IMPLEMENTATION OF A DIGITAL SCRIBE TO IMPROVE FACE TO FACE INTERACTIONS AND REDUCE CHARTING TIME

by

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DEDICATION

This project is dedicated to my partner Karen, children Ella and Liam, and my mother Sandra. Without your love, support, and sacrifices I would not have been able to complete this journey.

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ABSTRACT

Excessive documentation time in electronic health records (EHRs) has led to provider burnout, decreased efficiency, and reduced patient interaction, particularly in psychiatric care. This quality improvement project aimed to implement and evaluate an artificial intelligence (AI) digital scribe in a rural private psychiatric practice to reduce documentation time while maintaining accuracy. A scoping literature review was conducted to assess AI-assisted documentation methods, followed by a six-week implementation of the AI scribe in a single-provider clinic. The Plan-Do-Study-Act (PDSA) model guided implementation, with pre- and post-intervention documentation times recorded for analysis.

Results demonstrated a significant reduction in documentation time, with AI-assisted methods reducing documentation time by 72%, surpassing the initial goal of a 20% reduction. The provider experienced daily time savings of approximately 2.5 hours, allowing for improved patient interaction and workflow efficiency. Additionally, the AI scribe improved documentation quality and structure, ensuring accurate patient records while maintaining provider oversight.

While AI-assisted documentation has demonstrated benefits, human oversight remains necessary to mitigate risks such as transcription errors and automation bias. The findings suggest that AI scribes can significantly enhance clinical efficiency, reduce provider burden, and improve patient care, particularly in high-demand, underserved settings. Future studies should explore broader applications of AI scribes in diverse healthcare environments.

CHAPTER ONE

REVIEW OF THE LITERATURE

Introduction

In 2009 the United States enacted the Health Information Technology for Economic and Clinical Health (HITECH) Act. With the mandate of electronic health records (EHRs) the HITECH Act hoped to improve the safety, quality, and efficiency of healthcare. Arguably, efficiency has declined due to increased documentation requirements, which then affects quality and safety. Despite using many of the same EHR programs (e.g., EPIC, NextGen Healthcare, Greenway Health, etc.), providers in the United States spend significantly more time documenting in EHRs than in other developed countries (Holmgren et al., 2021). Estimates claim providers spend anywhere between one third and half of their time using EHRs, including time after regular work hours and at home (Apathy et al., 2022; Holmgren et al., 2021; L. Rotenstein et al., 2024; L. S. Rotenstein et al., 2023). Excessive time spent using EHRs contributes to provider burnout, reduced time with patients, and overall reduced efficiency (Apathy et al., 2022; Avendano et al., 2022; Bett et al., 2023; Ghatnekar et al., 2021; L. Rotenstein et al., 2024; L. S. Rotenstein et al., 2023). Providers utilize a number of different approaches to improve in these areas including copy/paste, note templates, EHR dot-phrases, in person scribes, dictation software, and most recently artificial intelligence (AI) based digital scribes (Avendano et al., 2022; Cao et al., 2024; Coiera et al., 2018; Gellert, 2023; Ghatnekar et al., 2021; Holmgren et al., 2021; Quiroz et al., 2019; Rajkomar et al., 2019; L. S. Rotenstein et al., 2023). Each approach towards improvement presents specific challenges and advantages.

Background and Significance

Documenting patient medical records goes back at least as far as the ancient Egyptians, (Lorkowski & Pokorski, 2022). Further refinement was established through the writings of Hippocrates and during the renaissance period by Leonardo Davinci (Lorkowski & Pokorski, 2022). In the New York Hospital in 1793, America began formal record keeping as outlined in the Book of Admissions and the Book of Discharges (Lorkowski & Pokorski, 2022). Soon after the state of New York formalized requirements for documentation, though they were grossly inadequate and often contained irrelevant information and even jest directed at the patients (2021; Lorkowski & Pokorski, 2022). Standards gradually improved and records were used in universities; in the 1880s records began being used for insurance purposes in Europe (Lorkowski & Pokorski, 2022). Fast forward to the 1960s and punch card use began which allowed for compiling diagnostic information, research, and improved administration (Lorkowski & Pokorski, 2022). Interestingly, up until 2009 approximately 90% of medical facilities still used paper records despite the commonality of computers (Lorkowski & Pokorski, 2022). As stated above, 2009 marked the implementation of the HTECH Act, and even with this act as of 2022 only an estimated 80% of medical facilities have implemented EHR systems (Lorkowski & Pokorski, 2022).

While EHRs certainly have improved record keeping, their impact on medical professionals and patients shows mixed results. Healthcare facility management pressure providers to maximize the number of patients seen. Nursing shortages contribute to increased patient ratios. This increase in patient contact means that providers and nurses spend a significant

amount of time in patient EHRs, and care becomes documentation driven (Avendano et al., 2022; Borgstadt et al., 2022; Coiera et al., 2018).

Documentation burden contributes heavily to employee burnout and dissatisfaction (Borgstadt et al., 2022; Fogleman et al., 2024; Van Buchem et al., 2021) Healthcare workers are therefore forced to decide between documentation quality or patient care quality. Rushed patient care has obvious negative health outcomes such as inaccurate or even missed diagnoses (Apathy et al., 2022; Borgstadt et al., 2022). Furthermore, limited provider interaction leaves patients feeling they are unheard, and their problems are left unaddressed (Borgstadt et al., 2022). Decreased patient interaction opens the possibility of medical staff missing changes in patient conditions. Both situations increase facility and employee liability in adverse events. On the other hand, inadequate documentation, and over documentation, increases liability, as well as negatively affecting insurance reimbursement (Apathy et al., 2022).

Providers use several approaches to accommodate documentation that demonstrate time saving (Avendano et al., 2022). Various EHRs allow the use of templates and shortcuts for documentation (Avendano et al., 2022). Providers open a template, either built in or custom, and "fill in the blanks." This method allows for consistency in provider notes by ensuring that relevant information is addressed in each encounter. However, "bloated" notes occur due to needless repetition and irrelevant subjects (Apathy et al., 2022). Furthermore, copy and paste compounds documentation issues by not showing any changes between subsequent encounters. For example, identical assessment notes copied and pasted leads to the concern of skipped assessments. Whereas updated and differing language clearly illustrates topics covered in each encounter.

Providers commonly use in-person scribes. In some instances, medical students looking to gain experience fulfill the role of scribe, in other instances facilities hire professional scribes. Scribes minimize the time providers spend documenting on their own (Gellert, 2023; Van Buchem et al., 2021). However, several drawbacks exist. First, the documentation burden still exists and only transfers to another individual. Second, scribes are expensive when paid and not an intern (Van Buchem et al., 2021). These costs have been shown to exceed $50,000 (Avendano et al., 2022). Training in medical nomenclature and medical understanding further increases costs. Third, providers must still review and sign off on the completed notes (Bett et al., 2023). Any errors require intensive corrections. The addition of a third party to medical appointments may not be welcomed by patients, though some studies support patient acceptance (Bett et al., 2023; Fogleman et al., 2024).

Dictation offers another mechanism of note completion and has been shown to improve documentation time (Avendano et al., 2022). Using this method, providers record their impressions/notes in audio files to be transcribed by software or medical scribes off site. Like in-person scribes, services come with a financial cost. Wages must be paid (or subscription) to another entity. Other challenges include deciphering medical jargon, understanding the providers speech (e.g., accents, poor recordings, volume), and again provider review (Avendano et al., 2022). Environmental issues such as ambient noise, equipment quality, and privacy further impact dictation charting

Digital scribes provide a modern update to provider documentation. Digital scribes are active during encounters and gather information from all present parties using context sensitive parameters (Van Buchem et al., 2021). These services combine elements from other methods of

documentation and allow the provider to spend more time with the patient and less on documentation (Borgstadt et al., 2022). They integrate directly into the provider's EHR, use existing formats (templates), and function through voice recognition and machine learning. Again, a cost exists for this service in the form of software purchase and/or subscription fees. Providers should still review documentation prior to final approval. While review can be time consuming, practice is necessary for all forms of documentation and takes less time overall than complete documentation without help.

Purpose

Focus, observation, and active communication are vital requirements for precise assessment and treatment of psychiatric patients. Additionally, providers must create, and maintain, accurate, thorough documentation. The purpose of this quality improvement project is to:

1. Select and implement a digital scribe program for use in a private practice outpatient mental health clinic.
2. Evaluate documentation efficiency before and after implementation.

This project aims to decrease provider documentation time and thereby improve provider satisfaction, improve patient, safety, and increase revenue. Improvement is identified as a reduction in documentation times by an estimated 20%. Changes necessary to meet these aims are the implementation of the AI program, and changes in processes, physical office layout, and updates to forms based on weekly outcome assessments.

Method

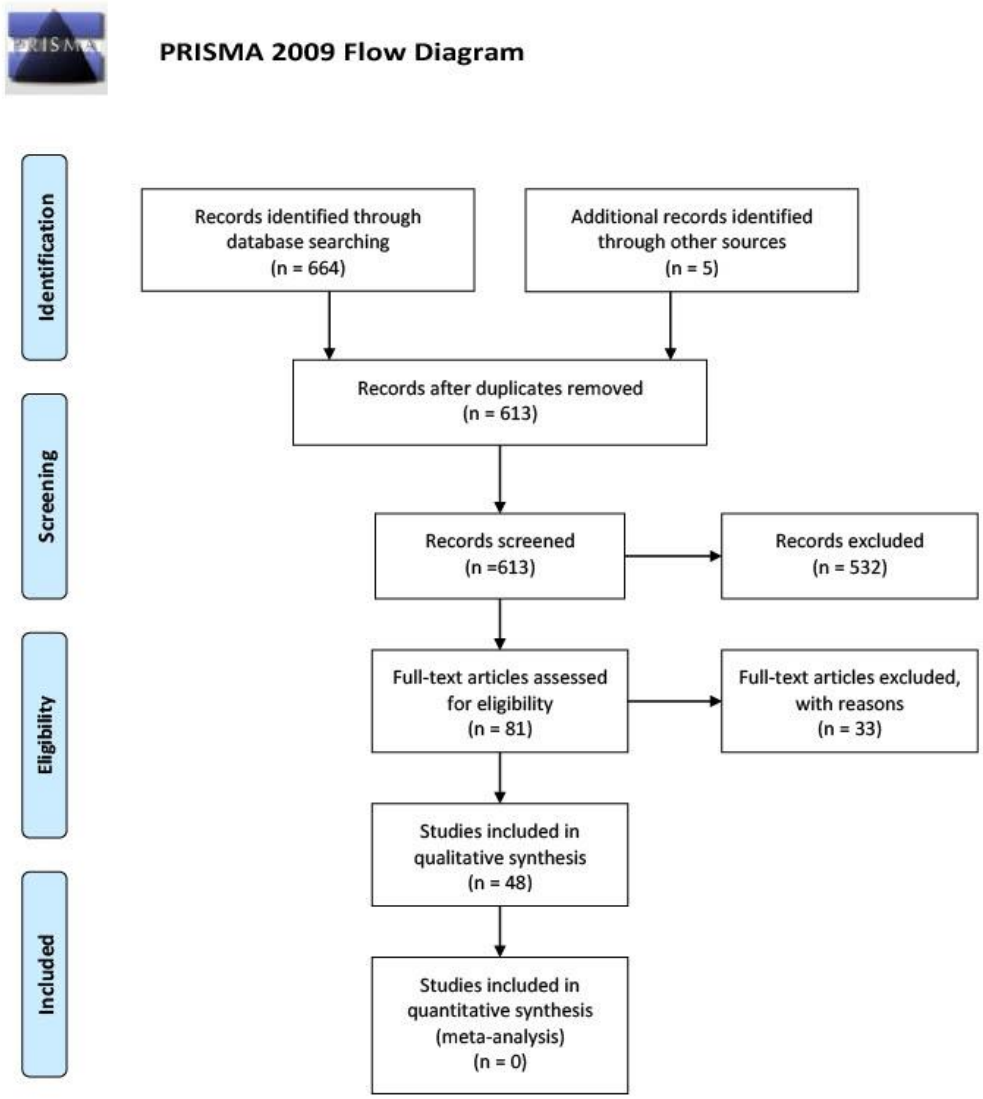
A scoping review was conducted to assess the effectiveness, feasibility, and barriers to implementation of an AI digital scribe in a Psychiatric Mental Health Nurse Practitioner (PMHNP) private practice. The Montana State University (MSU) Library's search engine, CatSearch, was used to identify relevant articles for review. This search engine searches MSU's library print and electronic holdings, online professional journal access held by the university, TRAILS (Treasure State Academic Information & Library Services), CINAHL, Medline, ProQuest Central, PsycINFO, PubMed, and a multitude of other resources. Searches were conducted in September 2024 using the search terms: Artificial intelligence charting, Digital scribe; ambient listening technology, natural language processing, speech recognition; machine learning; and clinical documentation. Further references were selected by reviewing the reference lists of relevant identified articles. All generated search result abstracts were further reviewed for relevance to the project.

Eligibility

Articles were included based on review of relevant content matching search terms, peer reviewed, open access, and available online from 2019-2024. Article abstracts were further reviewed for relevant content, as well as one thematic assessment of a health care symposium. eligibility. Exclusion criteria included non-English works, any articles older than 2019, content irrelevant to the medical field, lack of full text, duplicates, thesis/dissertation work, general conference proceedings, and presentations. The initial searches yielded 664 articles, after the first round of exclusions using duplicates, title, and abstract review, 81 articles remained. Second

round exclusions ruled out articles after full text review and yielded 47 articles. One additional article was added after reference reviews of the 47 articles and duplicates ruled out leaving a total of 48 articles for inclusion into the project.

Figure 1 – PRISMA



PRISMA Diagram illustrating reference selection process (Moher et al., 2009)

Literature Synthesis

Artificial intelligence has the potential to address significant issues in mental health, and particularly in the realm of documentation. A review of the literature investigating the use of AI as a digital scribe yielded several key points to include patient safety, ethical considerations, risks/limitations, and benefits. While the literature supports positive benefits and impacts from the use of AI in documentation (Anas, 2024; Avendano et al., 2022; Balloch et al., 2024; Blease, Worthen, et al., 2024; Cabello-Collado et al., 2024; Lebcir et al., 2021; Nashwan et al., 2024; Seibert et al., 2021; Van Genderen et al., 2024; Wang et al., 2022), careful evaluation of the other identified factors should be considered prior to implementing AI in a clinical setting.

Implementation challenges

The goal of AI in documentation is to reduce manual data entry, improve data management, and enhance patient safety (Anas, 2024; Avendano et al., 2022; Avula & Amalakanti, 2024; Balloch et al., 2024; Blease, Worthen, et al., 2024; Sankalp, 2024). Within this context literature shows several ethical concerns, limitations and risks. With a plethora of EHRs available to providers, interoperability between the AI and the EHR of choice is a concern (Anas, 2024; Cao et al., 2024). Duplication of records and missed fields are a possibility with software interfaces or note output type (Tran et al., 2023). The “black-box” nature of commercial AI products (proprietary information, programing, algorithms, etc.) makes communication between software, as well as understanding of the technology, difficult for providers (Avula & Amalakanti, 2024; Eastwood et al., 2023; Ennis-O’Connor & O’Connor, 2024; Fogleman et al.,

2024; Van Genderen et al., 2024). The opaque nature of proprietary information used in AI raises an ethical question between patient safety and intellectual property.

Voice to documentation errors present the greater concern for documentation. Significant background noise, accents, and jargon present barriers to natural language processing and speech recognition algorithms picked up by ambient audio recording devices compared with alternative documentation methods (e.g., scribe, provider notes, etc.) (Avendano et al., 2022; Avula & Amalakanti, 2024; Tran et al., 2023).

Automation bias, humans placing too much belief in electronics, presents another area where problems arise (Amigud, 2024; Anas, 2024; Avula & Amalakanti, 2024; Blease, Torous, et al., 2024; Van Genderen et al., 2024). As an example, acceptance of electrocardiogram results without review from a cardiologist. The machine's output may indeed be accurate, however, without review significant patient risk develops. Human review of output is essential for accurate and safe use (Anas, 2024; Avendano et al., 2022)

Artificial intelligence has been shown to enhance patient safety (Avula & Amalakanti, 2024; Blease, Worthen, et al., 2024; Nashwan et al., 2024; Sankalp, 2024). Easing the administrative burden of documentation through the use of AI reduces provider burnout, allows for greater patient focus/contact, and increases patient safety (Cabello-Collado et al., 2024; Eastwood et al., 2023; Gellert, 2023; Holmgren et al., 2021; Islam et al., 2024; Lebcir et al., 2021, 2021; Matsler et al., 2024; Nashwan et al., 2024; Pyne et al., 2023). Other articles allude that AI can be safe but presents several concerns related to ethics, safety, privacy, and accuracy in need of addressing (Coiera et al., 2018; Eastwood et al., 2023; Ennis-O'Connor & O'Connor, 2024; Fogleman et al., 2024; Ghatnekar et al., 2021; Kernberg et al., 2024; Lewis & Mercer,

2024; Liu et al., 2023; Montomoli et al., 2024; Novak et al., 2023; Sankalp, 2024; Yim et al., 2023). Key concerns include potential for data privacy due to security breaches, and inaccuracies in capture/translation of communications. For example, many medications have similar sounding names. Inaccurate medication lists lead directly to patient safety concerns.

Implementation of safeguards by providers, software developers, and regulatory agencies minimizes patient risk. Providers reduce risks through regular review of documentation prior to finalization (Blease, Worthen, et al., 2024; Nicolette et al., 2023). Software developers reduce risk through continued research, input from users, and through the use of best practice digital security. Regulatory agencies help, in conjunction with providers and consumers, to establish the rules and regulations necessary to ensure privacy and safety (Khullar et al., 2024; Liu et al., 2023; Montomoli et al., 2024; Murphy et al., 2021; Yim et al., 2023).

Benefits, impact, and implications in practice & policy

The use of traditional note taking and charting during an appointment creates gaps in communication where important information might be missed. Alternately, failure to document during a session relies solely on the provider's recollection and accurate rendition of the session. Either circumstance opens the door to inaccuracies due to omission or failure to capture key information. The use of digital scribes allows for unimpeded attention on the patient (Bett et al., 2023; Quiroz et al., 2020; Wang et al., 2021). Providers are free to focus on body language and specific words/phrases used by the patient, while simultaneously having the conversation documented.

Focus on the patient without distraction allows for improved rapport building and information gathering (Bett et al., 2023; Blease, Torous, et al., 2024; Quiroz et al., 2019; Wang et

al., 2021). While current technology still introduces inaccuracies — necessitating careful provider review — the entire process becomes more time efficient. A review of the information allows the provider to further conceptualize the case and create more accurate assessments and diagnoses. Further operational efficiency is improved through accurate, well documented diagnoses supporting insurance billing codes, and resulting in fewer billing rejections (Avendano et al., 2022; Cao et al., 2024).

In many jobs, documentation is often cited as one of the least desirable tasks (Apathy et al., 2022; Avendano et al., 2022; Kernberg et al., 2024; L. S. Rotenstein et al., 2023). Due to the commonality of litigation in the United States, providers show a propensity to over document (Nicolette et al., 2023; Yu et al., 2023). Coupled with other extensive computer tasks — emails, research, meetings, et cetera — direct patient care becomes secondary to the overall job. This reduced patient interaction leads to job dissatisfaction and burnout for providers (Apathy et al., 2022; Fogleman et al., 2024; Nicolette et al., 2023; Wang et al., 2021). With less hours to see patients, access to care is further impeded in an already backlogged an insufficient system (Blease, Worthen, et al., 2024; Borgstadt et al., 2022).

Conclusion

Artificial intelligence shows a transformative effect on global society. In the healthcare industry, AI improves efficiency and accuracy with the implementation of guardrails and oversight discussed above. Numerous benefits in healthcare are possible with implementation of AI, including improving patient care, reducing administrative burdens, and increasing workflow efficiency.

Streamlining operations and increased patient time and focus facilitates communication between healthcare providers and patients resulting in improved health outcomes. Patients leave appointments feeling seen and heard, further improving patient satisfaction. Providers experience improved, or continued, job satisfaction and reduced burnout. Improved documentation allows for accurate diagnosis and increased reimbursement from appropriate insurance coding.

CHAPTER TWO

QUALITY IMPROVEMENT PROPOSAL

Introduction and Problem

Introduction

Patient documentation requires accurate, thorough, and timely entry into EHRs while remaining succinct. As computers and technology improve, healthcare facilities worldwide integrate EHRs into standard practices (Gellert, 2023). Considering the millions of healthcare providers — and billions of patients — the amount of time spent documenting care through traditional methods (e.g., manual entry, dictation, personal scribes, etc.) is staggering (Gellert, 2023). Increased access of medical records by patients further underscores the importance of accurate, comprehensive notes (Blease, Torous, et al., 2024). Nationally, providers in the United States spend longer working in EHRs leading to decreased productivity and provider burnout (Holmgren et al., 2021). The United States has around 100,000 medical scribes, and no national guidelines or educational requirements exists (Gellert, 2023). While a considerable number of jobs exist, the lack of regulation introduces concerns for patient care, as well as the time burden only being shifted away from providers (Gellert, 2023). At a state and local level, particularly in rural areas, individuals available to scribe may be lacking, or pay too low. Additionally, smaller clinics and private practices may not be able to afford a scribe, or the need for an added employee. An additional person in sessions makes establishing trust more difficult, especially in patients with traumatic histories. At a practice level, patient communication and interaction are disrupted by the provider typing or physically taking notes during a session, and the provider

may miss key details while distracted with immediate documentation. Conversely, relying on memory recall of a session introduces gaps and inaccuracies. With appointment heavy days, provider fatigue contributes to additional documentation errors. Further complication exists when using in person scribes, as patients may not feel comfortable with a third party in the room — especially when discussing private medical history or even past trauma.

Problem and Aim

An identified problem exists where providers find clinical documentation bothersome and time-consuming, and patient interaction and rapport suffers while documenting during a visit. Providers over document in the United States due to factors such as insurance billing and litigation (Holmgren et al., 2021). Providers might spend as much as 50% of a their day on documentation and EHR use (L. Rotenstein et al., 2024). Documentation practices are inadequate, leading to poor patient health outcomes, poor patient satisfaction, provider burn out, and insurance coverage discrepancies. Therefore, the aim of this quality improvement project is to: Decrease charting time in a private practice mental health clinic by 20% through the implementation and EHR integration of an AI digital scribe program by March 15, 2025. Implementation of an AI scribe allows for uninterrupted conversation between provider and patient by capturing the discussion between provider and patient in real-time without the need for note taking, typing, or a physical scribe. Capture of the entire conversation prevents errors of omission. The captured information from the session is transcribed and integrated into the provider's EHR by the AI software. The provider then needs only to review the documentation for accuracy, thereby saving time and improving human interaction and trust.

Organizational Microsystem Assessment

The clinic chosen for this project is a rural private practice mental health clinic. The clinic consists of a sole psychiatric mental health nurse practitioner (PMHNP). During a meeting to discuss the project, the provider states they schedule patients two days per week over a 10-hour period and sees an average of fifteen patients per day. The clinic provides both in-person and telehealth services. In addition to seeing patients, the provider handles coding/billing, scheduling, and other office functions generally performed by support staff. These added tasks coupled with a large case load put time at a premium.

Individuals seeking treatment access services via telephone contact, or through sending a note on the clinic's website. Once the individual has connected with the provider, they are provided with a web link to complete initial demographic information, screening forms, and consent forms. Upon completion of the forms, the provider contacts the individual and schedules an appointment. While this approach to appointment scheduling is more complex than an online scheduling portal, the provider reports a decrease in patients not showing up for appointments. The clinic resides the Rocky Mountain West. Much of this region is considered rural with few resources, and multiple health disparities including access, economic, racial, and physical barriers (Nuako et al., 2022). Primary resources exist in larger urban areas which often require patients to travel long-distance or utilize telehealth access. Access to care in these areas is sub-optimal. Public transportation is unavailable, and patients seeking treatment may not have their own vehicle, the ability to drive, or any support network available to provide a ride. Those individuals who have access to transportation must contend with environmental factors that make travel dangerous or impossible. The rural nature of this region presents further challenges of communication access. A lack of cellular provider coverage, or internet connectivity prevents

telehealth in many cases. Though this is improving due to the Broadband Internet Connections for Rural America Act implemented under President Biden's administration (Rep. Scott, 2022). The limited access, and limited number of providers, puts provider time at a premium, creating appointment backlogs that are commonly weeks to months long.

The Data

As stated, the provider sees an average of 15 patients per day. Documentation length varies for the type of appointment. For example, new patients require complete assessment and case formulation, while follow up appointments require minimal updates to their existing file. An estimate of 15 minutes spent per patient in documentation equals 3 hours and 45 minutes spent at a computer each day. This is a substantial amount of time, which makes workdays longer for the provider, or delays documentation until the next day or later. Delays in documentation, or inaccuracies due to fatigue, have a negative impact on treatment plans and follow-up care. As discussed, fatigue or delays in documenting introduce potential for inaccurate data in patient files. Implementation of an AI scribe might reduce this time by an estimated 30%, or approximately 5 minutes per patient. This reduction equates to an added hour and a half of time savings. Time that equals an additional initial patient assessment with medication management, or approximately $230 at a Medicaid reimbursement rate (MT.GOV, 2024). Or even more important, time spent on provider self-care (at least time not in the office).

Quality Improvement Framework

The Plan, Do, Study and Act (PDSA), model from the Institute for Healthcare Improvement (IHI) was selected to aid in implementation of this project. The PDSA model

functions as a cyclical process for assessing change (IHI, n.d.). This process looks to answer the questions:

- What are we trying to accomplish?
- How will we know that change is an improvement?
- What changes can we make that will result in improvement?

Using the cycle involves planning a process for implementing a new process, implementing the process, observing and analyzing the outcome of the implementation, and using the new information to refine the original plan beginning the cycle again. Multiple cycles are common for establishing new processes. The PDSA model appropriately addresses the implementation process for the selected clinic.

Plan

The planning portion includes selection of an appropriate AI program, identifying clinic computers for installation, installation of the program and microphone, provider orientation/familiarization with the program, and start date/time for initial use. This stage will begin immediately after IRB approval and continue for one week. During this stage, the provider can test the program using simulated patients. A patient consent form will be created during this period to allow ample time for revision if necessary. Patient consent is imperative for this project given a small potential for data breaches, and the software "recording" the session.

Do

The "Do" phase will begin mid-January and continue through the duration of the program, with weekly PDSA cycles occurring over the 6-week implementation period. The project will begin with obtaining baseline documentation time over several days until baseline

data for 30 patients is obtained. The DNP student will initiate contact with scheduled patients to obtain signed consent through emailing the form out to scheduled patients, as well as verifying in person that the form was completed, and the patients consent at the time of appointment. After consent is obtained, the provider will begin the session with the patient. At the completion of the session and after the patient exits, the provider will begin documentation, and the DNP student will capture the time necessary to complete the documentation. In situations where there is inadequate time to document between patients, the timing of documentation will be conducted as soon as there is time to do so, or at the end of the shift as necessary. The DNP student will record the times captured and analyze the results with descriptive statistics, generating average time per patient, and total overall documentation time.

The next step in the process will be repeated with the student providing consent forms to patients via email requesting consent to capture documentation utilizing the AI scribe. This step will continue for two days in clinic. The provider will initiate the program at the start of the appointment and begin the session with the patients. At the conclusion of the appointment, the provider will review the captured information and make any adjustments to the document as necessary. The DNP student will again time from start of the review to finish. As above, accommodation will be made for documenting during available time, or at the end of the shift. Again, the captured times will be analyzed per patient and overall times, as well as compared to baseline data.

The DNP student and provider will review the entire process together after data is collected to assess ease of use, time savings (and excessive time), and workflow processes. Once collected, the data is then analyzed for the “Study” phase.

Study

During the "Study" phase, the provider and DNP student evaluate the data based on predictions of ease of use, time metrics, and workflow efficiency. The predictions for this process improvement are a decrease in documentation time due to a decrease in the need for note taking and manual entry of information into an EHR. Additional predictions are improved communication between the patient and provider, and improved office workflow. Key areas to review during the study phase include patient safety, confidentiality, user competence, and the financial impact to the clinic. This phase will occur weekly using documentation data from all patients seen during the week and compared back to the initial baseline data. Necessary adjustments will be identified and incorporated within the Act phase.

Act

The "Act" phase uses any identified deficiencies to develop adjustments needed and the cycle begins again. As an example, after installing, training, and using the AI program, the data may show an increase in documentation time for a patient. When analyzed, the data shows that the patient's voice is recorded and transcribed accurately, but information from the provider is inconsistent. Further analysis shows that the microphone is closer to the patient and blocked from the provider due to a cluttered desk. The proposed solution therefore becomes moving the microphone more centrally and clearing obstacles. The modification occurs and the cycle begins again. A second cycle reveals that documentation time remains longer than anticipated. The analysis also identifies the cause as an inadequate documentation template requiring the provider to spend time reading and reorganizing the material. A new template is created from the new information and the cycle begins a third time.

As demonstrated, the PDSA process allows for adjustment and adaptation to clinic needs based on prediction outcomes. In the best-case scenario, the cycles identify all challenges and proposed adjustments resulting in expectations met or exceeded. In a worst-case scenario, the process identifies the proposed project as inadequate for the clinic.

Methods

Implementation summary

The planned intervention site is a rural private practice mental health clinic. The clinic consists of a sole PMHNP. The population treated by this provider includes patients across the lifespan from age 6 through geriatric patients. The patients are a diverse mix of individuals from rural and urban areas, and all socioeconomic classes. The clinic provides both in-person and telehealth services. Project implementation will require provider familiarization with AI software and the interface with the existing EHR. The implementation timeline is expected to occur over 4-6 weeks after IRB approval in January of 2025.

Intervention and Implementation

After identifying the project, 10 potential AI programs were considered (Table 1). After consideration and assessment, the provider identified Heidi Health AI for implementation.

Table 1 – AI Programs considered

AI Scribe Programs Considered

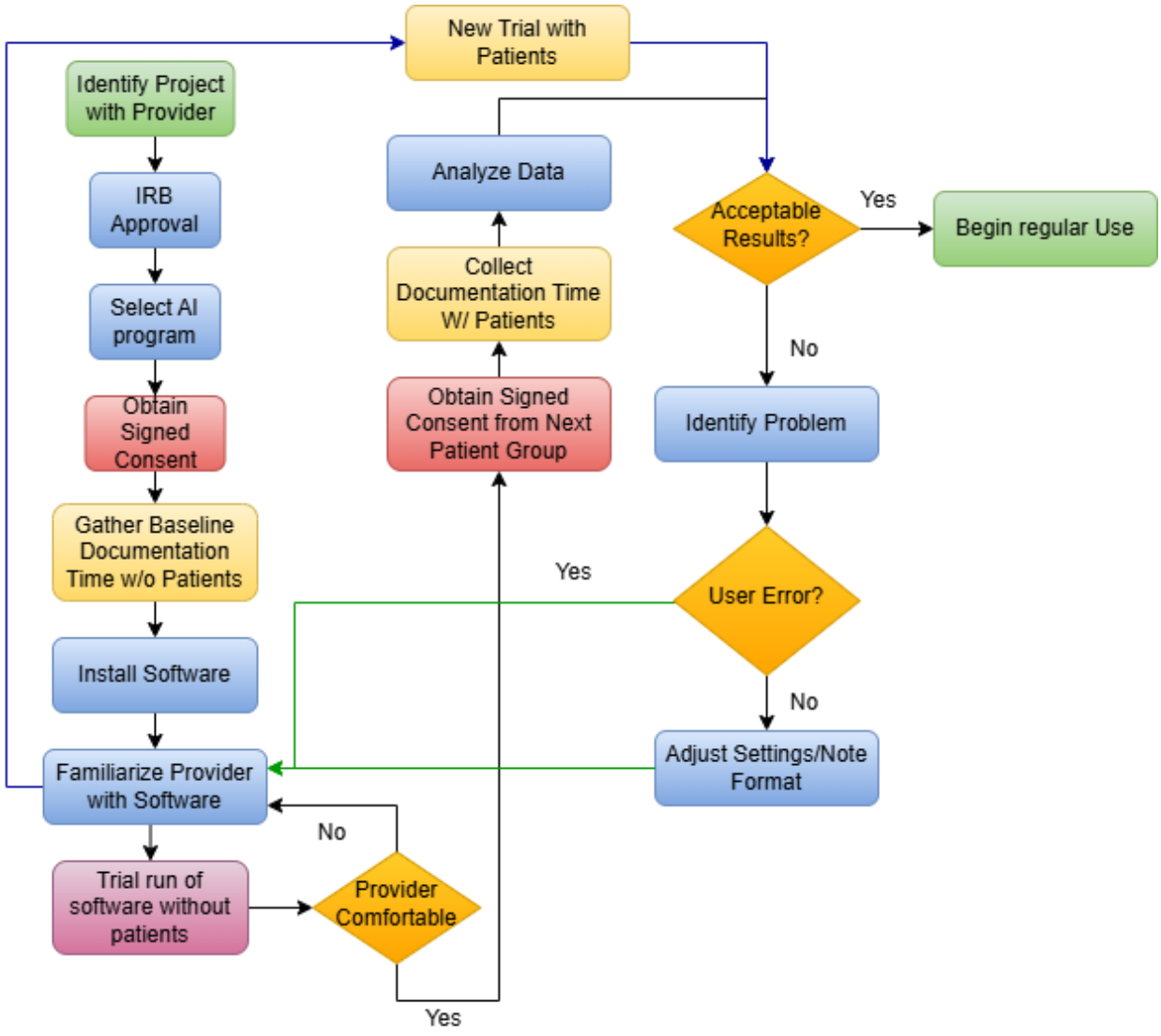
Brand	Integrates with EHR	Custom Notes	Cost	Confidentiality/HIPPA
Ambience AI	X	X	$2800-$3200/Year	X
Bastion GPT	X	X	$20/Month	X
Clinical Notes AI	X	X	$0-60/Month	X
Deep scribe AI	X	X	$400-$500/Month	X
Freed	X	Soap Notes	$99/Month	X
Heidi Health AI	X	X	$799/Year	X
JotPsych	Copy/Paste	X	$150/Month	X
Nabla	X	X	$119/Month	X
PMH Scribe	Replaces EHR	Unclear	$99/Month	X
Scribeberry	Copy/Paste	Unclear	$99/Month	X

This table lists AI scribe programs considered for implementation in the clinic with key points of consideration

Once Institute Review Board (IRB) approval is obtained baseline documentation time will be collected. Consent will be obtained, and documentation times will be collected for 30 patients (approximately 2 clinic days). Time to measure will begin when documentation for an individual patient is started and stopped at the conclusion of documentation for that patient. After collecting baseline data, the program will be installed on clinic computers and a software familiarization period will start. The length of time for familiarization will be determined by provider comfort level with the software. Once the provider is comfortable with the software patients will be provided with consent forms and documentation times will be collected for all patients during clinic days that week. The time frame for the project implementation and data collection will take place over approximately 4-6 weeks. Figure 2 illustrates the full process from problem identification through regular use of the AI scribe.

Figure 2 – Project Implementation

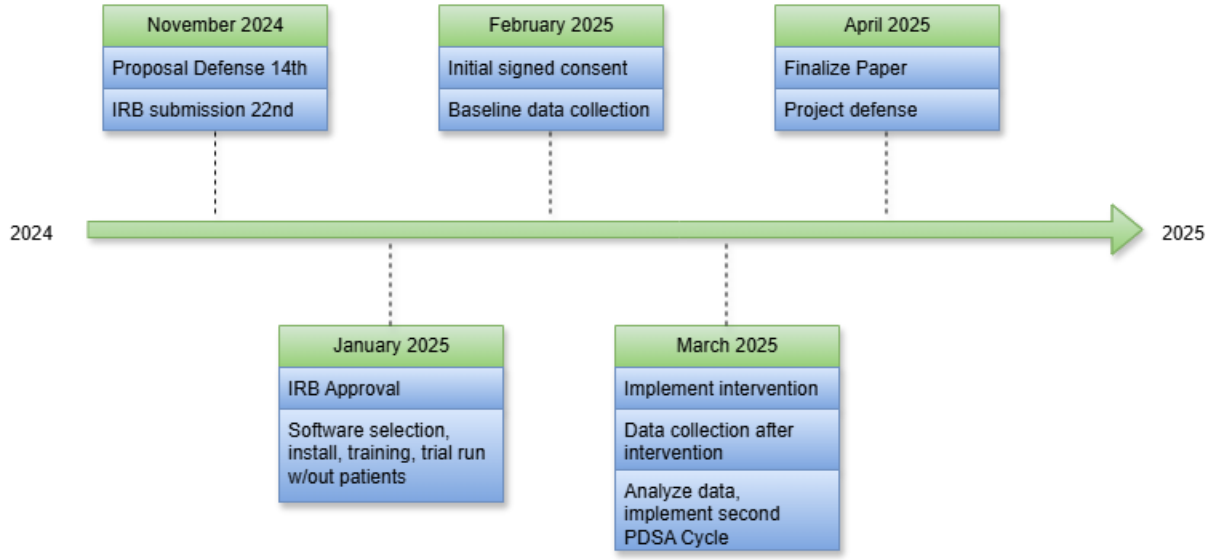
Project Implementation Flowsheet



This figure illustrates the process for implementing the AI scribe. Additionally, it shows the cyclic nature of the PDSA method.

Figure 3 - Timeline

Project timeline



This figure illustrates the anticipated project timeline from proposal defense through project presentation and defense.

Evaluation, Analysis, Safety, and Confidentiality

Evaluation and analysis of the data is a key consideration in determining the effectiveness of reduced documentation time. Aside from viewing patient information during clinic days, no patient identifying information will be collected. Regardless, the student will ensure that collected data is completely de-identified prior to analysis. Patients will be assigned a number daily based on their chronological arrival for their appointments (e.g., the first patient for the day will be assigned 1, the second 2, etc.). Data will be analyzed utilizing descriptive statistics based on before and after time measurements. Data will be classified by visit type to control for variation in required documentation type. For example, documentation times for initial patient visits will be compared separately from routine medication management visits. Quantitative data will be collected on:

1. Total number of patients before implementation and after implementation, with an estimated number of n=60 (30 pre implementation, 30 post implementation)
2. Baseline documentation time per patient categorized by visit type
3. After implementation documentation time per patient categorized by visit type
4. The number of patients consenting for, and declining, the use of an AI scribe during their appointment.

The data collected will be used to calculate:

1. Total number of patients (n=60)
2. The percentage of patients giving consent to AI use
3. Average overall pre-implementation time, and average times based on visit type
4. Average overall post-implementation time, and average times based on visit type
5. Upon completion of data analysis, the results will be compared against the SMART objective identified above, and in figure 4.

Ensuring the safety and confidentiality of behavioral health patients is critical. Current cultural stigmas against mental illness are a barrier to seeking treatment in many cases. As such, patients even seeking treatment for their conditions must extend a certain amount of trust and vulnerability to even seeking treatment. A violation of this trust could result in poor patient outcomes, especially in patients with suicidal or homicidal ideation. In consideration of this, the project will be thoroughly vetted by the clinic provider, project chairs, and the Montana State University Internal Review Board.

Patient identifying data and demographics are unnecessary for this project. None-the-less, all data will be reviewed to ensure no identifying data is present. The aim of the project only requires data collection based on documentation time, visit type, and patient consent. As a further

patient safeguard, the clinic provider and DNP student are the only authorized people allowed access to patient files, on clinic computers.

Figure 4 – SMART Goals

This illustration demonstrates the SMART approach to defining project aims and objectives.

Conclusion

Clinical documentation is bothersome and time-consuming. Patient interaction is impacted when providers focus on note taking during sessions, and documentation suffers from provider fatigue, delays in completion, and inaccuracies. Implications are poor patient outcomes, provider burnout, and insurance reimbursement challenges. Implementation of an AI scribe corrects these challenges by capturing the entire session dialogue between provider and patient and transcribing the content into a standardized form within the provider's EHR. Documentation time is reduced while maintaining patient-provider rapport and improving patient health outcomes.

A small, rural single provider (PMHNP) private practice in the Rocky Mountain West was selected to implement the improvement process. The clinic serves several at risk populations, and populations experiencing significant health disparities. Due to limited access in the region, the provider schedules long office hours and sees a high number of patients per workday. The high number of patients equates to lengthy documentation times with the current documentation practices and can be improved with the introduction of an AI scribe. Alternative methods such as in-person scribes, or dictation impact patient interaction, or miss key elements presented by the patient.

The implementation of this project will follow PDSA methodology beginning with AI scribe selection, installation, patient consent forms, and baseline data collection. Figure 3 illustrates the anticipated project timeline from IRB approval through presentation of material. After implementation data will be collected and analyzed to assess if the project improvement meets established goals and modified or refined to address identified issues. The process will

repeat until expectations are met, or the project considered ineffective. All collected data will be deidentified and access limited to provider and student.

CHAPTER THREE

QUALITY IMPROVEMENT MANUSCRIPT

Contribution of Authors and Co-Authors

Manuscript in Chapter 3

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Contributions: Literature review, project development, data collection/analysis

Co-Author: Dr. Julie Ruff

Contributions: Project Chair, edit suggestions

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Journal of the American Association of Nurse Practitioners

Status of Manuscript: [Put an x in one of the options below, then delete instruction in brackets]
☒ Prepared for submission to a peer-reviewed journal
☐ Officially submitted to a peer-reviewed journal
☐ Accepted by a peer-reviewed journal
☐ Published in a peer-reviewed journal

Journal of the American Association of Nurse Practitioners

Manuscript

IMPLEMENTATION OF A DIGITAL SCRIBE TO IMPROVE FACE TO FACE INTERACTIONS AND REDUCE CHARTING TIME

Jamie Logan Young, BS Psych, BSN, RN

Abstract

Background: The 2009 Health Information Technology for Economic and Clinical Health (HITECH) Act mandated the transition to electronic health records (EHRs) to improve healthcare efficiency and documentation accuracy. However, this shift has led to unintended consequences, including increased administrative burden, reduced provider-patient interaction, and documentation-driven care (Avendano et al., 2022; Borgstadt et al., 2022; Coiera et al., 2018). Studies indicate that providers spend between 20-50% of their time on documentation, leading to burnout, decreased efficiency, and patient dissatisfaction (Apathy et al., 2022; Holmgren et al., 2021; L. Rotenstein et al., 2024). Traditional solutions, such as note templates, dictation software, and human scribes, present challenges related to cost, efficiency, and accuracy (Bett et al., 2023; Van Buchem et al., 2021). Artificial intelligence (AI) scribes have emerged as a promising alternative, leveraging machine learning and voice recognition to automate documentation while maintaining accuracy and efficiency (Blease, Worthen, et al., 2024; Cao et al., 2024).

Local Problem: A rural private mental health clinic, operated by a sole Psychiatric Mental Health Nurse Practitioner (PMHNP), faced significant documentation burdens, reducing patient interaction and provider efficiency.

Methods: A Plan-Do-Study-Act (PDSA) framework guided the implementation of an AI scribe program. Baseline documentation times were collected and compared post-implementation.

Interventions: The Heidi© AI scribe was integrated into the clinical workflow to transcribe and summarize patient encounters for EHR documentation.

Results: AI-assisted documentation reduced charting time by 35.03%, saving an average of 2.5 hours per clinic day. The provider also reported enhanced documentation quality and patient engagement.

Conclusions: AI scribes offer a viable solution for reducing administrative burden, improving workflow efficiency, and enhancing provider-patient interactions in psychiatric care (Avendano et al., 2022; Balloch et al., 2024; Rajkomar et al., 2019).

Keywords: Artificial intelligence; AI; scribe; mental health; documentation; PMHNP; psychiatry.

In In 2009 the United States enacted the Health Information Technology for Economic and Clinical Health (HITECH) Act. With the mandate of electronic health records (EHRs) the HITECH Act hoped to improve the safety, quality, and efficiency of healthcare. While EHRs have improved record keeping, their impact on medical professionals and patients shows mixed results. Healthcare facility management pressures providers to maximize the number of patients seen. Nursing shortages contribute to increased patient ratios. The inpatient ratios leads to providers spending a significant time charting, and care becomes documentation driven (Avendano et al., 2022; Borgstadt et al., 2022; Coiera et al., 2018). Documentation burden contributes to provider burnout, reduced time spent with patients, reduced efficiency, and dissatisfaction (Apathy et al., 2022; Avendano et al., 2022; Bett et al., 2023; Borgstadt et al., 2022; Fogleman et al., 2024; Ghatnekar et al., 2021; L. S. Rotenstein et al., 2023, 2023; Van Buchem et al., 2021)

Providers are forced to decide between documentation quality or patient care quality. Despite consistency in EHR programs (e.g., EPIC, NextGen Healthcare, Greenway Health, etc.), providers in the United States spend significantly more time documenting in EHRs than in other developed countries (Holmgren et al., 2021). Estimates claim providers spend anywhere between

one third to half of their time documenting, including evenings and weekends (Apathy et al., 2022; Holmgren et al., 2021; L. Rotenstein et al., 2024; L. S. Rotenstein et al., 2023).

Rushed patient care has negative health outcomes such as inaccurate or missed diagnoses (Apathy et al., 2022; Borgstadt et al., 2022). Furthermore, limited provider interaction leaves patients feeling they are unheard, their concerns are left unaddressed, and medical staff may miss changes in patient conditions (Borgstadt et al., 2022). Both situations increase facility and employee liability in adverse events. On the other hand, inadequate documentation, and over documentation, increases liability, as well as negatively affecting insurance reimbursement (Apathy et al., 2022).

Providers utilize a number of different approaches to improve efficiency, including copy/paste, note templates, EHR dot-phrases, in-person scribes, dictation software, and most recently artificial intelligence (AI) based digital scribes (Avendano et al., 2022; Cao et al., 2024; Quiroz et al., 2019; Rajkomar et al., 2019; L. S. Rotenstein et al., 2023). Each approach towards improvement presents specific challenges and advantages. A financial cost exists for all options in the form of wages, software purchases, or subscriptions.

Various EHRs allow the use of templates and shortcuts for documentation (Avendano et al., 2022). This method allows for consistency in provider notes by ensuring that relevant information is addressed in each encounter. However, “bloated” notes occur due to needless repetition and irrelevant subjects (Apathy et al., 2022). Identical follow up assessment notes from the use of copy and paste, or the use of prefilled templates leads to the concern of skipped assessments. Whereas updated and differing language clearly illustrates topics covered in each encounter.

Scribes decrease the time providers spend documenting independently (Gellert, 2023; Van Buchem et al., 2021). However, several drawbacks exist such as shifted documentation burden, or scribe expense (Van Buchem et al., 2021). Professional scribe costs (including training in medical nomenclature) have been shown to exceed $50,000 (Avendano et al., 2022). While cost savings can be realized by using medical students or interns, the challenges of documentation burden and errors remain. Intensive error corrections may be required (Bett et al., 2023). Finally, the addition of a third party may make some patients uncomfortable, though some studies support patient acceptance (Bett et al., 2023; Fogleman et al., 2024).

Dictation offers another mechanism of note completion and has been shown to improve documentation time (Avendano et al., 2022). Providers record their impressions/notes in audio files to be transcribed by software or medical scribes off site. Like in-person scribes, services come with a significant financial cost. Other challenges further impact dictation charting, including understanding the providers speech (e.g., accents, tones, inflection, volume), and environmental issues such as ambient noise, equipment quality, and privacy (Avendano et al., 2022).

Digital scribes provide a modern update to provider documentation. Digital scribes are active during encounters and gather information from all present parties using context sensitive parameters (Van Buchem et al., 2021). These services combine elements from other methods of documentation allowing the provider to spend more time with the patient and less on documentation (Borgstadt et al., 2022). They function through voice recognition and machine learning. Again, costs and review of the documentation remains necessary, while reviewing documents requires less time than full documentation.

Precise assessment and treatment of psychiatric patients requires focus, observation, and active communication. Additionally, providers must create, and maintain, accurate, thorough documentation. The purpose of this quality improvement project is to:

1. Select and implement a digital scribe program for use in a rural outpatient mental health clinic.
2. Evaluate documentation efficiency before and after implementation.

This project aimed to decrease provider documentation time, thereby improving provider satisfaction, patient safety, and potentially increasing revenue. Improvement is identified as a reduction in documentation time by an estimated 20%. Changes necessary to meet these aims are the implementation of the AI program, changes in processes, physical office layout, and updates to forms based on weekly outcome assessments.

Literature Synthesis

Artificial intelligence has the potential to address significant issues in mental health care, particularly in the realm of documentation. A scoping review was conducted to assess the effectiveness, feasibility, and barriers to implementation of an AI digital scribe in a Psychiatric Mental Health Nurse Practitioner (PMHNP) private practice. Goals of AI-assistance include reduced manual data entry, improved data management, and enhanced patient safety (Anas, 2024; Avendano et al., 2022; Avula & Amalakanti, 2024; Balloch et al., 2024; Blease, Worthen, et al., 2024; Sankalp, 2024). The literature review revealed several key considerations for the use of AI digital scribes including patient safety, ethical considerations, risks/limitations, and potential benefits. While the literature supports positive benefits and impacts from the use of AI-assistance in documentation (Anas, 2024; Avendano et al., 2022; Balloch et al., 2024; Blease, Worthen, et al., 2024; Cabello-Collado et al., 2024; Lebcir et al., 2021; Nashwan et al., 2024;

Seibert et al., 2021; Van Genderen et al., 2024; Wang et al., 2022), careful evaluation of other identified factors should be considered prior to implementing AI in a clinical setting.

Many concerns arise from a technological standpoint regarding AI. With a plethora of EHRs available to providers, interoperability between the AI and the EHR of choice becomes a concern (Anas, 2024; Cao et al., 2024). Duplication of records and missed fields are a possibility with software interfaces or note output type (Tran et al., 2023). The potential for data privacy due to security breaches presents another concern. The opaque nature of proprietary information used in AI raises an ethical question between patient safety and intellectual property. The "black-box" nature of commercial AI products (proprietary information, programing, algorithms, etc.) makes communication between software, as well as understanding of the technology, challenging for providers (Avula & Amalakanti, 2024; Eastwood et al., 2023; Ennis-O'Connor & O'Connor, 2024; Fogleman et al., 2024; Van Genderen et al., 2024).

Voice to documentation errors present the greatest concern for documentation. Significant background noise, accents, and jargon present barriers to natural language processing and speech recognition algorithms picked up by ambient audio recording devices compared with alternative documentation methods (e.g., scribe, provider notes, etc.) (Avendano et al., 2022; Avula & Amalakanti, 2024; Tran et al., 2023). For example, many medications have similar sounding names. Inaccurate medication transcription leads directly to patient safety concerns.

Automation bias, humans placing too much belief in electronics, presents another area where problems arise (Amigud, 2024; Anas, 2024; Avula & Amalakanti, 2024; Blease, Worthen, et al., 2024; Van Genderen et al., 2024). As an example, acceptance of electrocardiogram results

without review from a cardiologist. Without human review of the output an opportunity for significant patient risk develops (Anas, 2024; Avendano et al., 2022).

Easing the administrative burden of documentation through the use of AI reduces provider burnout, allows for greater patient focus/contact, and increases patient safety (Cabello-Collado et al., 2024; Eastwood et al., 2023; Gellert, 2023; Holmgren et al., 2021; Islam et al., 2024; Lebcir et al., 2021; Matsler et al., 2024; Nashwan et al., 2024; Pyne et al., 2023). Implementation of safeguards by providers, software developers, and regulatory agencies minimizes patient risk. Providers reduce risks through regular review of documentation prior to finalization (Blease, Worthen, et al., 2024; Nicolette et al., 2023). Software developers reduce risk through continued research, input from users, and through the use of best practice digital security. Regulatory agencies help, in conjunction with providers and consumers, to establish the rules and regulations necessary to ensure privacy and safety (Khullar et al., 2024; Liu et al., 2023; Montomoli et al., 2024; Murphy et al., 2021; Yim et al., 2023).

Methods

Intervention and Implementation

The intervention site is a rural private practice mental health clinic with a sole PMHNP provider. The population treated includes a diverse mix of patients across the lifespan. from rural and urban areas, and all socioeconomic classes. Both in-person and telehealth services are provided. The Plan, Do, Study, Act (PDSA) quality project improvement process was followed (IHI, n.d.). Project implementation required provider familiarization with AI software and an interface with the existing EHR. Patient consent to participate in the process improvement, as well as the use of AI, was obtained using a consent form created by the student and uploaded by

the provider to their EHR patient portal. The provider sent an email out to patients instructing them to complete the forms. Baseline patient documentation times prior to AI installation were collected, followed by documentation times after installation, and finally analysis of the collected data (Figure 5). The implementation timeline covered 6 weeks after IRB approval in January of 2025.

Selection of an AI scribe program began the process. Ten potential AI programs were considered (Table 2) for this project. The AI program selection was left to the provider considering a financial cost exists. Selection criteria were cost, useful features, ease of operation, positive reviews from colleagues, and a free trial option versus scheduling a demonstration. After review, the provider selected Heidi Health AI for implementation; a web-based program which allows for computer, smartphone or tablet use, and is reasonably priced at ~$800/year (Heidi Health, 2025).

Operationally, the provider initiates the AI scribe for each patient session with a simple mouse click. The session continues on in its entirety while the AI captures the conversation between all parties present. When the session ends the program is stopped, and documentation can begin immediately or at a more convenient time. To begin documentation, the AI is instructed to analyze the session transcript and produce an output document. Documents are produced as a preset format or custom template. As an example, a preset format might be SOAP notes (Subjective, Objective, Analysis, Plan). The AI analysis pulls information from the transcript and summarizes the elements into the appropriate category. Custom templates follow the same process, while the categories and context are determined by the provider. The provider

then reviews the results, makes any corrections, and copy/paste into the EHR if not an integrated AI. In addition to the notes, the AI can generate referral letters, orders, and aftercare instructions.

An interesting, and relevant, sidebar here is the consideration of feedback from colleagues in the field. Feedback was gathered through forum interactions and topic searches for prior discussions in specific PMHNP social media groups (PMHNP Facebook Group, personal communication, January & February 2025), as well as from colleagues. Many of the companies offering AI scribes include boiler plate consent forms for downloading. Dialogue in social media groups exists in addressing the consent question (PMHNP Facebook Group, personal communication, January & February 2025). The Facebook group searched for was a PMHNP specific private group with membership requiring NPI verification. The group is only open to practicing PMHNP providers and current PMHNP students. Answers fell on a spectrum ranging from full consent forms at every intake to not using one at all and declaring the use of AI as a core business practice (PMHNP Facebook Group, personal communication, January & February 2025). The rational for full practice integration makes claim that patients have the freedom to choose to engage in services before making appointments. In essence, the use of AI becomes an automatic “opt in” when receiving services at that facility. There may be merit here considering that none of the patients seen during this implementation period declined the use of AI.

As one can imagine, social media provides a plethora of program suggestions with pros and cons for each suggestion. Opinions varied widely, often in outright contradiction of other points of view. While convenient and biased, an interesting perspective was gained into how individual providers/clinics are using this technology. The information illuminated specific features and capabilities of AI used across regions and settings.

Table 2 – AI Programs considered

AI Scribe Programs Considered

Brand	Integrates with EHR	Custom Notes	Cost	Confidentiality/HIPPA
Ambience AI	X	X	$2800-$3200/Year	X
Bastion GPT	X	X	$20/Month	X
Clinical Notes AI	X	X	$0-60/Month	X
Deep scribe AI	X	X	$400-$500/Month	X
Freed	X	Soap Notes	$99/Month	X
Heidi Health AI	X	X	$799/Year	X
JotPsych	Copy/Paste	X	$150/Month	X
Nabla	X	X	$119/Month	X
PMH Scribe	Replaces EHR	Unclear	$99/Month	X
Scribeberry	Copy/Paste	Unclear	$99/Month	X

This table lists AI scribe programs considered for implementation in the clinic with key points of consideration

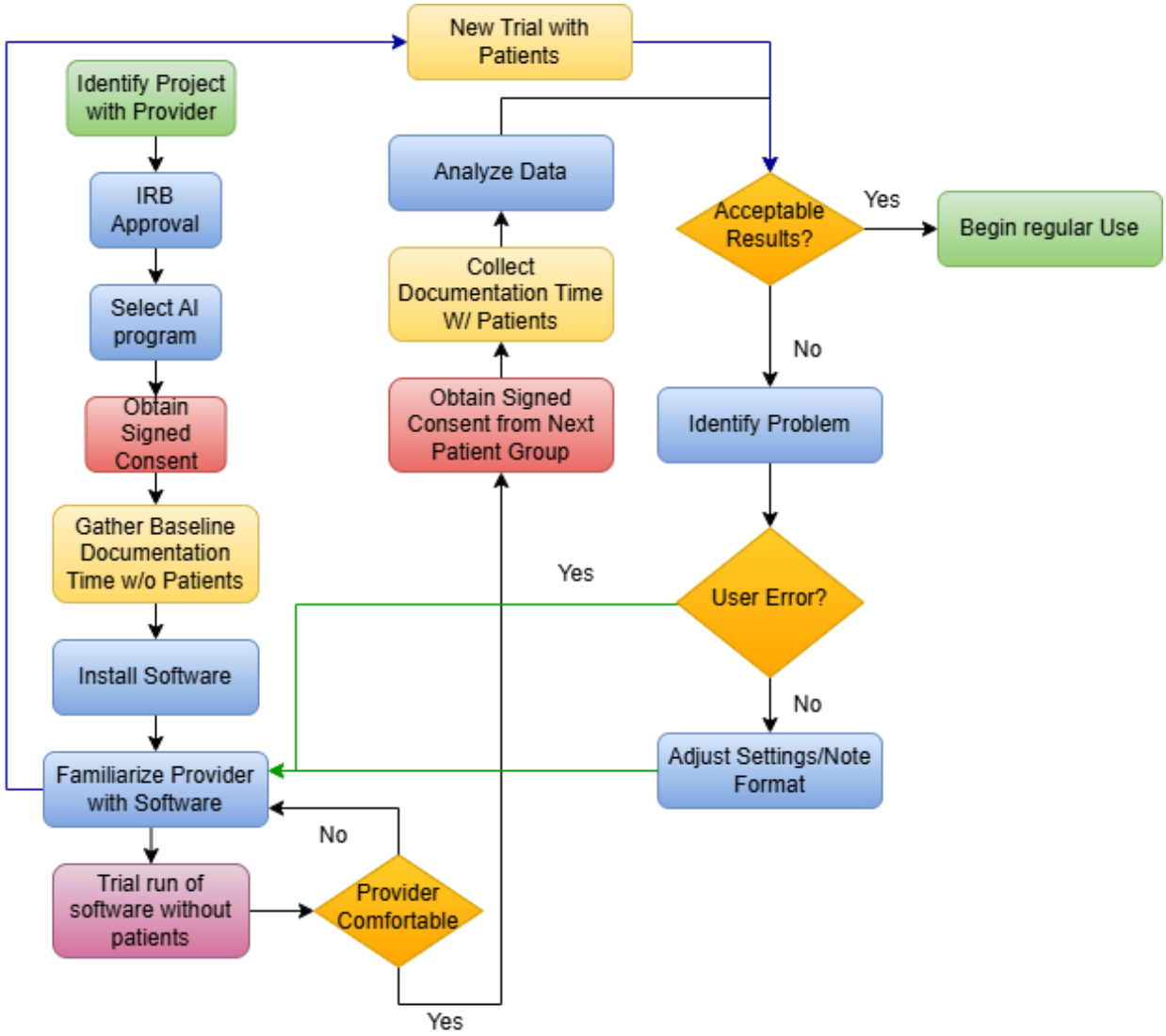
After selection and familiarization, Institute Review Board (IRB) approval was obtained, patients were provided with informed consent, using the provider's patient portal, for participating in the improvement project. The provider sees patients three days per week with an average of 15 patients per day. Baseline documentation times were collected for 30 patients (approximately 2 clinic days). Documentation times were defined as the length of time required to fully document each patient's session in the provider's EHR. As an important distinction, this provider took minimal notes (primarily follow-up appointment dates and medication dosages) that took mere seconds and did not interrupt appointment flow. Their preferred method of documentation was between clients, and barring that, at the culmination of their daily appointments. This documentation delay and frustration was a key factor in the provider's willingness to trial AI scribes. The provider had some initial challenges transitioning to full AI use due to workflow habits. For example, for the first day of use they continually wrote down

the next appointment date even though the AI captured the information every time. By the end of the PDSA cycle the provider rarely utilized their "scratch pad."

Ideally, documentation begins after the patient session and within the allotted appointment time scheduled. However, in practice this is rarely the case. Often the next appointment begins without any delay, necessitating documentation during lunch periods, after the last patient, or after hours. These delays became the impetus for this quality improvement process. Time measurements were conducted using a stopwatch application available on a smartphone. Measurements began with the provider announcing they were beginning documentation on an individual patient, and the stopwatch stopped when the provider announced completion of documentation.

The first PDSA cycle iteration involved AI selection, familiarization, and baseline data collection. While the intent was to gather baseline data prior to initiating the use of AI, provider enthusiasm and eagerness led to some use of the AI prior to full baseline data collection, and at times when the student was not at the clinical site. This led to a small delay in completing baseline data. Regardless, total data (baseline and after implementation) was collected on 78 Patients, consisting of both new patient intakes and follow-up medication management. Data and processes were reviewed — initially by the student and then results and suggested adjustments were discussed with the provider — and the second PDSA cycle began. Figure 2 illustrates the full process from problem identification through regular use of the AI scribe.

Figure 5 - Implementation flowsheet
Project Implementation Flowsheet



This figure illustrates the process for implementing the AI scribe. Additionally, it shows the cyclic nature of the PDSA method.

The second cycle was initiated using AI exclusively. The AI program is web based and requires the use of a microphone available in the provider's primary computer, a tablet computer and the provider's smartphone were available as backup devices. Sessions were initiated (both in

person and via. telehealth), while data recording procedures mirrored the collection process described above.

One challenge that presented itself during this cycle was the provider not consistently starting the recording process. However, this presented an opportunity to utilize the dictation function of the AI program. The provider found dictation to provide significant time savings. Another challenge: general templates did not provide adequate documentation, for the remainder of this cycle dictation was used to supplement missing information (primarily treatment plans).

Given the output challenges, social media was again utilized in an effort to find relevant tips and processes for optimizing the AI program (PMHNP Facebook Group, personal communication, January & February 2025). Based off the information obtained, a custom template was created with specific categories to meet the provider's documentation requirements. The third PDSA cycle repeated the data collection using the new template. Additionally, the provider further acclimated to the process, and dictation became rarely necessary.

At the culmination of the third cycle, the provider felt that their documentation time was adequately reduced. An additional (though anecdotal) benefit of higher quality notes was identified as an unexpected improvement. The provider was confident at this point in discontinuing PDSA cycles and fully adopting the established process.

Implementation challenges

Evaluation, Analysis, Safety, and Confidentiality

Ensuring the safety and confidentiality of behavioral health patients is critical. Current stigmas regarding mental illness remain a barrier to seeking treatment. As such, patients must

extend a certain amount of trust and vulnerability when engaging in services. A trust violation could result in poor patient outcomes, particularly with patients with suicidal or homicidal ideation, The project was thoroughly vetted by the clinic provider, project chairs, and the Montana State University Internal Review Board.

Patient identifying data and demographics were unnecessary for this project, all data was reviewed to ensure no identifying information was present. Data collected was limited to documentation time, visit type, complexity, and patient consent. Patient consent to participate in the process improvement, as well as the use of AI, was obtained using a consent form created by the student and uploaded by the provider to their EHR patient portal. The provider sent an email out to patients instructing them to complete the forms. The clinic's provider retained control of consent records for ongoing business practice. As a further patient safeguard, the clinic provider and DNP student were the only authorized people allowed access to patient files, and clinic computers.

Evaluation and analysis of the data is necessary to determine the effectiveness of the intervention. Participating patients were assigned a number based on their chronological arrival for their appointments (e.g., the first participating patient for the day was assigned 1, 2, etc.). Data was analyzed utilizing descriptive statistics based on before and after time measurements. Data was classified by visit type to control for variation in required documentation type, as well as by case complexity. Documentation times for initial patient visits differ significantly from routine medication management visits. Case complexity further lengthens documentation time according to the provider, however at the culmination of this project no unduly complicated cases were encountered. Quantitative data was collected on:

1. Total number of patients before implementation and after implementation, n=78 with n=26 for baseline, and n= 52 post implementation (n=22 PDSA cycle 2, n=30 PDSA cycle 3).
2. Baseline documentation time per patient categorized by visit type (initial, follow-up)
3. After implementation documentation time per patient categorized by visit type
4. The number of patients who consented or declined the use of an AI scribe during their appointment (100%).

The data collected was used to calculate:

1. Total number of patients (n=78)
2. The percentage of patients giving consent to AI use (100%)
3. Average overall pre-implementation time, and average times based on visit type
4. Average overall post-implementation time, and average times based on visit type

Upon completion of data analysis, the results were compared against the objectives identified above.

Results

A comparative analysis was conducted on documentation time across different methods: baseline (traditional charting), AI dictation, active AI, and fully AI-assisted (Table 2). Descriptive statistics, including mean time, standard deviation, and range, were used to evaluate efficiency. The impact on total clinic time and percentage improvements in documentation efficiency were also assessed.

Table 3 – Descriptive statistics

Documentation Modality Descriptive statistics

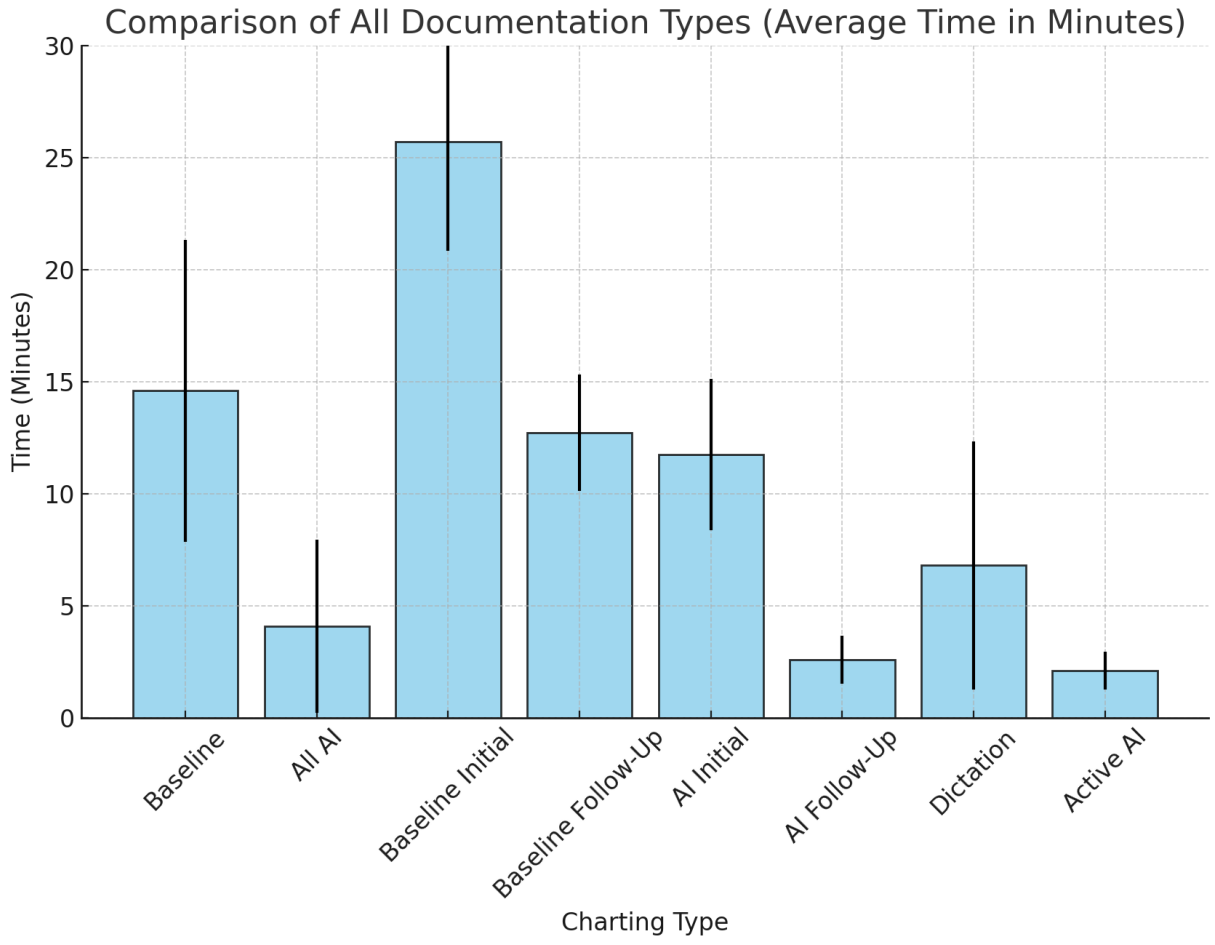
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
Baseline	26	31:57	00:14	32:11	14:35	06:44	.879	.456	1.502	.887
Baseline Initial	5	0:12:10	0:20:01	0:32:11	0:25:42	0:04:51	.145	.913	-1.143	2.000
Baseline Follow-up	21	0:08:59	0:08:51	0:17:50	0:12:35	0:02:34	.218	.501	-.741	.972
All AI	52	17:57	01:01	18:58	04:04	03:52	2.194	.330	4.497	.650
AI Initial	8	0:10:11	0:08:47	0:18:58	0:12:17	0:03:17	1.294	.752	1.705	1.481
AI Follow-up	44	0:05:04	0:01:01	0:06:05	0:02:35	0:01:04	1.193	.357	2.144	.702
AI Dictation	12	0:17:05	0:01:53	0:18:58	0:05:57	0:05:18	1.955	.637	2.948	1.232
Active AI	10	0:02:35	0:01:01	0:03:36	0:02:06	0:00:50	.330	.687	-.636	1.334
Valid N (listwise)	5									

This table lists AI scribe programs considered for implementation in the clinic with key points of consideration

These results highlight that Active AI is the most effective documentation method, providing substantial time savings and freeing time for direct patient care or other essential tasks. Total documentation time using Baseline: ~219 minutes. Total documentation time using AI assisted: ~61 minutes Total time saved: ~158 minutes (approximately 2 hours and 38 minutes), or 35.03%. Baseline charting requires significantly more time than fully AI-assisted documentation (Figure 2). The error bars show some variability, but AI-assistance consistently

demonstrates a lower time. Dictation reduces documentation time compared to Baseline but remains more time-consuming than Active AI. Active AI demonstrates the lowest average documentation time. The general trend indicates that Baseline charting methods require the longest time, while AI-assisted methods significantly reduce documentation duration.

Figure 6 - Documentation comparison



This figure illustrates the process for implementing the AI scribe. The figure illustrates the impact implementation of an AI scribe had on documentation for the provider (ChatGPT, OpenAI, 2025).

These findings suggest that AI tools and dictation significantly improve documentation efficiency, with Active AI offering the greatest time savings. AI-assistance presents an opportunity to enhance clinical efficiency, significantly reducing total documentation time and variability in documentation. Overall, the documentation time decreased by approximately 72.04% using AI-assistance.

Discussion

Benefits, impact, and implications in practice & policy

The use of traditional note taking and charting during an appointment creates gaps in communication where important information may be missed. Alternately, failure to document during a session relies solely on the provider's recollection and recall. Either circumstance opens the door for inaccuracies due to omission or failure to capture key information, while the use of digital scribes allows for unimpeded attention on the patient (Quiroz et al., 2020; Sankalp, 2024; Wang et al., 2022).

This quality improvement project was consistent with the literature regarding efficiency and time savings. The objectives outlined early in the process were met and exceeded. The documentation burden was reduced by 72% over our estimated 20% goal. The provider showed a net gain of 2 hours and 38 minutes per day (given an average of 15 patients per day) in their clinic due to the accuracy, efficiency, and format of the AI scribe output. In contrast, the provider cited a particularly busy week where 68 patients were seen. By their estimate, completing documentation that week "took an entire clinical day" (in actuality 16.5 Hours). Had AI been implemented prior to this week the provider would have reduced the total documentation time from 16.5 hours to 4.6 hours. This is consistent with the provider's estimate of an entire day

worth of documentation. While the AI did not integrate specifically with the provider's EHR, significant benefit was shown when copying and pasting from a customized template to match the provider's documentation style and EHR.

In several instances a failure to start AI at the beginning (or at all) during patient sessions occurred, whereby the provider utilized the dictation feature in the AI program to capture relevant information. The dictation features seamlessly integrated the provided information into the developed template. Consistent with the literature, dictation alone decreased documentation times. Additionally, the provider reported very few errors in the output relative to traditional dictation methods — resulting in minimal note review.

Focus on the patient without distraction allows for improved rapport and information gathering (Bett et al., 2023; Blease, Torous, et al., 2024; Quiroz et al., 2019; Wang et al., 2021). While not measured specifically, patients accepted the use of AI, perhaps due to the prevalence of computers, tablets, and smart phones in our daily lives. While not a specific measurement of the project, it should also be noted that the AI functioned equally well in sessions between in person or telehealth visits. With current technology, inaccuracies necessitate careful provider review. Even still, the incidence of necessary corrections appeared very low requiring a few words, context, or content addition every 3-5 patients. Per provider's observation, necessary corrections were generally "only a word or two every few patients." Frequently the provider was overheard stating, "this is perfect, I don't need to correct anything."

Though not a specific aim of this project, the provider felt that with AI use their note quality improved. In discussions with the provider they stated that they feel the documentation was more thorough while remaining concise. They presented several examples where important

information was captured (such as after care instructions, mental health status exam fields, etc.) and presented in wording found more appropriate. Future improvement projects might specifically assess documentation quality to verify improvement. These results are also consistent with the literature citing better case conceptualization, and more accurate assessments/diagnoses. Higher quality documentation could reduce insurance billing code errors, resulting in fewer billing rejections (Avendano et al., 2022; Cao et al., 2024).

Improvement in accuracy therefore may equate to increased revenue from fewer rejected claims or through identifying additional billable codes. Accuracy improvements are in addition to the possible increased revenue potential gained from scheduling additional patients during the hours saved — This provider incidentally elected to use the time they have saved to improve their quality of life.

Limitations

While the implementation of an AI scribe proved effective in this clinic, the project and process may not generalize to other mental health facilities. For instance, in the above discussion points on social media variations exist in documentation needs, formats, and individual preferences (citations). Individual state requirements (laws and policy) and differences between facility policies further drives documentation needs. Electronic hardware, operating systems, privacy, and room layout may hinder, or even prevent implementation of an AI scribe. Room layout impacts implementation due to room acoustics, location of the recording microphone (computer, tablet, phone, etc.) For instance, if the provider and patient choose to sit in comfortable seating away from the provider's desk, the microphone may have difficulty picking up the conversation.

One significant limitation identified during this process was the provider's eagerness to begin utilizing the program. Baseline data collection was prolonged due to the provider utilizing the AI with some patients before all baseline data was collected. After minimal use, the provider felt the intervention so effective that continuing baseline collection wasn't necessary. The argument presented was similar to medication trial studies where treatment is shown to be so effective that continuing the study and delaying treatment to the control group equates to unethical practices. Ultimately full baseline data was collected.

Reduced documentation was the primary goal of this project, and as such quantitative measures were appropriate. However, in retrospect a mixed methods approach may have yielded interesting results regarding documentation quality. This perspective arose from discussions about patient acuity and complexity. The implication being quality of documentation outweighs the time variable. However, it can be argued that time savings can simultaneously exist in these cases as the time burden for documentation is substantial when documenting without AI. Acutely ill and complex patient diagnoses were infrequent making the time required to obtain significant data in this area prohibitive within a six-week window of implementation.

Conclusion

A small, rural private practice provider (PMHNP) in the Rocky Mountain West was selected to implement the improvement process. The clinic serves several at risk populations, and those experiencing significant health disparities. Due to limited healthcare access in the region, the provider schedules long office hours and sees a high number of patients per workday. The high number of patients seen equates to lengthy documentation times. Implementing an AI scribe

in this practice has reduced the overall documentation time by 2.5 hours on an average 15 patient day. Anecdotally, the provider feels that documentation quality has improved.

The PDSA methodology used in this project allowed for controlled changes and adaptations to procedures, ultimately refining the use of the AI scribe to a level the provider is content with. The provider feels that the AI interface is user-friendly and enhances their workflow through minimal adaptations or procedural interruptions. Largely, these results are consistent with the current literature.

Clinical documentation is time-consuming. Patient interaction is impacted when providers focus on note taking during sessions. Documentation quality and content suffer from provider fatigue, delays in completion, and inaccuracies. Implications for practice are poor patient outcomes, provider burnout, and insurance reimbursement challenges. Implementation of an AI scribe corrects these challenges by capturing the entire session dialogue between provider and patient and transcribing the content into a standardized form for use in a provider's EHR. The ultimate result is a substantial reduction in documentation time while maintaining patient-provider rapport and improving patient health outcomes.

References Cited

AACN. (2006). *The Essentials of Doctoral Education for Advanced Practice Nursing*. American Association of Colleges of Nursing. https://www.aacnnursing.org/portals/42/publications/dnpessentials.pdf

Amigud, A. (2024). The Age of the Intelligent Machine: Singularity, Efficiency, and Existential Peril. *Philosophy & Technology*, *37*(2), 49. https://doi.org/10.1007/s13347-024-00740-0

Anas, A. (2024). *Redefining Healthcare With Artificial Intelligence (AI): The Contributions of ChatGPT, Gemini, and Co-pilot*. https://doi.org/10.7759/cureus.57795

Anthes, E. (2020). *The Great Indoors*. Scientific American / Farrar, Straus and Giroux.

Apathy, N. C., Hare, A. J., Fendrich, S., & Cross, D. A. (2022). I had not time to make it shorter: An exploratory analysis of how physicians reduce note length and time in notes. *Journal of the American Medical Informatics Association : JAMIA*, *30*(2), 355–360. https://doi.org/10.1093/jamia/ocac211

Avendano, J. P., Gallagher, D. O., Hawes, J. D., Boyle, J., Glasser, L., Aryee, J., & Katt, B. M. (2022). Interfacing With the Electronic Health Record (EHR): A Comparative Review of Modes of Documentation. *Cureus*. https://doi.org/10.7759/cureus.26330

Avula, V. C. R., & Amalakanti, S. (2024). Artificial intelligence in psychiatry, present trends, and challenges: An updated review. *Archives of Mental Health*, *25*(1), 85. https://doi.org/10.4103/amh.amh_167_23

Balloch, J., Sridharan, S., Oldham, G., Wray, J., Gough, P., Robinson, R., Sebire, N. J., Khalil, S., Asgari, E., Tan, C., Taylor, A., & Pimenta, D. (2024). Use of an ambient artificial intelligence tool to improve quality of clinical documentation. *Future Healthcare Journal*, *11*(3), 100157. https://doi.org/10.1016/j.fhj.2024.100157

Bett, E. S., Frommeyer, T. C., Reddy, T., & Johnson, J. “Ty.” (2023). Assessment of patient perceptions of technology and the use of machine-based learning in a clinical encounter. *Intelligence-Based Medicine*, *7*, 100096. https://doi.org/10.1016/j.ibmed.2023.100096

Blease, C., Torous, J., McMillan, B., Hägglund, M., & Mandl, K. D. (2024). Generative Language Models and Open Notes: Exploring the Promise and Limitations. *JMIR Medical Education*, *10*, e51183. https://doi.org/10.2196/51183

Blease, C., Worthen, A., & Torous, J. (2024). Psychiatrists' experiences and opinions of generative artificial intelligence in mental healthcare: An online mixed methods survey. *Psychiatry Research*, *333*, 115724. https://doi.org/10.1016/j.psychres.2024.115724

Borgstadt, J. T., Kalpas, E. A., & Pond, H. M. (2022). A Qualitative Thematic Analysis of Addressing the Why: An Artificial Intelligence (AI) in Healthcare Symposium. *Cureus*. https://doi.org/10.7759/cureus.23704

Cabello-Collado, C., Rodriguez-Juan, J., Ortiz-Perez, D., Garcia-Rodriguez, J., Tomás, D., & Vizcaya-Moreno, M. F. (2024). Automated Generation of Clinical Reports Using Sensing Technologies with Deep Learning Techniques. *Sensors*, *24*(9), 2751. https://doi.org/10.3390/s24092751

Cao, D. Y., Silkey, J. R., Decker, M. C., & Wanat, K. A. (2024). Artificial intelligence-driven digital scribes in clinical documentation: Pilot study assessing the impact on dermatologist workflow and patient encounters. *JAAD International*, *15*, 149–151. https://doi.org/10.1016/j.jdin.2024.02.009

ChatGPT. (2025, March). *Response to a prompt asking ChatGPT to create a graph using provided descriptive statistics* [Large language model]. OpenAI. https://chat.openai.com/

Coiera, E., Kocaballi, B., Halamka, J., & Laranjo, L. (2018). The digital scribe. *Npj Digital Medicine*, *1*(1), 1–5. https://doi.org/10.1038/s41746-018-0066-9

Eastwood, K. W., May, R., Andreou, P., Abidi, S., Abidi, S. S. R., & Loubani, O. M. (2023). Needs and expectations for artificial intelligence in emergency medicine according to Canadian physicians. *BMC Health Services Research*, *23*(1), 798. https://doi.org/10.1186/s12913-023-09740-w

Ennis-O'Connor, M., & O'Connor, W. T. (2024). Charting the future of patient care: A strategic leadership guide to harnessing the potential of artificial intelligence. *Healthcare Management Forum*, *37*(4), 290–295. https://doi.org/10.1177/08404704241235893

Fogleman, B. M., Goldman, M., Holland, A. B., Dyess, G., & Patel, A. (2024). Charting Tomorrow's Healthcare: A Traditional Literature Review for an Artificial Intelligence-Driven Future. *Curēus (Palo Alto, CA)*, *16*(4), e58032–e58032. https://doi.org/10.7759/cureus.58032

Gellert, G. A. (2023). Medical Scribes: Symptom or Cause of Impeded Evolution of a Transformative Artificial Intelligence in the Electronic Health Record? *Perspectives in Health Information Management*, *20*(1), 1–17.

Ghatnekar, S., Faletsky, A., & Nambudiri, V. E. (2021). Digital scribe utility and barriers to implementation in clinical practice: A scoping review. *Health and Technology*, *11*(4), 803–809. https://doi.org/10.1007/s12553-021-00568-0

Heidi Health. (2025, March 20). *Pricing*. https://www.heid health.com/pricing

Holmgren, A. J., Downing, N. L., Bates, D. W., Shanafelt, T. D., Milstein, A., Sharp, C. D., Cutler, D. M., Huckman, R. S., & Schulman, K. A. (2021). Assessment of Electronic Health Record Use Between US and Non-US Health Systems. *Archives of Internal Medicine (1960)*, *181*(2), 251–259. https://doi.org/10.1001/jamainternmed.2020.7071

IBM Corp. (2023). *IBM SPSS Statistics for Windows, Version 29.0* [Computer software]. IBM Corp.

IHI. (n.d.). *Quality Improvement Essentials Toolkit | Institute for Healthcare Improvement*. Institute for Healthcare Improvement (IHI). Retrieved October 18, 2024, from https://www.ihi.org/resources/tools/quality-improvement-essentials-toolkit

Islam, M. N., Mim, S. T., Tasfia, T., & Hossain, M. M. (2024). Enhancing patient treatment through automation: The development of an efficient scribe and prescribe system. *Informatics in Medicine Unlocked*, *45*, 101456. https://doi.org/10.1016/j.imu.2024.101456

Khullar, D., Wang, X., & Wang, F. (2024). Large Language Models in Health Care: Charting a Path Toward Accurate, Explainable, and Secure AI. *Journal of General Internal Medicine*, *39*(7), 1239–1241. https://doi.org/10.1007/s11606-024-08657-2

Lebcir, R., Hill, T., Atun, R., & Cubric, M. (2021). Stakeholders' views on the organisational factors affecting application of artificial intelligence in healthcare: A scoping review protocol. *BMJ Open*, *11*(3), e044074. https://doi.org/10.1136/bmjopen-2020-044074

Liu, J., Wang, C., & Liu, S. (2023). Utility of ChatGPT in Clinical Practice. *Journal of Medical Internet Research*, *25*, e48568. https://doi.org/10.2196/48568

Matsler, N., Pepin, L., Banerji, S., Hoyte, C., & Heard, K. (2024). Use of large language models to optimize poison center charting. *Clinical Toxicology*, *62*(6), 385–390. https://doi.org/10.1080/15563650.2024.2348107

Montomoli, J., Bitondo, M. M., Cascella, M., Rezoagli, E., Romeo, L., Bellini, V., Semeraro, F., Gamberini, E., Frontoni, E., Agnoletti, V., Altini, M., Benanti, P., & Bignami, E. G. (2024). Algor-ethics: Charting the ethical path for AI in critical care. *Journal of Clinical Monitoring and Computing*, *38*(4), 931–939. https://doi.org/10.1007/s10877-024-01157-y

MT.GOV. (2024, July 1). *Montana.Gov* [Government]. Mid-Level Practitioner. https://medicaidprovider.mt.gov/44

Murphy, K., Di Ruggiero, E., Upshur, R., Willison, D. J., Malhotra, N., Cai, J. C., Malhotra, N., Lui, V., & Gibson, J. (2021). Artificial intelligence for good health: A scoping review of the ethics literature. *BMC Medical Ethics*, *22*(1), 14. https://doi.org/10.1186/s12910-021-00577-8

Nashwan, A. J., Abujaber, A., & Ahmed, S. K. (2024). Charting the Future: The Role of AI in Transforming Nursing Documentation. *Cureus*. https://doi.org/10.7759/cureus.57304

Nicolette, B., Cassar, K., Caruana, D. G., & Grima, M. J. (2023). *Medical Note Quality Audit at the Vascular Surgical Unit Compared With the British Medical Journal (BMJ) Guidelines*. https://doi.org/10.7759/cureus.50110

Nuako, A., Liu, J., Pham, G., Smock, N., James, A., Baker, T., Bierut, L., Colditz, G., & Chen, L.-S. (2022). Quantifying rural disparity in healthcare utilization in the United States: Analysis of a large midwestern healthcare system. *PloS One*, *17*(2), e0263718–e0263718. https://doi.org/10.1371/journal.pone.0263718

Pyne, Y., Wong, Y. M., Fang, H., & Simpson, E. (2023). Analysis of 'One in a Million' primary care consultation conversations using natural language processing. *BMJ Health & Care Informatics*, *30*(1), e100659. https://doi.org/10.1136/bmjhci-2022-100659

Quiroz, J. C., Laranjo, L., Kocaballi, A. B., Berkovsky, S., Rezazadegan, D., & Coiera, E. (2019). Challenges of developing a digital scribe to reduce clinical documentation burden. *Npj Digital Medicine*, *2*(1), 114. https://doi.org/10.1038/s41746-019-0190-1

Quiroz, J. C., Laranjo, L., Kocaballi, A. B., Briatore, A., Berkovsky, S., Rezazadegan, D., & Coiera, E. (2020). Identifying relevant information in medical conversations to summarize a clinician-patient encounter. *Health Informatics Journal*, *26*(4), 2906–2914. https://doi.org/10.1177/1460458220951719

Rajkomar, A., Kannan, A., Chen, K., Vardoulakis, L., Chou, K., Cui, C., & Dean, J. (2019). Automatically Charting Symptoms From Patient-Physician Conversations Using Machine Learning. *JAMA Internal Medicine*, *179*(6), 836. https://doi.org/10.1001/jamainternmed.2018.8558

Rep. Scott, D. [D-G.-13. (2022, December 16). *H.R.4374 - 117th Congress (2021-2022): Broadband Internet Connections for Rural America Act* (2021-07-09) [Legislation]. https://www.congress.gov/bill/117th-congress/house-bill/4374

Rotenstein, L., Melnick, E. R., Iannaccone, C., Zhang, J., Mugal, A., Lipsitz, S. R., Healey, M. J., Holland, C., Snyder, R., Sinsky, C. A., Ting, D., & Bates, D. W. (2024). Virtual Scribes and Physician Time Spent on Electronic Health Records. *JAMA Network Open*, *7*(5), e2413140. https://doi.org/10.1001/jamanetworkopen.2024.13140

Rotenstein, L. S., Apathy, N., Holmgren, A. J., & Bates, D. W. (2023). Physician Note Composition Patterns and Time on the EHR Across Specialty Types: A National, Cross-sectional Study. *Journal of General Internal Medicine: JGIM*, *38*(5), 1119–1126. https://doi.org/10.1007/s11606-022-07834-5

Sankalp, Y. (2024). Embracing Artificial Intelligence: Revolutionizing Nursing Documentation for a Better Future. *Cureus*, *16*(4). https://doi.org/10.7759/cureus.57725

Seibert, K., Domhoff, D., Bruch, D., Schulte-Althoff, M., Fürstenau, D., Biessmann, F., & Wolf-Ostermann, K. (2021). Application Scenarios for Artificial Intelligence in Nursing Care: Rapid Review. *Journal of Medical Internet Research*, *23*(11), e26522. https://doi.org/10.2196/26522

Tran, B. D., Latif, K., Reynolds, T. L., Park, J., Elston Lafata, J., Tai-Seale, M., & Zheng, K. (2023). "Mm-hm," "Uh-uh": Are non-lexical conversational sounds deal breakers for the ambient clinical documentation technology? *Journal of the American Medical Informatics Association: JAMIA*, *30*(4), 703–711. https://doi.org/10.1093/jamia/ocad001

Van Buchem, M. M., Boosman, H., Bauer, M. P., Kant, I. M. J., Cammel, S. A., & Steyerberg, E. W. (2021). The digital scribe in clinical practice: A scoping review and research agenda. *Npj Digital Medicine*, *4*(1), 57. https://doi.org/10.1038/s41746-021-00432-5

Van Genderen, M. E., Van De Sande, D., Hooft, L., Reis, A. A., Cornet, A. D., Oosterhoff, J. H. F., Van Der Ster, B. J. P., Huiskens, J., Townsend, R., Van Bommel, J., Gommers, D., & Van Den Hoven, J. (2024). Charting a new course in healthcare: Early-stage AI algorithm registration to enhance trust and transparency. *Npj Digital Medicine*, *7*(1), 119. https://doi.org/10.1038/s41746-024-01104-w

Wang, J., Lavender, M., Hoque, E., Brophy, P., & Kautz, H. (2021). A patient-centered digital scribe for automatic medical documentation. *JAMIA Open*, *4*(1), ooab003. https://doi.org/10.1093/jamiaopen/ooab003

Wang, J., Yang, J., Zhang, H., Lu, H., Skreta, M., Husić, M., Arbabi, A., Sultanum, N., & Brudno, M. (2022). PhenoPad: Building AI enabled note-taking interfaces for patient encounters. *Npj Digital Medicine*, *5*(1), 12. https://doi.org/10.1038/s41746-021-00555-9

Yim, W., Fu, Y., Ben Abacha, A., Snider, N., Lin, T., & Yetisgen, M. (2023). Aci-bench: A Novel Ambient Clinical Intelligence Dataset for Benchmarking Automatic Visit Note Generation. *Scientific Data*, *10*(1), 586. https://doi.org/10.1038/s41597-023-02487-3

CHAPTER FOUR

ADVANCED NURSING ESSENTIALS REFLECTION

Introduction

In 2018 I decided it was time to reinvent myself. My first foray into college was fraught with indecision and a lack of direction. Ultimately, I dropped out of college. Uncertain about what to do, I found a job as a detention officer with the local Sheriff's Office. Fast forward 18 years (2018) and I was nearing retirement eligibility, and school was again on the table.

From the beginning, my entire career in law enforcement involved daily exposure to individuals with mental health needs. In a jail setting, people are often at their lowest point in life. Substance use issues are frequently encountered, as well as nearly every other DSM-5 diagnosis represented at one time or another it seemed. The job taught me compassion, sharpened my communication skills, and started an interest in mental health disorders. Consequently, I focused my training hours in these areas, along with leadership, and a desire to improve myself. I wanted to find a career outside of the law enforcement field, but still one where my skills were easily transferrable towards. Nursing, and specifically a Psychiatric Nurse Practitioner, seemed to be a natural fit.

My first attempt at college turned out to not be a waste of time. Since I had been undecided about my career (incidentally I started with an electrical engineering focus) I had most of my core courses covered. I picked up where I had left off and finished an undergraduate degree in applied psychology. With this first degree, and the prerequisite courses taken, I was accepted directly into an accelerated nursing program where 15 months later I graduated with my

2nd bachelor's degree. I retired from the sheriff's office, began working as a registered nurse in a psychiatric emergency services unit and began the Psychiatric Mental Health Doctor of Nursing Practice program. Nearly seven years later (and boards willing) I am now close to beginning a new life chapter as a PMHNP.

I share this history to illustrate the foundation I'm building upon, and to add context to skills and education I've obtained and reinforced throughout the course of the DNP program. With a clear focus on mental health practice, there have been times throughout the program where I questioned the relevance of some of the content — why should I care about cardiac medications or listening to lung fields? Though as the program culminated, these questions and many more were answered for me.

From the beginning of the program, the American Association of Colleges of Nursing (AACN) Essentials of Doctoral Education for Advanced Nursing Practice were stressed and applied by professors, instructors, and at clinical sites. The eight DNP Essentials establish a foundation of competencies that DNP graduates should possess regardless of their area of specialty or focus (AACN, 2006). The eight ACCN Essentials address core competencies in areas of leadership, quality improvement, evidence-based practice, technology, advocacy, collaboration, population health, and advanced nursing practice. I believe I have illustrated competency in these essentials throughout the program, and within this project.

AACN Essentials

Essential 1: Scientific Underpinnings for Practice

Nearly every course in the DNP program addresses the scientific underpinnings for practice in one capacity or another. During clinical rotations, the integration of pharmacology

(NRSG 603), psychopharmacology (NRSG 630), pathophysiology (NRSG 602), and assessment (NRSG 601) form the scientific foundation for evidence-based patient treatment. Each discipline contributes critical knowledge that enhances clinical decision-making and patient care. Examples are understanding and translating current research on mental health disorders, and then selecting a medication based best treatment practices. Additionally, understanding how a medication works allows for patient education on what to expect, what side effects may occur, and potential reasons a medication may not work or need dosing adjustments.

The DNP program additionally covered health care design (NRSG 608), biostatistics (NRSG 606) and epidemiology (NRSG 614). Education in these areas allowed me to identify physical and structural deficiencies that if improved could vastly improve patient experiences and care. Instruction in translational science and evidence-based practice (NRSG 604 & 605) helped me develop competencies in translating scientific research into clinical practice. This integration of scientific knowledge with patient-centered care ensures an evidence-based and individualized treatment plan, optimizing both mental and physical health outcomes.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The courses covering statistics (NRSG 606), research methods (NRSG 604, 605, & 611) and writing have all vastly improved my skills necessary to provide evidence-based care practices. Not only as a future provider, but as a current registered nurse, and as a healthcare consumer as well. Additionally, gaining the skills to appropriately source information and assess the quality of the information improves my ability to educate patients, friends/family, management/leadership, and the general public. With the current polarization of our political landscape in the United States, possessing these skills are necessary for rational discussion and

decision-making as emotions and political opinions muddy public and individual perceptions of mental and physical health.

Essential IV: Information Systems/Technology and Patient Care Technology For the improvement and Transformation of Health Care

Courses covering informatics and healthcare design (NRSG 608, 609, 610, 611 & 613) helped to guide, influence, and establish this DNP project. As technology progresses new tools emerge to improve the health, wellbeing, and safety of patients while helping providers and agencies improve efficiency and workflow. One impactful takeaway I gained from the healthcare design course (NRSG 608) is the concept that good design practices benefit everyone. The examples that resonated the most were handicap accessible sidewalk ramps, and sensory rooms for individuals living with autism spectrum disorder. The book for the course points out that initial designs for ramps were to allow easier access in crossing roads for wheelchair use, as the ramps were used they showed usefulness for parents with child strollers and for bicycles (Anthes, 2020). The descriptions of a sensory room in the book is presented as a room that anyone might like to help with relaxation and adjustable levels of stimulation using lighting, textures, and sound (Anthes, 2020). Information on AI gleaned from the informatics course (NRSG 610), combined with the design course (NRSG 608), led to discussions with a private practice PMHNP looking to better manage charting time in their practice while improving patient interactions.

Essential V: Health Care Policy for Advocacy in Health Care

While specific courses drove the interest in pursuing this project, courses covering policy, law and ethics (NRSG 612 & 613) provided a foundation to consider patient safety, liability, and

data protection. I have had the opportunity to observe multiple preceptors throughout the program model ethical behavior in prescribing practices, and in a lack of prejudice towards the populations they serve. Patient rights forms, consent forms (for treatment, and participation in my project), and EHRs were used to protect patients data and to ensure informed consent. The opportunity to work with rural and underserved populations reinforced my perspectives in equitable treatment for others regardless of the barriers they experience. This was further reinforced by my acceptance into the Behavioral Health Workforce Education and Training program (BHWET). This program provided me with extra training in communication, indigenous Montana populations, as well as at risk populations such as patients with substance use disorders or high-risk pregnancies.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

I found the most impact in this category from my clinical experiences. While many of the courses stressed the importance of interdisciplinary team collaboration, I found seeing this concept in practice to be more powerful. I had opportunities during clinical rotations to observe a Patient Aligned Care Team (PACT) in operation serving homeless populations and other at-risk individuals. The power of case workers, providers, nurses, counselors, and legal/justice representatives working together for the good of the patients was inspiring.

I observed a community health model that incorporated mental health practice directly with physical health in providing warm handoffs to therapists from providers and education on available community resources. In a campus setting I worked with an interdisciplinary team geared for overall student wellness in the areas of medical, mental health, and physical

education. Finally, working with professors, instructors, therapists, and providers has expanded my network of resources to help with further referrals, education, and outreach.

Essential VIII: Advanced Nursing Practice

I feel that all of the program courses contributed to this essential, though NRSG 609 and 629 focused in this area specifically. Entering my Doctor of Nursing Practice (DNP) program, I anticipated education and experiences that would refine my clinical expertise, leadership, and evidence-based decision-making. The program met these expectations through diverse clinical opportunities and rigorous coursework. While I have the expected anxieties of pursuing a new career, I feel the program has given me a foundation that will allow me to become a highly skilled, independent practitioner. The program has enhanced my assessment skills as a current registered nurse, allowing for improved patient treatment as I transition into a new role as a provider. I was allowed to practice and improve the competencies learned in the coursework throughout many clinical hours and with multiple mental health professionals (both providers, therapists, and college faculty).

I feel — based on patient and preceptor feedback during clinical hours — that I was able to impact and improve the lives of many patients using these competencies. On several occasions patients expressed that they, or their family members, would feel comfortable being seen by me as a provider in a future practice. I believe I can directly attribute this feedback to the education and experiences I have received throughout this DNP program.

Through my DNP final project, I conducted this quality improvement process to decrease provider documentation time, allowing for improved patient contact and improved quality of life for the provider. I feel this project demonstrates how scientific principles can be translated into

practice to improve healthcare outcomes. A critical component of my DNP training involved understanding the legal and regulatory frameworks within Montana, and nationally, that govern advanced nursing practice. The coursework in Health Policy and Ethics (NRSG 612) further reinforced state and federal regulations, scope of practice considerations, and the impact of healthcare policies on patient access and provider autonomy.

Conclusion

As I complete this DNP program, I reflect on the transformation that has taken place over the past several years. A journey to reinvent myself has evolved into a comprehensive and purpose-driven education in advanced nursing practice. My experiences in law enforcement provided a strong foundation in communication, crisis management, and leadership—skills that seamlessly transfer into my current role as a psychiatric nurse and as a PMHNP.

Throughout this program, I have had the opportunity to apply theoretical knowledge to clinical practice, finetune skills in assessment, diagnosis, treatment, and patient-centered care (NRSG 603, 625, 630, 661, 662, 663, & 664). The DNP Essentials have been embedded throughout my coursework and clinical experiences, reinforcing my competencies in scientific knowledge, evidence-based practice, policy advocacy, interprofessional collaboration, and leadership. The integration of biophysical, psychosocial, and regulatory sciences has prepared me to deliver high-quality, holistic care that addresses the complex needs of patients with mental health disorders, to include patients from rural, underserved, and marginalized populations. My DNP final project, focused on enhancing provider efficiency and patient engagement, embodies the core principles of this program—leveraging research and innovation to create meaningful change in clinical practice.

While transitioning into a new career brings uncertainty, I feel confident that my DNP education has equipped me with the skills, knowledge, and clinical expertise to excel as an independent provider. The feedback from preceptors, professors, and patients affirms my ability to make a positive impact in the field of psychiatric nursing. I look forward to the responsibilities and challenges of my new role, while knowing that this program has reinforced and enhanced my desire for lifelong learning, professional growth, and compassionate, evidence-based practice.

REFERENCES CITED

AACN. (2006). *The Essentials of Doctoral Education for Advanced Practice Nursing*. American Association of Colleges of Nursing. https://www.aacnnursing.org/portals/42/publications/dnpessentials.pdf

Amigud, A. (2024). The Age of the Intelligent Machine: Singularity, Efficiency, and Existential Peril. *Philosophy & Technology*, *37*(2), 49. https://doi.org/10.1007/s13347-024-00740-0

Anas, A. (2024). *Redefining Healthcare With Artificial Intelligence (AI): The Contributions of ChatGPT, Gemini, and Co-pilot*. https://doi.org/10.7759/cureus.57795

Anthes, E. (2020). *The Great Indoors*. Scientific American / Farrar, Straus and Giroux.

Apathy, N. C., Hare, A. J., Fendrich, S., & Cross, D. A. (2022). I had not time to make it shorter: An exploratory analysis of how physicians reduce note length and time in notes. *Journal of the American Medical Informatics Association: JAMIA*, *30*(2), 355–360. https://doi.org/10.1093/jamia/ocac211

Avendano, J. P., Gallagher, D. O., Hawes, J. D., Boyle, J., Glasser, L., Aryee, J., & Katt, B. M. (2022). Interfacing With the Electronic Health Record (EHR): A Comparative Review of Modes of Documentation. *Cureus*. https://doi.org/10.7759/cureus.26330

Avula, V. C. R., & Amalakanti, S. (2024). Artificial intelligence in psychiatry, present trends, and challenges: An updated review. *Archives of Mental Health*, *25*(1), 85. https://doi.org/10.4103/amh.amh_167_23

Balloch, J., Sridharan, S., Oldham, G., Wray, J., Gough, P., Robinson, R., Sebire, N. J., Khalil, S., Asgari, E., Tan, C., Taylor, A., & Pimenta, D. (2024). Use of an ambient artificial intelligence tool to improve quality of clinical documentation. *Future Healthcare Journal*, *11*(3), 100157. https://doi.org/10.1016/j.fhj.2024.100157

Bett, E. S., Frommeyer, T. C., Reddy, T., & Johnson, J. “Ty.” (2023). Assessment of patient perceptions of technology and the use of machine-based learning in a clinical encounter. *Intelligence-Based Medicine*, *7*, 100096. https://doi.org/10.1016/j.ibmed.2023.100096

Blease, C., Torous, J., McMillan, B., Hägglund, M., & Mandl, K. D. (2024). Generative Language Models and Open Notes: Exploring the Promise and Limitations. *JMIR Medical Education*, *10*, e51183. https://doi.org/10.2196/51183

Blease, C., Worthen, A., & Torous, J. (2024). Psychiatrists' experiences and opinions of generative artificial intelligence in mental healthcare: An online mixed methods survey. *Psychiatry Research*, *333*, 115724. https://doi.org/10.1016/j.psychres.2024.115724

Borgstadt, J. T., Kalpas, E. A., & Pond, H. M. (2022). A Qualitative Thematic Analysis of Addressing the Why: An Artificial Intelligence (AI) in Healthcare Symposium. *Cureus*. https://doi.org/10.7759/cureus.23704

Cabello-Collado, C., Rodriguez-Juan, J., Ortiz-Perez, D., Garcia-Rodriguez, J., Tomás, D., & Vizcaya-Moreno, M. F. (2024). Automated Generation of Clinical Reports Using Sensing Technologies with Deep Learning Techniques. *Sensors*, *24*(9), 2751. https://doi.org/10.3390/s24092751

Cao, D. Y., Silkey, J. R., Decker, M. C., & Wanat, K. A. (2024). Artificial intelligence-driven digital scribes in clinical documentation: Pilot study assessing the impact on dermatologist workflow and patient encounters. *JAAD International*, *15*, 149–151. https://doi.org/10.1016/j.jdin.2024.02.009

Coiera, E., Kocaballi, B., Halamka, J., & Laranjo, L. (2018). The digital scribe. *Npj Digital Medicine*, *1*(1), 1–5. https://doi.org/10.1038/s41746-018-0066-9

ChatGPT. (2025, March). *Response to a prompt asking ChatGPT to create a graph using provided descriptive statistics* [Large language model]. OpenAI. https://chat.openai.com/

Eastwood, K. W., May, R., Andreou, P., Abidi, S., Abidi, S. S. R., & Loubani, O. M. (2023). Needs and expectations for artificial intelligence in emergency medicine according to Canadian physicians. *BMC Health Services Research*, *23*(1), 798. https://doi.org/10.1186/s12913-023-09740-w

Ennis-O'Connor, M., & O'Connor, W. T. (2024). Charting the future of patient care: A strategic leadership guide to harnessing the potential of artificial intelligence. *Healthcare Management Forum*, *37*(4), 290–295. https://doi.org/10.1177/08404704241235893

Fogleman, B. M., Goldman, M., Holland, A. B., Dyess, G., & Patel, A. (2024). Charting Tomorrow's Healthcare: A Traditional Literature Review for an Artificial Intelligence-Driven Future. *Curēus (Palo Alto, CA)*, *16*(4), e58032–e58032. https://doi.org/10.7759/cureus.58032

Gellert, G. A. (2023). Medical Scribes: Symptom or Cause of Impeded Evolution of a Transformative Artificial Intelligence in the Electronic Health Record? *Perspectives in Health Information Management*, *20*(1), 1–17.

Ghatnekar, S., Faletsky, A., & Nambudiri, V. E. (2021). Digital scribe utility and barriers to implementation in clinical practice: A scoping review. *Health and Technology*, *11*(4), 803–809. https://doi.org/10.1007/s12553-021-00568-0

Heidi Health. (2025, March 20). *Pricing*. https://www.heid health.com/pricing

Holmgren, A. J., Downing, N. L., Bates, D. W., Shanafelt, T. D., Milstein, A., Sharp, C. D., Cutler, D. M., Huckman, R. S., & Schulman, K. A. (2021). Assessment of Electronic Health Record Use Between US and Non-US Health Systems. *Archives of Internal Medicine (1960)*, *181*(2), 251–259. https://doi.org/10.1001/jamainternmed.2020.7071

IBM Corp. (2023). *IBM SPSS Statistics for Windows, Version 29.0* [Computer software]. IBM Corp.

IHI. (n.d.). *Quality Improvement Essentials Toolkit | Institute for Healthcare Improvement*. Institute for Healthcare Improvement (IHI). Retrieved October 18, 2024, from https://www.ihi.org/resources/tools/quality-improvement-essentials-toolkit

Islam, M. N., Mim, S. T., Tasfia, T., & Hossain, M. M. (2024). Enhancing patient treatment through automation: The development of an efficient scribe and prescribe system. *Informatics in Medicine Unlocked*, *45*, 101456. https://doi.org/10.1016/j.imu.2024.101456

Khullar, D., Wang, X., & Wang, F. (2024). Large Language Models in Health Care: Charting a Path Toward Accurate, Explainable, and Secure AI. *Journal of General Internal Medicine*, *39*(7), 1239–1241. https://doi.org/10.1007/s11606-024-08657-2

Lebcir, R., Hill, T., Atun, R., & Cubric, M. (2021). Stakeholders' views on the organisational factors affecting application of artificial intelligence in healthcare: A scoping review protocol. *BMJ Open*, *11*(3), e044074. https://doi.org/10.1136/bmjopen-2020-044074

Liu, J., Wang, C., & Liu, S. (2023). Utility of ChatGPT in Clinical Practice. *Journal of Medical Internet Research*, *25*, e48568. https://doi.org/10.2196/48568

Matsler, N., Pepin, L., Banerji, S., Hoyte, C., & Heard, K. (2024). Use of large language models to optimize poison center charting. *Clinical Toxicology*, *62*(6), 385–390. https://doi.org/10.1080/15563650.2024.2348107

Montomoli, J., Bitondo, M. M., Cascella, M., Rezoagli, E., Romeo, L., Bellini, V., Semeraro, F., Gamberini, E., Frontoni, E., Agnoletti, V., Altini, M., Benanti, P., & Bignami, E. G. (2024). Algor-ethics: Charting the ethical path for AI in critical care. *Journal of Clinical Monitoring and Computing*, *38*(4), 931–939. https://doi.org/10.1007/s10877-024-01157-y

MT.GOV. (2024, July 1). *Montana.Gov* [Government]. Mid-Level Practitioner. https://medicaidprovider.mt.gov/44

Murphy, K., Di Ruggiero, E., Upshur, R., Willison, D. J., Malhotra, N., Cai, J. C., Malhotra, N., Lui, V., & Gibson, J. (2021). Artificial intelligence for good health: A scoping review of the ethics literature. *BMC Medical Ethics*, *22*(1), 14. https://doi.org/10.1186/s12910-021-00577-8

Nashwan, A. J., Abujaber, A., & Ahmed, S. K. (2024). Charting the Future: The Role of AI in Transforming Nursing Documentation. *Cureus*. https://doi.org/10.7759/cureus.57304

Nicolette, B., Cassar, K., Caruana, D. G., & Grima, M. J. (2023). *Medical Note Quality Audit at the Vascular Surgical Unit Compared With the British Medical Journal (BMJ) Guidelines*. https://doi.org/10.7759/cureus.50110

Nuako, A., Liu, J., Pham, G., Smock, N., James, A., Baker, T., Bierut, L., Colditz, G., & Chen, L.-S. (2022). Quantifying rural disparity in healthcare utilization in the United States: Analysis of a large midwestern healthcare system. *PloS One*, *17*(2), e0263718–e0263718. https://doi.org/10.1371/journal.pone.0263718

Pyne, Y., Wong, Y. M., Fang, H., & Simpson, E. (2023). Analysis of 'One in a Million' primary care consultation conversations using natural language processing. *BMJ Health & Care Informatics*, *30*(1), e100659. https://doi.org/10.1136/bmjhci-2022-100659

Quiroz, J. C., Laranjo, L., Kocaballi, A. B., Berkovsky, S., Rezazadegan, D., & Coiera, E. (2019). Challenges of developing a digital scribe to reduce clinical documentation burden. *Npj Digital Medicine*, *2*(1), 114. https://doi.org/10.1038/s41746-019-0190-1

Quiroz, J. C., Laranjo, L., Kocaballi, A. B., Briatore, A., Berkovsky, S., Rezazadegan, D., & Coiera, E. (2020). Identifying relevant information in medical conversations to summarize a clinician-patient encounter. *Health Informatics Journal*, *26*(4), 2906–2914. https://doi.org/10.1177/1460458220951719

Rajkomar, A., Kannan, A., Chen, K., Vardoulakis, L., Chou, K., Cui, C., & Dean, J. (2019). Automatically Charting Symptoms From Patient-Physician Conversations Using Machine Learning. *JAMA Internal Medicine*, *179*(6), 836. https://doi.org/10.1001/jamainternmed.2018.8558

Rep. Scott, D. [D-G.-13. (2022, December 16). *H.R.4374 - 117th Congress (2021-2022): Broadband Internet Connections for Rural America Act* (2021-07-09) [Legislation]. https://www.congress.gov/bill/117th-congress/house-bill/4374

Rotenstein, L., Melnick, E. R., Iannaccone, C., Zhang, J., Mugal, A., Lipsitz, S. R., Healey, M. J., Holland, C., Snyder, R., Sinsky, C. A., Ting, D., & Bates, D. W. (2024). Virtual Scribes and Physician Time Spent on Electronic Health Records. *JAMA Network Open*, *7*(5), e2413140. https://doi.org/10.1001/jamanetworkopen.2024.13140

Rotenstein, L. S., Apathy, N., Holmgren, A. J., & Bates, D. W. (2023). Physician Note Composition Patterns and Time on the EHR Across Specialty Types: A National, Cross-sectional Study. *Journal of General Internal Medicine: JGIM*, *38*(5), 1119–1126. https://doi.org/10.1007/s11606-022-07834-5

Sankalp, Y. (2024). Embracing Artificial Intelligence: Revolutionizing Nursing Documentation for a Better Future. *Cureus*, *16*(4). https://doi.org/10.7759/cureus.57725

Seibert, K., Domhoff, D., Bruch, D., Schulte-Althoff, M., Fürstenau, D., Biessmann, F., & Wolf-Ostermann, K. (2021). Application Scenarios for Artificial Intelligence in Nursing Care: Rapid Review. *Journal of Medical Internet Research*, *23*(11), e26522. https://doi.org/10.2196/26522

Tran, B. D., Latif, K., Reynolds, T. L., Park, J., Elston Lafata, J., Tai-Seale, M., & Zheng, K. (2023). "Mm-hm," "Uh-uh": Are non-lexical conversational sounds deal breakers for the ambient clinical documentation technology? *Journal of the American Medical Informatics Association: JAMIA*, *30*(4), 703–711. https://doi.org/10.1093/jamia/ocad001

Van Buchem, M. M., Boosman, H., Bauer, M. P., Kant, I. M. J., Cammel, S. A., & Steyerberg, E. W. (2021). The digital scribe in clinical practice: A scoping review and research agenda. *Npj Digital Medicine*, *4*(1), 57. https://doi.org/10.1038/s41746-021-00432-5

Van Genderen, M. E., Van De Sande, D., Hooft, L., Reis, A. A., Cornet, A. D., Oosterhoff, J. H. F., Van Der Ster, B. J. P., Huiskens, J., Townsend, R., Van Bommel, J., Gommers, D., & Van Den Hoven, J. (2024). Charting a new course in healthcare: Early-stage AI algorithm registration to enhance trust and transparency. *Npj Digital Medicine*, *7*(1), 119. https://doi.org/10.1038/s41746-024-01104-w

Wang, J., Lavender, M., Hoque, E., Brophy, P., & Kautz, H. (2021). A patient-centered digital scribe for automatic medical documentation. *JAMIA Open*, *4*(1), ooab003. https://doi.org/10.1093/jamiaopen/ooab003

Wang, J., Yang, J., Zhang, H., Lu, H., Skreta, M., Husić, M., Arbabi, A., Sultanum, N., & Brudno, M. (2022). PhenoPad: Building AI enabled note-taking interfaces for patient encounters. *Npj Digital Medicine*, *5*(1), 12. https://doi.org/10.1038/s41746-021-00555-9

Yim, W., Fu, Y., Ben Abacha, A., Snider, N., Lin, T., & Yetisgen, M. (2023). Aci-bench: A Novel Ambient Clinical Intelligence Dataset for Benchmarking Automatic Visit Note Generation. *Scientific Data*, *10*(1), 586. https://doi.org/10.1038/s41597-023-02487-3

APPENDICES

APPENDIX A

INFORMED CONSENT

This form was completed to provide informed consent to patients interested in participating in the project. The form was uploaded to the provider's patient portal and links sent to patients. The provider's name and business have been redacted from this appendix to maintain confidentiality.

Consent Form for Participation in DNP Program Process Improvement Project

Implementation of AI Scribe Software at XXXXXX Mental Health

Principal Investigator: XXXXXX, PhD, DNP, PMHNP

Student Investigator: Jamie Young, BSN, RN

Institution: XXXXXX Mental Health

Project Overview

As part of a Doctor of Nursing Practice (DNP) program process improvement project, XXXXXX Mental Health is implementing an AI scribe software system to assist in documentation during patient-provider interactions. This project, led by Dr. XXXXXX and Jamie Young, BSN, RN, aims to evaluate the impact of the AI scribe on documentation time and to assess patient perceptions of the technology.

The goal of the project is to improve clinical workflows and enhance patient care by reducing time spent on documentation, thereby allowing providers to focus more on direct patient interaction. Your participation is vital in understanding the impact of this tool and ensuring that it aligns with patient needs.

Purpose of the Project

The primary objectives of this process improvement project are to:

1. Measure the change in patient encounter documentation times before and after the introduction of AI scribe software.
2. Assess patients' perceptions of the AI scribe software, including whether they view it positively, negatively, or are undecided.

This consent form is provided to ensure that you understand the nature of the project, the data being collected, and your rights as a participant. Please read it carefully and ask any questions before agreeing to participate.

Participation in the Project

Your participation in this project is voluntary. If you choose to participate, you will be asked to:

1. Allow the AI Scribe Software to be used during your clinical encounters: The AI software will transcribe and summarize the conversation between you and your healthcare provider, Dr. XXXXXX.
2. Provide feedback on your perception of the AI scribe: After your encounter, you may be asked to complete a brief survey or participate in a short interview regarding your thoughts on the use of AI scribe technology (positive, negative, or undecided).

The information collected will include:

1. Documentation Time Data: This data will be gathered by comparing the time spent on documentation before and after the implementation of the AI scribe.
2. Patient Perception Data: Feedback on your experience with the AI scribe will be gathered through surveys or interviews, which will explore whether you view the use of technology as positive, negative, or undecided.

Confidentiality and Privacy

All data collected during this project will be kept confidential. Your personal information, including your identity and medical records, will not be shared or linked to the data in any reports or publications resulting from this project. Only authorized project team members, including Dr. Wade Hill and Jamie Young, will have access to the data.

The data collected will only be used for the purpose of this quality improvement project and will not be used in any way that impacts your medical care or treatment.

Potential Risks

There are minimal risks associated with this project:

1. The AI scribe software may not capture every detail of your conversation, which could lead to minor inaccuracies in the documentation.

2. There is a small chance you may feel uncomfortable with the use of technology in your healthcare setting, but your provider will ensure that your privacy and comfort are prioritized.
3. If you feel uncomfortable with the use of the AI scribe during your visit, you can opt out of the project without affecting the care you receive.

Voluntary Participation

Your participation in this project is completely voluntary, and you have the right to withdraw at any time. If you choose to withdraw, it will not affect the care or treatment you receive at XXXXXX Mental Health. You can choose not to participate in any data collection activities (such as surveys or interviews) without penalty.

Consent for Participation

By signing this consent form, you acknowledge that:

1. You have been informed about the purpose of the DNP process improvement project, the data being collected, and how it will be used.
2. You understand that your participation is voluntary, and you can withdraw at any time without affecting your care.
3. You agree to participate in the project and provide feedback regarding your experience with the AI scribe software.
4. You consent to the collection of documentation time data and your feedback on the AI scribe's use.
5. If you have any questions about the project, please contact Dr. XXXXXl at [phone number] or Jamie Young at [phone number].

Consent to Participate

By signing below, I acknowledge that I have read and understood the information provided about the process improvement project. I consent to participate in this project and understand that my participation is voluntary.

Patient Name: _____

Date of Birth: _____

Signature of Patient: _____

Date: _____

Signature of Provider (XXXXXX, PhD, DNP, PMHNP): _____

Date: _____

Signature of Student Investigator (Jamie Young, BSN, RN): _____

Date: _____

APPENDIX B

PROVIDER'S PRACTICE CONSENT

This form was created for the provider to implement as standard practice for all new patients if they decide to incorporate a consent form rather than make AI a standard business practice with notification of its use. Provider name and business have been redacted to maintain confidentiality.

XXXXXX Mental Health

Consent Form for the Use of AI Scribe Software

Introduction

XXXXXX Mental Health is committed to providing high-quality care to all patients. As part of this effort, we are incorporating AI-powered scribe software to assist in documenting patient interactions. The AI software will generate notes based on conversations between patients and providers, ensuring accurate and efficient documentation while enhancing the quality of care.

This consent form is designed to provide you with detailed information about the use of AI scribe software in your treatment and to obtain your informed consent for its use. Please read this document carefully and ask any questions you may have before providing consent.

1. Purpose of AI Scribe Software

The AI scribe software will be used to transcribe and summarize conversations between you and your healthcare provider during appointments. The AI software will create a written record of these interactions that will be stored in your electronic health record (EHR) for clinical use and continuity of care.

2. How AI Scribe Software Works

The software listens to and analyzes the audio of your appointment. It then generates a written summary of key information discussed, such as diagnoses, treatment plans, and other important details. A trained provider will review and edit the generated notes to ensure their accuracy before they are included in your EHR.

3. Privacy and Confidentiality

All data collected by the AI scribe software is securely stored and protected by encryption. Only authorized healthcare providers and personnel will have access to your EHR and AI-generated notes. The software does not collect or store any personal identifiable information outside of the clinical context. You will be informed if any information shared with the AI scribe software is used in ways beyond normal clinical documentation.

4. Risks and Limitations

While the AI scribe software is designed to accurately capture the essential content of your appointment, it may not fully reflect nuances or context in every conversation. There is a small risk of technical errors in transcription or interpretation of information, though all AI-generated notes will be reviewed by a healthcare provider before becoming part of your EHR.

5. Voluntary Participation

Your participation in using the AI scribe software is entirely voluntary. You may decline the use of AI scribe technology at any time, and this will not affect your care or treatment in any way. If you do not consent to the use of the AI-scribed software, your healthcare provider will continue to take manual notes during your appointments.

6. Consent for Use

By signing this consent form, you acknowledge that:

1. You have read and understood the purpose, privacy, and risks associated with the use of AI scribe software.
2. You consent to the use of the AI scribe software during your appointments at XXXXXX Mental Health.
3. You understand that you may withdraw your consent at any time without affecting the quality of your care.

7. Questions and Contact Information

If you have any questions about the use of AI software, please contact XXXXXX Mental Health at [insert contact details] or speak directly with your healthcare provider.

Consent to Use AI Scribe Software

By signing below, I acknowledge that I have been fully informed about the use of AI scribe software in my treatment and voluntarily consent to its use. I understand that I can withdraw my consent at any time without affecting the quality of care I receive.

Patient Name: _____

Date of Birth: _____

Signature of Patient: _____

Date: _____

Signature of Provider: _____

Date: _____

APPENDIX C

DATA COLLECTION FORM

The table below was created to capture data from charting times, both before (baseline) and after implementation of the AI Scribe. Data was collected by the use of a stopwatch app on a smartphone. Timing began at the announcement of "beginning documentation" by the provider and ended with the announcement "finished documentation."

Documentation Time Collection

PDSA Cycle	

Patient	Consent (Y/N)	Baseline (B) or after AI (A)?	Appointment Type	Stable/unstable	Documentation Time
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
…					

APPENDIX D

SITE PROJECT FORM

This form was the letter sent to the provider (redacted) selected for the project implementation. It explains project aims, and timelines.

MONTANA STATE UNIVERSITY
MARK & ROBYN JONES College of NURSING

Dear Dr. [redacted]

As a Doctor of Nursing Practice (DNP) student of the Mark and Robyn Jones College of Nursing, I appreciate your willingness to work with me on a project spanning two semesters. To facilitate this partnership, I would like you to know the faculty members' expectations for my project.

The DNP Project will aim to:

- Implement an innovative practice change, which either directly or indirectly impacts the quality of healthcare delivered.
- Focus on a system (micro-, meso-, or macro- level) or population focus.
- Translate quality evidence-based guidelines into daily clinical practice.
- Incorporates quality improvement frameworks and interventions to move current practice closer to national or international benchmarks.
- Utilize interventions, such as new processes, clinical education, documentation templates, screening tools or treatment decision tools, to enhance measurable outcomes.
- Adapt, as agreed upon by the site stakeholders and faculty, project interventions during implementation.
- Determine plans for project sustainability after the partnership is completed.

To better facilitate this endeavor, on page two you may find the anticipated timelines and deliverables spanning both Fall and Spring semesters. If you have questions or concerns regarding any aspect of the partnership, please feel free to contact me or my project chair. Again, I look forward to our partnership and what we can achieve together.

Sincerely,

Jamie Young
Jamie.young@student.montana.edu

Faculty Chair: Dr. Julie Ruff
julie.ruff@ecat1.montana.edu

Main Campus
Anna Pearl Sherrick Hall
P.O. Box 173560
Bozeman, MT 59717-3560
Tel 406-994-3783
Fax 406-994-6020

Billings Campus
1500 University Drive
MSU-Billings, Campus Box 574
Billings, MT 59101
Tel 406-657-2912
Fax 406-657-1715

Great Falls Campus
400 15th Ave. South, Suite 106
Great Falls, MT 59405-4375
Tel 406-771-4450
Fax 406-771-4449

Kalispell Campus
210 Sunny View Lane, Suite 5
Kalispell, MT 59901
Tel 406-751-6967

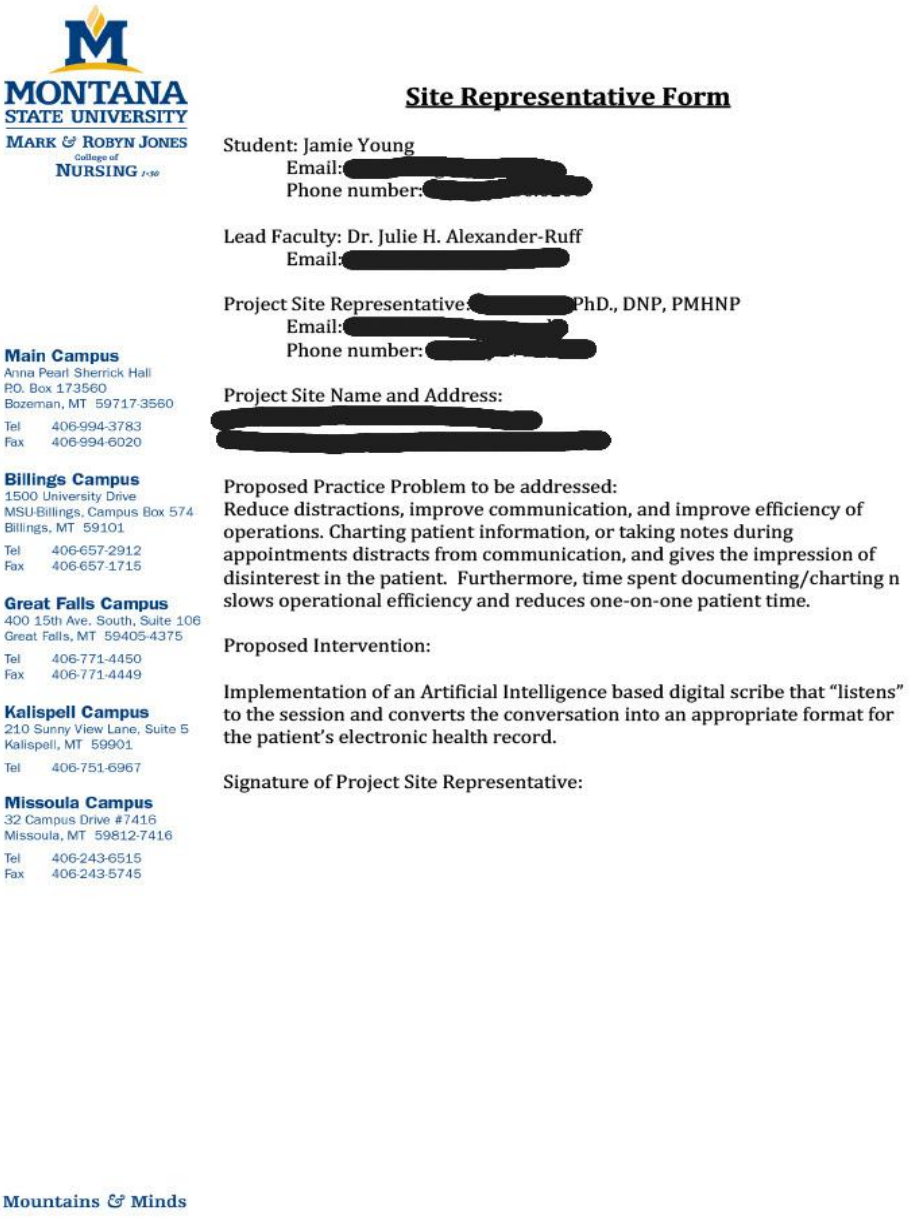
Missoula Campus
32 Campus Drive #7416
Missoula, MT 59812-7416
Tel 406-243-6515
Fax 406-243-5745

Mountains & Minds

APPENDIX E

REPRESENTATIVE FORM

This form presents the problem to address, and proposed solution to the provider (redacted). Signatures indicate acceptance of the quality improvement project.



MONTANA STATE UNIVERSITY
MARK & ROBYN JONES College of NURSING

Site Representative Form

Student: Jamie Young
Email: [redacted]
Phone number: [redacted]

Lead Faculty: Dr. Julie H. Alexander-Ruff
Email: [redacted]

Project Site Representative: [redacted] PhD., DNP, PMHNP
Email: [redacted]
Phone number: [redacted]

Project Site Name and Address:
[redacted]

Proposed Practice Problem to be addressed:
Reduce distractions, improve communication, and improve efficiency of operations. Charting patient information, or taking notes during appointments distracts from communication, and gives the impression of disinterest in the patient. Furthermore, time spent documenting/charting n slows operational efficiency and reduces one-on-one patient time.

Proposed Intervention:

Implementation of an Artificial Intelligence based digital scribe that "listens" to the session and converts the conversation into an appropriate format for the patient's electronic health record.

Signature of Project Site Representative:

Main Campus
Anna Pearl Sherrick Hall
P.O. Box 173560
Bozeman, MT 59717-3560
Tel 406-994-3783
Fax 406-994-6020

Billings Campus
1500 University Drive
MSU-Billings, Campus Box 574
Billings, MT 59101
Tel 406-657-2912
Fax 406-657-1715

Great Falls Campus
400 15th Ave. South, Suite 106
Great Falls, MT 59405-4375
Tel 406-771-4450
Fax 406-771-4449

Kalispell Campus
210 Sunny View Lane, Suite 5
Kalispell, MT 59901
Tel 406-751-6967

Missoula Campus
32 Campus Drive #7416
Missoula, MT 59812-7416
Tel 406-243-6515
Fax 406-243-5745

Mountains & Minds

Planning:	Implementation:	Evaluation & Presentation:

August – September
• Student meets with site representative/ stakeholders to identify site needs.
• Meet with Course Faculty to refine and get preliminary approval on project concept
• Obtain:
  ○ *"Site Representative Support Letter"* signed by student and representative
  ○ Site representative CV or resume.
September - October
Students:
• conduct a literature review to determine best practice approaches to achieve the project aim.
• develop a detailed intervention plan with measurable outcomes, implementation steps, and methods for data collection / confidentiality.
• present ideas to the site, after receiving faculty feedback.
• revise proposal to achieve agreed upon interventions.
November
Students:
• present proposal to MSU project chair and committee members.
• receive feedback and adapts project as needed.
• submits to site IRB or committee if needed.
• submit for exempt status from MSU IRB approval.
December
Students plan for implementation.
	January – Early March
	Students:
	• finalize implementation timelines and processes.
	• initiate agreed upon interventions, data collection and outcome evaluation. *(Anticipate weekly or every other week assessment and data review)*
	• adapt interventions as determined during implementation by stakeholders.
	• develop a sustainability plan.
	February - March
	Students:
	• analyze process and outcomes.
	• share with stakeholders in agreed upon method and timeframe.
		March – April
		Students:
		• prepare for dissemination (executive summary, poster presentation, paper).
		• present findings and future recommendations to stakeholders.
		• provide final project defense to faculty committee, as well as open to public.
		May
		Students complete course deliverables and prepare to graduate.

APPENDIX F

EXECUTIVE SUMMARY

This form summarizes the entire project and outcomes and was provided to the Project Committee, as well as the provider hosting the project.

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

PROJECT INTRODUCTION

Implementation of a Digital Scribe to Improve Face to Face Interactions and Reduce Charting Time

Student Name

Jamie L. Young

Project Advisor and Team

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PROBLEM

Excessive documentation time in electronic health records (EHRs) contributes to provider burnout, reduced patient interaction, and inefficiencies in clinical workflow. Providers in the U.S. spend significantly more time documenting than their international counterparts, with estimates indicating up to 50% of their work hours are devoted to EHR-related tasks. In psychiatric settings, this documentation burden affects patient rapport, quality of care, and workflow efficiency. Addressing this issue is crucial, particularly in rural settings where providers manage high caseloads with limited administrative support.

PURPOSE & AIMS

This project aimed to evaluate the effectiveness of an artificial intelligence (AI) digital scribe in a rural PMHNP private practice. Specific objectives included:

1. Implementing an AI scribe to reduce provider documentation time.
2. Evaluating the impact on documentation efficiency and workflow.
3. Assessing provider satisfaction and patient safety in documentation.
4. Measuring the percentage reduction in documentation time, with an initial goal of 20%.

METHODS

Population & Setting: The study was conducted in a rural private PMHNP practice serving a diverse patient population, including both in-person and telehealth visits.

EXECUTIVE SUMMARY

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Stakeholders: The primary stakeholder was the PMHNP, with indirect benefits extending to patients through improved provider engagement.

Timeframe: A six-week quality improvement project implementation period.

QI Model: The Plan-Do-Study-Act (PDSA) model was used across three iterative cycles to refine AI scribe use and optimize efficiency.

Tools Used:

- AI digital scribe (Heidi Health AI)
- Time tracking for documentation before and after AI implementation
- Custom documentation templates for AI-assisted note generation

EVALUATION

Data Collection Frequency:

- Baseline documentation times were recorded before AI implementation.
- Post-intervention documentation times were collected for 52 patients using the AI scribe. For three PDSA cycles.
- Time data were categorized by visit type (initial vs. follow-up).

Descriptive Statistics Used:

- Mean, range, and standard deviation for documentation times
- Percentage reduction in documentation time
- Comparative analysis between traditional, dictation, and AI-assisted documentation

OUTCOMES

Over the **six-week process**, AI-assisted documentation resulted in a **72% reduction** in provider documentation time, far exceeding the initial 20% goal.

- **Baseline documentation time per patient:** 14:35 minutes (mean)
- **AI-assisted documentation time per patient:** 4:04 minutes (mean)
- **Total time saved per clinic day:** ~2.5 hours
- **Patient acceptance of AI documentation:** 100%

Graph/Table Example:

Documentation Modality Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Baseline	26	31:57	00:14	32:11	14:35	06:44	.879	.456	1.502	.887
Baseline Initial	5	0:12:10	0:20:01	0:32:11	0:25:42	0:04:51	.145	.913	-1.143	2.000
Baseline Follow-up	21	0:08:59	0:08:51	0:17:50	0:12:35	0:02:34	.218	.501	-.741	.972
All AI	52	17:57	01:01	18:58	04:04	03:52	2.194	.330	4.497	.650
AI Initial	8	0:10:11	0:08:47	0:18:58	0:12:17	0:03:17	1.294	.752	1.705	1.481
AI Follow-up	44	0:05:04	0:01:01	0:06:05	0:02:35	0:01:04	1.193	.357	2.144	.702
AI Dictation	12	0:17:05	0:01:53	0:18:58	0:05:57	0:05:18	1.955	.637	2.948	1.232
Active AI	10	0:02:35	0:01:01	0:03:36	0:02:06	0:00:50	.330	.687	-.636	1.334
Valid N (listwise)	5									

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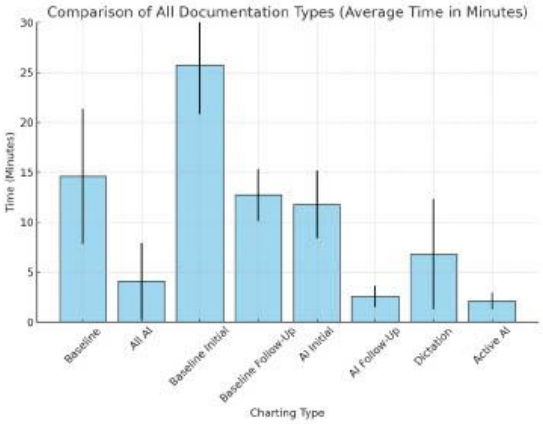

RECOMMENDATIONS

Future Sustainability: The AI scribe was successfully integrated into clinical workflow and is recommended for continued use.

Adapt/Adopt/Abandon:

- **Adopt AI-assisted documentation** as a standard practice.
- **Adapt** by refining AI-generated templates to improve documentation accuracy further.
- **Abandon** traditional methods of patient documentation

Revisions:

- Future improvements could focus on optimizing AI note structuring and expanding AI use to other rural psychiatric settings.
- Further evaluation and focus on documentation quality
- Additional research on long-term provider satisfaction and patient perceptions of AI use in clinical settings is recommended.