user experience
	• Performance was assessed using a set of typical ICU tasks involving documentation and medical interpretation
	• The study found that VIDS showed a statistically significant advantage over the other two methods
	  ○ Tasks were completed significantly faster (p < 0.01)
	  ○ Significantly significant fewer errors were made compared to PDMS (p = 0.03) and paper documentation (p < 0.001)
	  ○ Subjective user perception was found to be statistically significant in VIDS compared to PDMS and paper documentation (p < 0.001)
	• No statistically significant difference was found between VIDS and PDMS for mental workload (p = 0.06)
		High	Publication date: November 2023
			
			Jurisdiction studied: Germany
			
			Methods: Crossover clinical trial
				None identified

• Types of AI tools for reducing administrative burden
  ○ Scribing and documentation tools
• Sectors
  ○ Primary care
• Healthcare providers
• Outcomes
  ○ Provider experiences
  ▪ Time spent on administrative tasks (e.g., documentation)
	AI tools such as NLP for documentation, predictive analytics for patient flow, and automated discharge planning (e.g., improving discharge dates and reducing delays) were found to reduce administrative burdens in mental health inpatient units, improve clinician efficiency, enhance patient care through better resource allocation, and address barriers such as regulatory challenges and trust issues, with system and organizational facilitators identified as key to successful AI adoption (51)
	• Barriers to AI adoption included regulatory concerns, trust in technology, and lack of infrastructure, while
		High	Publication date: May 2021
			
			Jurisdiction studied: United Kingdom
			
			Methods: Mixed methods, semi-structured interviews
				• Occupation
				• Education

Dimension of organizing framework	Declarative title and key findings	Relevance rating	Study characteristics	Equity considerations
▪ Time available for patient care • Barriers to adoption and scaling up ○ System-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Patient-level facilitators	facilitators included strong organizational leadership and investment in AI training and systems • Interviewees identified potential roles for AI in improving patient flow in mental health inpatient units related to standardizing and recommending patient treatments, diagnoses and discharges, mitigating human error, and assisting with administrative tasks or transcribing notes • Interviewees highlighted the importance of introducing AI as a tool to assist in healthcare settings, rather than take on healthcare decisions • Though interviewees recognized the potential uses of AI in mental health care they identified three challenges – technical, regulatory, and humanistic – that must be addressed before AI tools are implemented in this setting, and noted the importance of investment and infrastructure to scale up and seamlessly integrate AI technologies			

Appendix 4: Detailed findings from a jurisdictional scan of Canadian provincial and territorial experiences with AI tools for reducing administrative burden among front-line healthcare providers

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
Canada (Federal)	• Canada Health Infoway is a federally funded not-for-profit organization that works to increase digital health innovation and secure information sharing ○ Aims to increase use of AI in healthcare by working with industry and public partners for the adoption of AI technologies including AI scribes, scheduling tools, and analytic planning decision support systems • Developed a toolkit to assist healthcare systems across Canada to understand and implement AI and a procurement toolkit to ensure compliance to AI regulations, ethics and safety	• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools • Healthcare providers ○ Physicians ▪ Generalists ▪ Specialists • Settings ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
		▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Facilitators of adoption and scaling up ○ System-level facilitators
	• The AI Strategy for the Federal Public Service 2025–2027 was developed to ensure AI adoption and use by public servants aligns with government values, delivers the greatest benefits, is efficiently and collaborative developed, and risks and harms are mitigated • The strategy includes initiatives including CANChat, which is a multilingual chatbot that assists in drafting, editing, and information management	• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools ○ Communication supports • Facilitators of adoption and scaling up ○ System-level facilitators
	• Scale AI is a ferally funded AI global innovator (a part of the Pan-Canadian Artificial Intelligence Strategy) based in Montreal that aims to improve Canada's AI supports in a variety of sectors including healthcare to streamline processes and improve service delivery • It aims to improve productivity and optimize hospital operations to improve healthcare delivery	• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools ○ Communication supports • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care
	• CareWay, a Canadian-based AI medical assistant scribe, has partnered with CAN Health Network to streamline physician workflows • CareWay generates medical documentation and completes medical forms during medical consultations using a microphone • This collaboration aims to improve workflow, increase efficiency, reduce clinician burnout, and increase patient care	• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care
	• The Canadian Medical Association (Joule) partnered with Cloud DX Inc, an Ontario digital healthcare AI company, to improve quality of patient care and reduce physician burden through the use of mixed reality (VR) technologies • The technology will allow physicians to increase triage efficiency and make quicker decisions	• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care
British Columbia	• Doctors of BC has released a policy statement outlining the measures they believe are important to successfully integrating AI technology into healthcare spaces; recommendations include involving physicians in leadership and governance, establishing risk mitigation, continuous monitoring and evaluation, privacy protections, transparency, training for clinicians, and consideration of ethical implications	• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools

Jurisdiction	Key findings	Component(s) of the organizing framework addressed

	• The Fraser Health Authority is currently working with Deloitte Canada to develop and implement an AI tool that will assist with scheduling and predicting trends in demand for healthcare
	  ○ The AI tool has been piloted in an emergency department with positive results, allowing staff to better understand trends in patient arrivals and optimize scheduling accordingly
	  ○ A similar tool is being developed for use by hospitalists to predict surges and proactively adjust clinician workflow
	• The Fraser Health Authority has developed and implemented an AI tool to predict when patients are ready for discharge
	  ○ The tool was found to be 86% accurate in predicting when patients are ready for discharge; this is four times more accurate than traditional human predictions
	  ○ With the use of the AI discharge tool 600 patients might be discharged in a day, compared to 250–300 without
	• The Artificial Intelligence Scribe Burdens pilot program evaluates the potential for an AI scribe to reduce physician administrative workloads; some findings include:
	  ○ a reduction of 2.7 hours per week of administrative tasks
	  ○ A projection of 5.7 hours saved weekly on post-appointment documentation
	  ○ 97% of participating clinicians would recommend an AI scribe
	  ○ 78% of participating clinicians felt they would be more efficient with the AI scribe
	  ○ 78% of participating patients felt they received increased attention from their physician
	• The B.C. Digital Health Strategy published in 2024 identifies the use of AI as one way to reduce the time providers spend on administrative tasks
		○ Patient-discharge supports
		• Sectors
		  ○ Primary care
		  ○ Specialty care
		  ▪ Emergency care
		  ▪ Outpatient specialty care
		  ▪ Inpatient specialty care
		• Healthcare providers
		  ○ Physicians
		  ▪ Generalists
		  ▪ Specialists
		  ○ Nurses
		• Settings
		  ○ Rural/remote communities (vs. urban communities)
		  ○ Academic- or research-oriented care settings (vs. community settings)
		• Outcomes
		  ○ Provider experiences
		  ▪ Time spent on administrative tasks (e.g., documentation)
		  ▪ Time available for patient care
		• Accuracy of outputs
		  ○ Other equity-centred quadruple aim metrics
		  ▪ Patient experience
		  ▪ Health outcomes
		• Facilitators of adoption and scaling up
		  ○ Organizational-level facilitators
		  ○ Provider-level facilitators

Alberta	• Alberta Innovates has given $9.5 million in funding to research projects aimed at integrating AI into healthcare spaces; projects include:
	  ○ development of an AI scribe technology
	  ○ improving Alberta 811 Health Link to predict opioid overdoses and increase diagnostic imaging efficiency
	  ○ identifying and treating stroke patients
	  ○ patient decision support tools
	  ○ infection control within hospitals
	  ○ understanding impacts of social determinants of health in primary care
	• The University of Alberta is developing and piloting an AI scribe technology for emergency departments in partnership with Alberta Health Services
		• Types of AI tools for reducing administrative burden
		  ○ Scribing and documentation tools
		• Sectors
		  ○ Primary care
		  ○ Specialty care
		  ▪ Emergency care
		  ▪ Outpatient specialty care
		  ▪ Inpatient specialty care
		• Healthcare providers
		  ○ Physicians
		  ▪ Generalists

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
	• The Alberta Medical Association has developed a Principles and Policy document outlining their position on the use of AI in healthcare with respect to ethics, patient care, physician education, implementation processes, medical accountability, privacy and data management, environmental impact, and governance and regulation • Professional associations including the Alberta College of Dental Hygienists, College of Physicians & Surgeons of Alberta, and Alberta Association of Nurses have released guidance on the use of AI in healthcare, emphasizing aspects such as patient privacy and technological bias • A 2023 report by the Alberta College of Family Physicians and Alberta Medical Association regarding decreasing administrative burden in primary care identified AI as a potential technology to alleviate administrative burden through referrals, electronic medical records, and documentation assistance	▪ Specialists ○ Nurses ○ Allied health professionals • Settings ○ Rural/remote communities (vs. urban communities) ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Health outcomes • Facilitators of adoption and scaling up ○ Organizational-level facilitators ○ Provider-level facilitators
Saskatchewan	• The Saskatchewan Medical Association provides AI Scribe Resources to help physicians identify appropriate AI solutions for their practice ○ The webpage provides guidelines for selection an appropriate tool considering privacy, requirements, and functional needs ○ The webpage states that the benefits of AI might include reduced burden, enhanced patient experience, reduced time, increased patient care time, reduced cognitive load, and improved workflow ○ Risks of AI might include data breaches, errors, biases, training time, and integration issues ○ Physician obligations when using AI scribe resources include ensuring accuracy, monitoring outcomes, ensuring informed consent, and maintaining transparency • The College of Physicians and Surgeons of Saskatchewan created a guidance document for AI in medical practice ○ The document states that AI should augment, not replace, medical judgment; physicians must remain accountable for decisions, continuous learning is needed, and privacy and biases issues must be mitigated ○ Physicians must be transparent on their use of AI and ensure informed consent ○ AI can be used to create educational materials to improve engagement and health literacy ○ Examples of AI include: ▪ artificial intelligence for diagnosis, treatment planning, and patient care ▪ machine learning for prediction, disease detection, and personalizing treatment plans ▪ deep learning for image recognition ▪ natural language processing to analyze clinical notes and outcomes ▪ generative AI to create educational materials or treatment plans ▪ large language models for literature reviews ▪ computer vision for analyzing medical imaging	• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Healthcare providers ○ Physicians • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Health outcomes

Jurisdiction	Key findings	Component(s) of the organizing framework addressed

Manitoba	• The 2024 report from the Joint Task Force to Reduce Administrative Burden for Physicians in Manitoba recommends using artificial intelligence to simplify scheduling and documentation tasks
	  ○ The report provides no specific examples, but it can be inferred that strategies to facilitate completion of medical forms and easily update electronic record systems be implemented
	• The College of Physicians and Surgeons of Manitoba completed a report providing suggestions for the responsible use of artificial intelligence
	  ○ Potential applications of GenAI include generating diagnoses, prescriptions, treatment plans, and educational materials; however, there is limited evidence supporting its use
	  ○ Physicians must be responsible for their use of AI and any harms of benefits its use may have
	  ○ When using tools physicians should ensure they are up to date, valid, transparent, and explainable to patients along with any risks
	• In 2024, the College of Physiotherapists of Manitoba created a guideline for the use of AI in clinical practice
	  ○ Physiotherapists use should AI responsibly, ensure informed consent, verify the accuracy of information if used for documentation, and verify any potential biases associated with AI
	  ○ The report also states that GenAI may support shared decision making and physiotherapists should be open to discussing patient's concerns or strategies learned through use of GenAI
		• Types of AI tools for reducing administrative burden
		  ○ Scribing and documentation tools
		• Sectors
		  ○ Rehabilitation care
		• Healthcare providers
		  ○ Physicians
		  ○ Allied health professionals
		• Outcomes
		  ○ Provider experiences
		  ▪ Time spent on administrative tasks (e.g., documentation)
		  ▪ Time available for patient care
		• Accuracy of outputs
		  ○ Other equity-centred quadruple aim metrics
		  ▪ Patient experience
		  ▪ Health outcomes

Ontario	• Ontario has piloted AI scribe tools to address administrative burdens faced by front-line healthcare providers
	• These tools, powered by artificial intelligence, transcribe patient-provider conversations into clinical documentation in real-time, aiming to reduce the time spent on paperwork and electronic health record entries
	  ○ Clinicians reported a 70% reduction in documentation time, saving up to four hours per week
	  ○ Over 80% of providers expressed interest in continuing to use AI scribes beyond the pilot
	  ○ The tool enabled 79% of participants to spend more time on patient care, while 76% experienced a reduction in cognitive burden during clinical encounters
	  ○ Overall, early evidence from Ontario suggests that AI scribes can improve clinician well-being and efficiency without compromising quality of care
	• OntarioMD has launched the AI Knowledge Zone to support clinicians in adopting and utilizing AI tools, particularly AI scribes, within primary care settings
	  ○ This initiative addresses common concerns among healthcare providers, such as data privacy, security, and the reliability of AI applications
	  ○ The AI Knowledge Zone offers resources focused on privacy and legal requirements, aiming to guide clinicians through the integration of AI into their practices
	  ○ As more AI tools become available, OntarioMD plans to expand the content of the AI Knowledge Zone to encompass a broader range of applications in primary care
	• At Unity Health Toronto, AI tools have been developed to streamline administrative tasks
	  ○ The Emergency Department Nurse Assignment Tool reduced the time to assign up to 27 nurses per shift from three hours to 15 minutes or less
	  ○ This optimization also decreased the repeat rate of nurses being assigned to the same role in consecutive shifts from over 20% to 5%, promoting varied experiences and job satisfaction
	  ○ Additionally, predictive models assist in planning interprofessional resource teams by forecasting staff absences, aiding in efficient workforce management
		• Types of AI tools for reducing administrative burden
		  ○ Patient-scheduling and triage supports
		  ○ Scribing and documentation tools
		  ○ Communication supports
		  ○ Patient-discharge supports
		• Sectors
		  ○ Primary care
		  ○ Specialty care
		  ▪ Emergency care
		• Outcomes
		  ○ Provider experiences
		  ▪ Time spent on administrative tasks (e.g., documentation)
		  ▪ Time available for patient care
		• Accuracy of outputs
		• Facilitators of adoption and scaling up
		  ○ System-level facilitators

Jurisdiction	Key findings	Component(s) of the organizing framework addressed

	• St. Michael's Hospital in Toronto utilizes CHARTWatch Surgical, an AI tool that monitors patient data in real-time to predict deterioration risks
	  ○ Since its implementation in October 2020, the hospital observed a 26% reduction in unexpected deaths in units where the tool is active
	  ○ The system provides hourly assessments, enabling timely interventions and informed discussions about patient care preferences	

Quebec	• In May 2024, the Quebec government announced an $8 million investment in IVADO (Institute for Data Valorization) to strengthen the province's AI ecosystem
	  ○ This funding, extending through 2026, aims to enhance collaborative research and innovation programs, facilitating the adoption of AI technologies by Quebec companies and organizations
	  ○ Led by Université de Montréal, in partnership with Polytechnique Montréal, HEC Montréal, Université Laval, and McGill University, IVADO serves as a bridge between academic research and industry application
	  ○ The initiative is expected to promote the commercialization of AI innovations, support digital transformation across sectors, and contribute to the creation of highly qualified jobs
	• The Centre hospitalier de l'Université de Montréal (CHUM) has implemented AI tools for predictive analytics, assisting in early detection of patient deterioration and optimizing resource allocation
	  ○ By leveraging AI, CHUM developed a scheduling model that reduced the time required to organize radiologist appointments by half, freeing up 11 additional hours of treatment per day without increasing staff
	  ○ Applying AI to predict patient treatment times, CHUM achieved a 5% increase in efficiency in its infusion clinic, equating to 11 extra hours of treatment capacity daily
	  ○ Collaborating with AssistIQ, CHUM implemented AIQ Capture to track the usage of single-use surgical instruments in real-time, leading to a 24.5% cost reduction and potential annual savings between $4.5 million and $8.4 million
		• Types of AI tools for reducing administrative burden
		  ○ Patient-scheduling and triage supports
		  ○ Patient-discharge supports
		• Outcomes
		  ○ Provider experiences
		  ▪ Time available for patient care
		  ▪ Accuracy of outputs
		• Sectors
		  ○ Primary care
		  ○ Specialty care
		  ▪ Emergency care
		  ▪ Outpatient specialty care
		• Facilitators of adoption and scaling up
		  ○ System-level facilitators

New Brunswick	• Researchers at the University of New Brunswick have developed a groundbreaking AI system known as "curious AI", which combines curiosity-driven exploration with efficient decision-making	• Types of AI tools for reducing administrative burden ○ Communication supports

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
	○ This approach enables the AI to actively seek out new information while performing tasks, allowing it to refine strategies in real-time and adapt to unpredictable situations ○ The AI system employs a method called dual iterative linear quadratic Gaussian (iLQG) control, enhancing decision-making in uncertain environments ○ Unlike traditional adaptive control systems that react based on past data, this AI proactively tests its assumptions, similar to a driver cautiously tapping brakes to assess icy road conditions ○ This proactive learning allows the AI to make better-informed decisions, especially when stakes are high ○ In practical applications, the AI demonstrated its effectiveness by outperforming traditional models in managing COVID-19 policies, balancing health and economic risks more efficiently ○ Notably, the system operates with minimal computing power, having been run on a decade-old laptop, making it accessible for various applications	• Settings ○ Academic- or research-oriented care settings (vs. community settings) • Outcomes ○ Provider experiences • Accuracy of outputs • Facilitators of adoption and scaling up ○ System-level facilitators
Nova Scotia	• Nova Scotia Health is collaborating with Google Cloud to implement AI healthcare tools by fall 2025 aimed at reducing physicians' administrative workload, including: ○ A natural-language search function that enables clinicians to quickly find relevant details in a patient's health record, saving time in navigating files and enhancing decision-making ○ AI support for radiologists by generating preliminary findings for chest X-rays to add efficiency • As of 2024, the Government of Nova Scotia plans to invest $42 million in its partnership with Google Cloud over five years • The College of Physicians & Surgeons of Nova Scotia acknowledges and supports the use of AI scribe technology in clinical care due in part to its potential to reduce administrative burden on physicians, and sets out standards and guidelines governing its use • Doctors Nova Scotia, the Department of Health and Wellness, and Nova Scotia Health are collaborating to pilot AI scribe technology	• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Sectors ○ Primary care • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Facilitators of adoption and scaling up ○ System-level facilitators
Prince Edward Island	• The Digital Health Strategy 2024–2029 developed by the Department of Health and Wellness and Health Prince Edward Island defines a strategic goal to "enhance the use of digital health tools," which is in part actioned by evaluating opportunities for the use of machine learning and/or AI to improve administrative efficiency and care quality • In Health Prince Edward Island's call for innovation posting seeking solutions from companies to improve documentation efficiency in patient interactions – with the goal of easing administrative burdens on healthcare providers and improving care experience– it looks for a number of essential outcomes relating to transcription accuracy, user experience, documentation time required, documentation quality, integration with existing electronic medical records system, and data security	• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience
Newfoundland and Labrador	• The Health Accord NL report outlines a 10-year plan to transform the healthcare system, emphasizing the adoption of digital technologies to improve efficiency and patient care; the focus on digital transformation suggests adopting and leveraging virtual care technologies to streamline administrative processes and support healthcare providers ○ Newfoundland and Labrador's HealthTech and BioTech Ecosystem 2024–2026 Action Plan involves investing in new start-up firms to improve delivery and management of healthcare services • The Newfoundland and Labrador Medical Association (NLMA) provides information on AI scribes, digital tools designed to automate the documentation of patient encounters; these tools can record, transcribe, and summarize	• Types of AI tools for reducing administrative burden ○ Scribing and documentation tools ○ Communication supports • Healthcare providers ○ Physicians • Outcomes ○ Provider experiences

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
	real-time conversations into structured notes, such as SOAP notes, and can assist in preparing referral letters and patient instructions ○ Physicians are encouraged to consult guidelines from the College of Physicians and Surgeons of Newfoundland and Labrador (CPSNL) and the Canadian Medical Protective Association (CMPA) regarding privacy, security, and best practices when implementing AI scribes in their practice • The Government of Newfoundland and Labrador is providing $553,693 to SiftMed through the Business Growth Program to support a 13-month R&D project focused on enhancing its AI-driven platform that sorts medical documents and predicts claim complexities, improving risk assessment and triage ○ SiftMed, based in St. John's, is also receiving up to $400,000 in federal support from NRC IRAP to further develop its medical AI technology, with provincial funding helping create six new technical positions ○ The company's AI tools are aimed at streamlining workflows for legal, insurance, and medical professionals	▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care
Yukon	• No tools identified	
Northwest Territories	• As part of the Department of Health and Social Service (DHSS)'s medical equipment evergreening program, hospitals in Stanton, Inuvik, and Hay River now use Fujifilm endoscopy systems equipped with CADEYE AI software, which supports front-line providers by automating polyp detection and characterization ○ This AI integration improves efficiency and accuracy in colonoscopies, allowing clinicians to focus more on patient care rather than manual interpretation and administrative tasks related to image review and reporting ○ By minimizing equipment downtime with on-site loaner scopes and improving workflow with user-friendly, high-resolution tools, the upgrade streamlines clinical operations and reduces administrative delays in cancer screening services • The 2021 Proposed Amendments to the Northwest Territories Nursing Profession Act recommend expanding the scope of Registered Psychiatric Nurses in the NWT, including prescribing and test-ordering within their mental health and addictions role, along with consensus that the Nursing Regulation in Northwest Territories & Nunavut should have bylaw-making authority over telehealth and virtual care to keep pace with evolving technologies like AI	• Types of AI tools for reducing administrative burden ○ Communication supports • Outcomes ○ Provider experiences ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Health outcomes • Healthcare providers ○ Nurses
Nunavut	• No tools identified	

Appendix 5: Detailed findings from a jurisdictional scan of international experiences with AI tools for reducing administrative burden among front-line healthcare providers

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
Australia	• The Australian Health Practitioner Regulation Agency released a statement on meeting professional organizations while using artificial intelligence ○ Possible benefits include improved diagnostic times, improved care, and patient satisfaction ○ Healthcare professionals must remain accountable and verify the accuracy of records, understand potential risks to privacy, and remain transparent on use • The Australian Government Department of Health and Aged Care released an AI transparency statement ○ The department uses AI to automate activities to make tasks more efficient	• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools ○ Communication supports

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
	○ Possible domains of AI use include compliance and fraud detection and service delivery ○ The department does not use AI for decision-making ○ The department mandates that the use of AI must be verified for accuracy by a human • The New South Wales Agency for Clinical Innovation has a living document for AI use ○ Automate routine and indirect tasks such as clinical documentation ▪ This has been found to improve workflow, facilitate appointment scheduling and triage, ensure resource allocation and management, reduce burnout, allow more time with patients ▪ Materials should still be verified for accuracy ○ Reduce errors for prescriptions, drug interactions, infections, and other adverse events ○ Quality and process improvement to improve workflow and evaluate clinician skill ○ Evaluate patient reported data ○ Automate patient triage, management of surgical waitlists, predict bed capacity, and monitor discharge goals ○ Suggest improvements in system organization, for example emergency service allocation, predicting patient demand, and predicting staffing needs ○ Automate patient reminders, billing, and fraud identification • Australia's National Science Agency created a 2024 report on AI trends in healthcare ○ AI can be used at a systems level to identify areas needing improvement, reducing administrative burden, and allowing more time for patient care ○ At a clinician level, AI can allow for more time for patient care, reduce cognitive demand, and streamline diagnostic planning ○ At a patient level, AI can allow for better treatment and more personalized treatment plans, ultimately leading to better experiences and health outcomes • In 2023, the Australian Medical Association released a position statement on AI in healthcare ○ Physicians must be transparent on AI use, remain accountable for AI use, ensure privacy, and verify biases that may occur ○ The statement states that AI can assist with diagnosis, treatment recommendations, and transitions of care; no specific examples were provided • In 2025, the Australian Digital Health Agency released a transparency statement for AI use ○ The Agency uses Microsoft Copilot for internal documentation tasks, data analysis, and cyber security monitoring ○ Employees must complete training before using the tool • In 2021, the Australian Alliance for Artificial Intelligence in Healthcare released a Roadmap for Artificial Intelligence in Healthcare, providing the following recommendations ○ Developing an ethical framework to support AI in routine practice and improve safety monitoring systems ○ Healthcare organizations meeting minimum standards for cybersecurity and ensuring privacy ○ Allocate funds for exploring use of AI in clinical practice ○ Develop curriculum frameworks for healthcare professionals and creating accreditation program for training ○ Co-design AI systems with healthcare professionals and patients • In 2024, the Australian College of Nursing released a statement for the role of AI in nursing practice ○ The statement states that AI can support management of patient data, better monitoring of patient outcomes, and improved communication with healthcare professionals ○ Examples of AI include Clinical Decision Support Systems for providing evidenced-based recommendations, predictive analytics for predicting health outcomes, and telehealth and remote patient monitoring for continuity of care	○ Patient-discharge supports • Sectors ○ Primary care ○ Specialty care ▪ Emergency care ▪ Outpatient specialty care ▪ Inpatient specialty care ○ Rehabilitation care ○ Long-term care • Healthcare providers ○ Physicians ▪ Generalists ▪ Specialists ○ Nurses • Settings ○ Rural/remote communities (vs. urban communities) • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs ○ Other equity-centred quadruple aim metrics ▪ Patient experience ▪ Health outcomes ▪ Costs • Barriers to adoption and scaling up ○ System-level barriers ○ Organizational-level barriers ○ Provider-level barriers ○ Patient-level barriers • Facilitators of adoption and scaling up ○ System-level facilitators ○ Organizational-level facilitators ○ Provider-level facilitators ○ Patient-level facilitators

Jurisdiction	Key findings	Component(s) of the organizing framework addressed
	○ Generative AI can support nursing by enhancing clinical decision support by generating recommendations that must be verified, improving documentation, transcribing writing documents, spell checking, providing personalized healthcare recommendations for chronic conditions, enhancing learning by stimulating learning scenarios, and analyzing trends for delivery ○ Possible challenges include verifying accuracy and reliability, biases in how AI is trained, ethical and legal issues, privacy issues, and difficulty integrating with other systems ○ Nurses must also ensure that AI is meant to support decision-making, not replace it, and they must be transparent in its use • The Royal Australian College of General Practitioners provided a position statement on AI use in primary care in 2025 ○ AI may assist physicians by reducing burden for administrative tasks, filling service gaps in remote areas, reducing risks to patient safety, improving diagnostic accuracy, standardizing care, and personalizing treatment ○ Physicians must be aware of risks, including privacy concerns and perpetuation of biases by AI	
Denmark	• Denmark has established three key centres: Centre for Clinical Robotics (CCR), Centre for Clinical Artificial Intelligence (CAI-X) and Centre for Innovative Medical Technology (CIMT), which focus on launching new innovations/platforms within the Danish health system ○ CAI-X mission is to drive the responsible development and integration of AI in healthcare by fostering interdisciplinary collaboration, aligning solutions with real clinical needs ○ CAI-X has active financial support from the Independent Research Fund Denmark (DFF), Novo Nordisk Foundation, EU funding programmes such as a Horizon Europe, and other regional initiatives • AI technology helps reduce administrative workload by automating tasks such as appointment scheduling, medical record management, and billing, allowing healthcare providers to concentrate more on patient care; the Danish firm Systematic is at the forefront of these advancements ○ Systematic integrates artificial intelligence into its suite to enhance operational efficiency and decision-making by automating complex tasks such as route planning, anomaly detection, maritime track correlation, and object recognition, while also streamlining user workflows through adaptive AI-assisted tools • Denmark views digital health technologies as essential to addressing healthcare system challenges, with evidence showing that mature, user-friendly tools (like telemedicine and digital assistants) can free up staff, enhance care, and shift treatment into patients' homes; national and regional efforts are underway to scale these solutions using data-driven evaluations and proven case studies ○ Teton.ai's AI-powered nurse assistant uses sensor and camera technology to monitor patient movements, prevent falls, and automate routine checks and documentation, reducing staff workload by 25% during nights and improving patient safety, with proven results already implemented at North Denmark Regional Hospital • Emergency departments in North Denmark Region have implemented an AI tool to automatically read X-rays and identify fractures, reducing wait times for orthopedic patients by quickly clearing non-fracture cases; since its launch in June 2023, nearly 30,000 scans have been reviewed without missed significant fractures or complaints	• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Scribing and documentation tools ○ Communication supports • Outcomes ○ Provider experiences ▪ Time spent on administrative tasks (e.g., documentation) ▪ Time available for patient care • Accuracy of outputs • Facilitators of adoption and scaling up ○ System-level facilitators
Finland	• The Ministry of Social Affairs and Health released a strategy emphasizing the use of AI and robotics to streamline healthcare services ○ They emphasize developing user-friendly digital tools to empower individuals in managing their health, reducing healthcare professionals' workload by automating routine tasks, and reforming legislation to facilitate data sharing and automated decision-making	• Types of AI tools for reducing administrative burden ○ Patient-scheduling and triage supports ○ Communication supports • Outcomes ○ Provider experiences

Jurisdiction	Key findings	Component(s) of the organizing framework addressed

	• The Finnish Center for Artificial Intelligence (FCAI), a flagship initiative by Aalto University, the University of Helsinki, and VTT, develops trustworthy, data-efficient, and understandable AI to solve real-world problems, enhance human–AI collaboration, and drive ethical industrial and societal transformation
	  ○ FCAI is investing in the implementation of deep learning for electronic health records to streamline administrative burden and improve medical imaging analysis
	• Research projects involving organizations like VTT Technical Research Centre of Finland and the University of Eastern Finland are developing AI solutions to reduce nurses' workload; these tools aim to automate tasks such as patient registration and information review, potentially saving more than 30% of nurses' working hours, allowing them to focus more on patient care
	• AI-assisted patient record-keeping was piloted in three Finnish regions in 2024, with ongoing projects in Western Uusimaa and Kanta-Häme now funded by the Ministry of Social Affairs and Health; results from the pilot projects will be published in spring 2025
	  ○ The Ministry of Social Affairs and Health granted 550,000 euros to Western Uusimaa Wellbeing Services County (in Finnish and Swedish) to develop AI-assisted registration
	  ○ It also granted 480,000 euros to Kanta-Häme Wellbeing Services County (in Finnish) for AI-based background and risk data collection and capacity prediction
	• HUS Helsinki University Hospital is pioneering the integration of AI in healthcare by leveraging its medical images archive to develop advanced diagnostic tools, particularly for brain diseases
	  ○ Through collaborations within the CleverHealth Network, HUS combines clinical expertise with technological innovation to create AI algorithms capable of identifying conditions like intracerebral hemorrhages, aiming to enhance diagnostic accuracy and patient care
		▪ Time spent on administrative tasks (e.g., documentation)
		▪ Time available for patient care

Iceland	• The Ministry of Higher Education, Industry and Innovation presents its draft AI Action Plan for 2024–2026
	  ○ The plan promotes an approach to AI development in healthcare diagnostic and administrative usage, emphasizes independent review, and addresses privacy, security, and real-world application through detailed standards and practical use cases, with plans for continuous updates
	• Researchers from the University of Iceland developed an AI system to automate the coding of medical records in Icelandic, aligning with international International Classification of Diseases (ICD) standards
	• The Icelandic Health Care Association partnered with tech company Dicino to implement AI in patient interactions
	  ○ A pilot project at Heilsuvera used AI to handle patient chat check-ins by asking symptom and risk-related questions in Icelandic and English, covering over 1,200 medical issues
	  ○ The system successfully reduced workload for healthcare staff, leading to a renewed partnership between Dicino and Capital Area Healthcare to expand telehealth services
		• Types of AI tools for reducing administrative burden
		  ○ Scribing and documentation tools
		  ○ Communication supports
		• Outcomes
		  ○ Provider experiences
		  ▪ Time spent on administrative tasks (e.g., documentation)
		  ▪ Time available for patient care

New Zealand	• New Zealand's Health Research Council will invest NZD $5 million in health research focused on the use of AI, including applications of AI designed to reduce administrative burden
	  ○ It published guidelines in 2025 for applicants of AI in healthcare funding, which provide opportunities to propose AI-based solutions to improve administrative burden in the healthcare system
	• New Zealand's Ministry of Health, in partnership with Health New Zealand, other government agencies, and external advisory groups, are working to guide the use of AI and genomics in New Zealand's health system
	  ○ This integration is expected to, among other benefits, lead to the automation of certain aspects of complex data interpretation, allowing specialists to spend less time on analysis and documentation tasks
		• Types of AI tools for reducing administrative burden
		  ○ Patient-scheduling and triage supports
		  ○ Scribing and documentation tools
		  ○ Communication supports
		• Outcomes
		  ○ Provider experiences

Jurisdiction	Key findings	Component(s) of the organizing framework addressed

	• The Office of the Prime Minister's Chief Science Advisor Kaitohutohu Mātanga Pūtaiao Matua ki te Pirimia published a report in December 2023 on capturing the benefits of AI in healthcare, including to achieve better outcomes in administrative areas
	  ○ 'Low-hanging fruit' identified included using AI to automate scheduling for visits, procedures, and availability of physical space, as well as typing up notes and routine communications with patients
	  ○ Computer vision, referring to machine perception of images, was also identified as a field that can augment not only clinical judgment, but also help specialists more efficiently write notes and document tests to relieve the time burden associated with these activities
	  ○ The report highlights that AI technologies can be prone to reflect and perpetuate human bias and discrimination, making mitigation approaches such as monitoring for signs of bias important so that adopting AI is done in an equity-sensitive manner
	• A report by AI Forum New Zealand highlighted that AI-powered assistants for health providers can take over burdensome routine administrative tasks like scheduling, documentation and filling forms, while robotic process automation can be used to manage repetitive back-office tasks related to billing, claims processing, and patient registration
	  ○ The report also details how AI can more efficiently combine diverse datasets from across the system to help reduce manual data entry tasks to prevent data duplication, inconsistency, and fragmentation
	  ○ AI can also help to forecast demand and prioritize resource use and improve support evidence-based decision making by health administrators and policymakers by streamlining data analysis
		▪ Time spent on administrative tasks (e.g., documentation)
		▪ Time available for patient care
		• Accuracy of outputs
		• Facilitators of adoption and scaling up
		  ○ System-level facilitators

Norway	• Norway implemented a coordinated, cross-agency initiative that is led by the Directorate of Health that aims to strategically guide the safe and effective implementation of AI into the health system, including those that might work to reduce administrative burden
	  ○ It is supported by an AI Advisory Board and aims to be integrated within national eHealth strategies
	• The Norwegian Centre for E-health Research published a report in January 2022 on the implementation of AI in Norwegian healthcare, and highlighted a framework for implementing AI in healthcare that emphasizes trustworthiness, clinical relevance, and collaborative governance
	  ○ The framework includes components like workflow integration and cross-sector cooperation that are likely to streamline processes to reduce administrative burdens
	  ○ The successful implementation of AI in healthcare is hindered by limited human and financial resources, as well as limited cross-disciplinary expertise and fragmented data governance
	• Norway's National Health and Hospital Plan for 2020–2023 includes plans to integrate AI into the health system to 1) enable faster more accurate diagnosis and better treatment, 2) automate medical analyses, 3) provide AI tools to support patients and providers (e.g., patient scheduling and triaging), and 4) enhance data sharing to support personalized medicine
	  ○ Overall, these approaches can expect to reduce administrative burden by freeing up specialists' time by reducing diagnostic/medical analysis time and better coordinating scheduling, triaging, and information sharing across the system
	• DIPS AS supplies eHealth systems to Norwegian hospitals, incorporating AI administrative features to streamline scheduling and communication
		• Types of AI tools for reducing administrative burden
		  ○ Patient-scheduling and triage supports
		  ○ Scribing and documentation tools
		  ○ Communication supports
		• Sectors
		  ○ Specialty care
		  ○ Public health
		• Barriers to adoption and scaling up
		  ○ System-level barriers
		  ○ Provider-level barriers

Sweden	• AI Sweden, the Swedish national centre for applied artificial intelligence, published a white paper in December 2024 on the integration and return on investment of AI technology in healthcare, highlighting that AI has the potential to help automate routine tasks, improve operational efficiencies, and optimize resource planning and allocation
	  ○ Obstacles highlighted by stakeholders include concerns about data privacy and storage, and the ethical assessments needed to evaluate the level of risk they pose take considerable time
		• Types of AI tools for reducing administrative burden
		  ○ Patient-scheduling and triage supports
		  ○ Scribing and documentation tools

Jurisdiction	Key findings	Component(s) of the organizing framework addressed

	• AI Sweden, in partnership with Unity Health Toronto, have committed SEK 4,351,390 (approx. $620,000 CAD) to better manage missed patient appointments through AI-driven collaboration platforms for healthcare leaders and data scientists that improve diagnostics, treatment, and resource utilization
	  ○ Some of the applications of AI include scheduling, integrating diverse datasets and other health information, and facilitating resource allocation and planning
	  ○ The project is expected to lead to greater implementation of AI, with long-term outcomes aiming to improve patient care, decrease administrative burden for healthcare staff, and more efficient use of resources
	• Doktor.se is a digital healthcare platform based in Sweden with AI triage, covering 26 health centres
	• Cambio COSMIC healthcare information system uses AI to update providers with a patient journal that has information about bookings, test results, drugs, treatments and more, across organizations
		○ Communication supports
		• Sectors
		  ○ Primary care
		  ○ Specialty care
		• Outcomes
		  ○ Provider experiences
		  ▪ Time spent on administrative tasks (e.g., documentation)
		  ▪ Time available for patient care
		• Barriers to adoption and scaling up
		  ○ System-level barriers

Appendix 6: Documents excluded at the final stage of reviewing

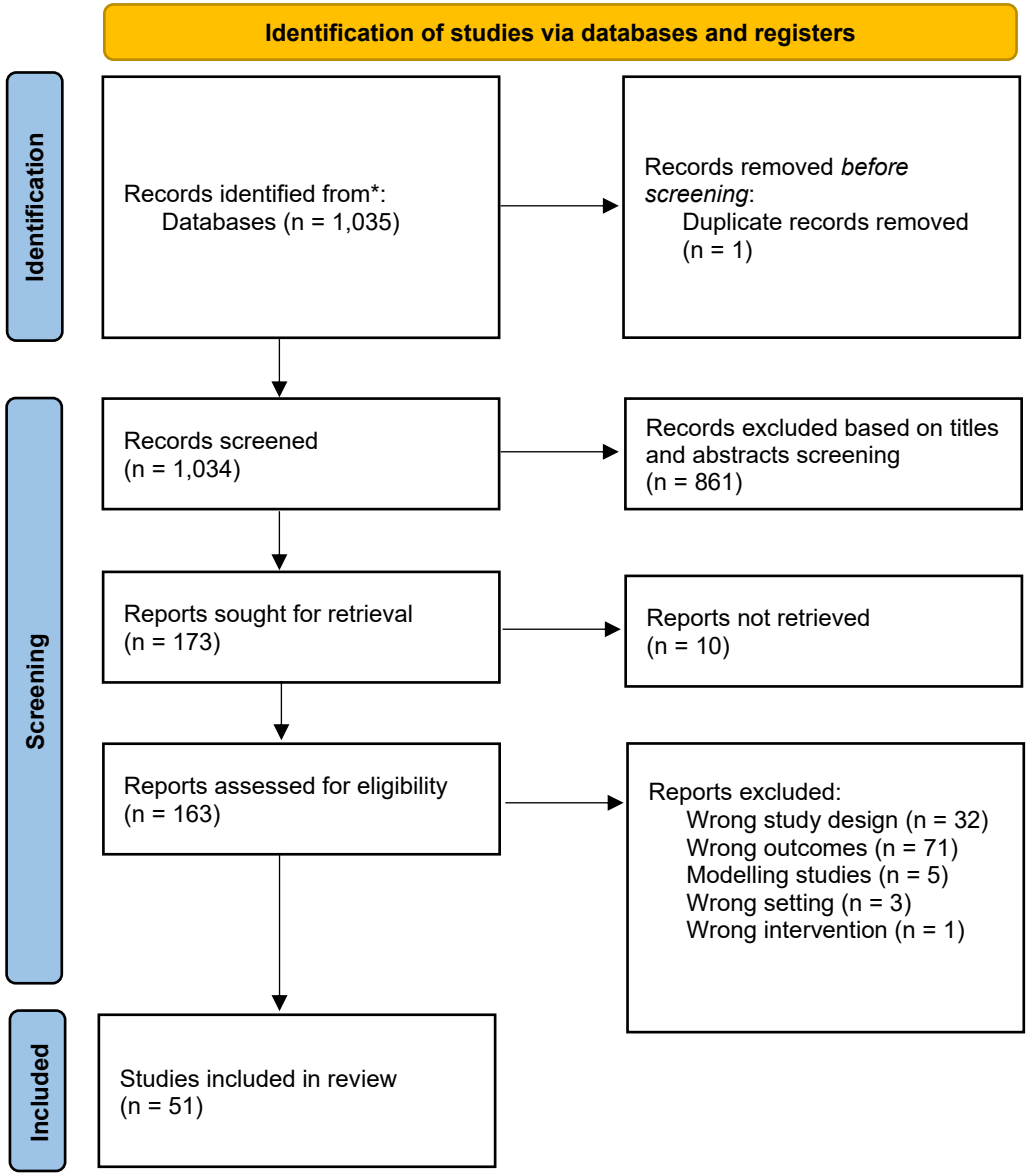
Reason for exclusion	Hyperlinked title
Wrong intervention	Significant and distinctive n-grams in oncology notes: A text-mining method to analyze the effect of OpenNotes on clinical documentation
Wrong setting	Using large language models for safety-related table summarization in clinical study reports
	Systematic literature review on the application of explainable artificial intelligence in palliative care studies
	Leveraging generative AI Tools to support the development of digital solutions in health care research: Case study
Modelling studies	Creating perinatal nursing care plans using ChatGPT: A pathway to improve nursing care plans and reduce documentation burden
	Applying queueing theory to evaluate wait-time-savings of triage algorithms
	Usability test for a smart glass–based application to support nurses' hospital admission tasks
	A patient-centered digital scribe for automatic medical documentation
	Performance comparison of junior residents and ChatGPT in the Objective Structured Clinical Examination (OSCE) for medical history taking and documentation of medical records: Development and usability study
Wrong outcomes	Deep learning k-space-to-image reconstruction facilitates high spatial resolution and scan time reduction in diffusion-weighted imaging breast MRI
	Evaluation by dental professionals of an artificial intelligence-based application to measure alveolar bone loss
	Machine learning for benchmarking critical care outcomes
	Assisting nurses in care documentation: from automated sentence classification to coherent document structures with subject headings
	When precision meets penmanship: ChatGPT and surgery documentation
	Evaluating the efficacy of large language models in generating medical documentation: A comparative study of ChatGPT-4, ChatGPT-4o, and Claude
	General practitioners' attitudes toward artificial intelligence–enabled systems: Interview study
	Impact of artificial intelligence on radiology: A EuroAIM survey among members of the European Society of Radiology
	A comprehensive artificial intelligence framework for dental diagnosis and charting
	Development and evaluation of a digital scribe: Conversation summarization pipeline for emergency department counseling sessions towards reducing documentation burden
	Automatic detection of actionable findings and communication mentions in radiology reports using natural language processing
	The perceptions of potential prerequisites for artificial intelligence in Danish general practice: Vignette-based interview study among general practitioners
	Using ChatGPT-4 to Create structured medical notes from audio recordings of physician-patient encounters: Comparative study
	A large language model–based generative natural language processing framework fine-tuned on clinical notes accurately extracts headache frequency from electronic health records
	Evaluation of a digital scribe: Conversation summarization for emergency department consultation calls
	Machine learning methods for identifying critical data elements in nursing documentation
	Natural language processing for literature search in vascular surgery: A pilot study testing an artificial intelligence based application
	Attitude of aspiring orthopaedic surgeons towards artificial intelligence: A multinational cross-sectional survey study
	Intelligent speech technologies for transcription, disease diagnosis, and medical equipment interactive control in smart hospitals: A review
	A comparison of veterans with problematic opioid use identified through natural language processing of clinical notes versus using diagnostic codes
	A novel high accuracy model for automatic surgical workflow recognition using artificial intelligence in laparoscopic totally extraperitoneal inguinal hernia repair (TEP)

Reason for exclusion	Hyperlinked title
	Large language model–based assessment of clinical reasoning documentation in the electronic health record across two institutions: Development and validation study
	AI integration in nephrology: Evaluating ChatGPT for accurate ICD-10 documentation and coding
	Perceptions of data set experts on important characteristics of health data sets ready for machine learning: A qualitative study
	A deep learning framework for automated classification and archiving of orthodontic diagnostic documents
	ChatGPT in surgery: A revolutionary innovation?
	Critical analysis of the AI impact on the patient-physician relationship: A multi-stakeholder qualitative study
	Comparison of the quality of discharge letters written by large language models and junior clinicians: Single-blinded study
	Needs and expectations for artificial intelligence in emergency medicine according to Canadian physicians
	AI in dental radiology-improving the efficiency of reporting with ChatGPT: Comparative study
Wrong study design	Potential applications and implications of large language models in primary care
	Large language models and the future of rheumatology: Assessing impact and emerging opportunities
	Should artificial intelligence be used for physician documentation to reduce burnout?
	Electronic health records: A critical appraisal of strengths and limitations
	Applications of artificial intelligence in health care delivery
	Understanding natural language: Potential application of large language models to ophthalmology
	Machine learning tools match physician accuracy in multilingual text annotation
	The promise of AI large language models for epilepsy care
	Navigating the artificial intelligence revolution: The future of general practice in India
	The perceptions of automated artificial intelligence-powered clinical documentation assisted in dentistry
	What complexity science predicts about the potential of artificial intelligence/machine learning to improve primary care
	Large language models in science
	Latest developments of generative artificial intelligence and applications in ophthalmology
	The advance of artificial intelligence in outpatient urology: current applications and future directions
	Utility of ChatGPT in clinical practice
	Generative artificial intelligence in academic surgery: Ethical implications and transformative potential
	Current applications of artificial intelligence in billing practices and clinical plastic surgery
	Timely and efficient AI insights on EHR: System design
	Unlocking the power of ChatGPT, artificial intelligence, and large language models: Practical suggestions for radiation oncologists
	Using artificial intelligence in electronic health record systems to mitigate physician burnout: A roadmap
	GPT-4 and ophthalmology operative notes
	Can artificial intelligence replace the unique nursing role?
	Transforming healthcare documentation: Harnessing the potential of AI to generate discharge summaries
	The utility of language models in cardiology: A narrative review of the benefits and concerns of ChatGPT-4
	Artificial intelligence: Singularity approaches
	ChatGPT's potential in enhancing physician efficiency: A Japanese case study
	The real ethical issues with AI for clinical psychiatry

Reason for exclusion	Hyperlinked title
	Artificial intelligence, the digital surgeon: Unravelling its emerging footprint in healthcare – The Narrative Review
	Empowering health: Model for sustainable AI implementation
	Artificial intelligence: Its future and impact on acute medicine
	Embracing artificial intelligence: Revolutionizing nursing documentation for a better future
	Applying language technology to nursing documents: Pros and cons with a focus on ethics
Low relevance (wrong outcomes)	Impact of ChatGPT on teleconsultants in healthcare: Perceptions of healthcare experts in Saudi Arabia
	Perceptions of cardiac surgeons regarding the integration of artificial intelligence in cardiac surgery
	Utilization of ChatGPT-4 in plastic and reconstructive surgery: A narrative review
	ChatGPT's ability to assist with clinical documentation: A randomized controlled trial
	Patient perception of plain-language medical notes generated using artificial intelligence software: Pilot mixed-methods study
	Revolutionizing cardiology with words: Unveiling the impact of large language models in medical science writing
	Ability of machine-learning based clinical decision support system to reduce alert fatigue, wrong-drug errors, and alert users about look alike, sound alike medication
	Physician opinions on artificial intelligence chatbots in dermatology: A national online cross-sectional survey of dermatologists
	Large language model-based chatbot vs surgeon-generated informed consent documentation for common procedures
	Physicians' and patients' expectations from digital agents for consultations: Interview study among physicians and patients
	Viability of open large language models for clinical documentation in German health care: Real-world model evaluation study
	Generative artificial intelligence for chest radiograph interpretation in the emergency department
	The impact of artificial intelligence on radiologists' reading time in bone age radiograph assessment: A preliminary retrospective observational study
	Assessment of real-time natural language processing for improving diagnostic specificity: A prospective, crossover exploratory study
	Using deep learning to safely exclude lesions with only ultrafast breast MRI to shorten acquisition and reading time
	The STREAMLINE pilot study on time reduction and efficiency in AI-mediated logging for improved note-taking experience
	Natural language processing-enabled and conventional data capture methods for input to electronic health records: A comparative usability study
	Artificial intelligence in plastic surgery, where do we stand?
	Deep natural language processing to identify symptom documentation in clinical notes for patients with heart failure undergoing cardiac resynchronization therapy
	An observational study to evaluate the usability and intent to adopt an artificial intelligence-powered medication reconciliation tool
	Supporting primary care through symptom checking artificial intelligence: a study of patient and physician attitudes in Italian general practice
	Using natural language processing techniques to detect adverse events from progress notes due to chemotherapy
	An AI-enabled nursing future with no documentation burden: A vision for a new reality
	The effect of ambient artificial intelligence notes on provider burnout
	Assessing the efficacy and clinical utility of artificial intelligence scribes in urology
	Effect of ambient voice technology, natural language processing, and artificial intelligence on the patient-physician relationship
	Perceptiveness and attitude on the use of artificial intelligence (AI) in dentistry among dentists and non-dentists – a regional survey
	Can large language models generate outpatient clinic letters at first consultation that incorporate complication profiles from UK and USA aesthetic plastic surgery associations?

Reason for exclusion	Hyperlinked title
	Orthopaedic surgeons display a positive outlook towards artificial intelligence: A survey among members of the AGA Society for Arthroscopy and Joint Surgery
	Assessing artificial intelligence-generated responses to urology patient in-basket messages
	ChatGPT as a tool for medical education and clinical decision-making on the wards: Case study
	Comparing patient perception and physician's records: Generative AI performance evaluation
	Free-text documentation of dementia symptoms in home healthcare: A natural language processing study
	Investigating awareness of artificial intelligence in healthcare among medical students and professionals in Pakistan: A cross-sectional study
	Adapted large language models can outperform medical experts in clinical text summarization
	Enhancing musculoskeletal injection safety: Evaluating checklists generated by artificial intelligence and revising the preformed checklist
	Can a novel natural language processing model and artificial intelligence automatically generate billing codes from spine surgical operative notes?
	Identification of prediabetes discussions in unstructured clinical documentation: Validation of a natural language processing algorithm
	Patient-representing population's perceptions of GPT-generated versus standard emergency department discharge instructions: Randomized blind survey assessment
	Generative artificial intelligence writing open notes: A mixed methods assessment of the functionality of GPT 3.5 and GPT 4.0
	Unlocking the potential: Investigating dental practitioners' willingness to embrace artificial intelligence in dental practice

Appendix 7: PRISMA flow diagram



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