

**Medicare Metrics: Overcoming Barriers to Increase Utilization of Annual Wellness Visits**

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**Author Note**

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She has no known conflict of interest to disclose.

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### **Abstract**

Medicare Annual Wellness Visits (AWVs) are critical to preventive healthcare delivery. However, utilization remains suboptimal, with completion rates averaging 20% annually due to limited health literacy, misconceptions about coverage, and scheduling barriers. A literature review demonstrated the effectiveness of electronic health record (EHR)- based strategies in improving adherence, with research suggesting that portal reminders enhance completion rates. This quality improvement project aimed to conduct a secondary analysis and retrospective chart review to evaluate the impact of an EHR intervention implemented at a rural primary care practice to enhance AWV adherence. Grounded in Social Cognitive Theory and guided by the Rosswurm and Larrabee evidence-based practice model, the intervention utilized EHR patient tracking features and automated messaging to identify eligible beneficiaries, provide patient education, and streamline the scheduling process. The study employed a structured pre- and post-intervention chart audit approved by the Arizona State University Institutional Review Board and found that an EHR-based intervention led to an 81% increase in Medicare Annual Wellness Visit (AWV) completion without adding staff workload. The low-cost, scalable strategy effectively increased AWV rates, boosted revenue potential, and aligned with existing research on digital outreach. Limitations included challenges with retrieving consistent EHR data, limited access among patients not enrolled in the portal, and a lack of evaluation on how well patients understood their AWV benefits due to the intervention. Future efforts should assess patient literacy, satisfaction, and long-term health outcomes.

*Keywords:* Medicare, annual wellness visits, electronic health records, patient tracking, automated messages

**Medicare Metrics: Overcoming Barriers to Increase Utilization of Annual Wellness Visits**

Medicare Annual Wellness Visits (AWVs) are essential to providing comprehensive, preventative medical care for adults aged 65 and older. Primary care providers are tasked with ensuring patients complete their AWV. However, they face various barriers, including low health literacy regarding the importance of preventative care or availability of coverage. Efforts to increase the adoption of AWVs have the potential to contribute to improved patient health outcomes and the functionality of primary care practices. As a result, a quality improvement (QI) project aiming to optimize the current electronic health record (EHR) of a rural private primary care office towards increasing AWV completion rates was introduced.

**Problem Statement**

In 2010, with the passage of the Patient Protection and Affordable Care Act (ACA), Medicare solidified its commitment to improving preventative care delivery. The ACA introduced the Medicare AWV in 2011 to improve primary care utilization, delivering preventative medicine and screening services via annual check-ups (Simpson et al., 2020). However, over the last decade, many primary care offices have continued to struggle to meet the goal of completing AWVs with their patient population. While they are essential avenues for practitioners to provide health education, assess potential health risks, and advocate for the completion of screenings, their utilization remains low nationally, increasing the risk that patients are deprived of pertinent information and services necessary to promote positive health outcomes and healthy aging across the lifespan (Jiang et al., 2018; Simpson et al., 2020).

**Purpose and Rationale**

Without comprehensive primary health care, Medicare recipients risk higher mortality rates, poorer health outcomes, increased hospital admission rates, and higher healthcare

utilization costs (O’Laughlin et al., 2024). Adequate screening for early detection and regular interaction for chronic disease management aids in preventing disease progression or exacerbation. This paper explores interventions aiming to engage Medicare beneficiaries and primary care providers in increasing engagement with primary care services and improving Medicare AWW completion rates.

### **Background and Significance**

For Medicare recipients, the AWW is an extensive primary care visit that requires a health risk assessment, a review of the patient's medical and family history, testing to identify any cognitive impairments, a review of the recommended screening schedule, a discussion of advance care planning, a review of a patient’s functional ability and safety level, and the provision of referrals to health education and community counseling services or programs (Centers for Medicare and Medicaid Services [CMS], 2023; Simpson et al., 2020). The AWW expands coverage of preventative health services for older adults, allowing providers to focus on aspects of preventative care that may often be overlooked during episodic visits or chronic disease follow-ups due to time constraints (Moore et al., 2021).

### **Medicare Beneficiaries**

Medicare is a federally funded health insurance program available to individuals 65 and older in the United States. As of October 2021, Medicare enrollment totaled 63,964,675 (CMS, 2021). This number is expected to grow as Americans aged 65 and older are projected to reach 23% of the total U.S. population by 2060 (Jiang et al., 2018). As a result, Medicare will play an essential role in promoting healthy aging and fostering the delivery of preventative care services, as it is the most extensive public health insurance program for this population (Jiang et al., 2018; O’Laughlin et al., 2024).

All Medicare participants become eligible for an AWV twelve months after enrolling in Part B coverage (Jiang et al., 2018). Several studies highlight the suboptimal completion rates of Medicare AWVs. Simpson et al. (2020) reported that in 2016, only 19.87% of beneficiaries participated in an AWV. Moore et al. (2018) cited this metric as improving to 24% by 2017, with primary care physicians performing most visits. However, according to Morgan et al. (2021), most AWVs billed were for subsequent appointments versus initial AWVs, meaning that new recruitment of Medicare patients remained low despite long-term retention.

### **Patient Tracking and Standardization**

Moore et al. (2021) found that decreasing barriers to scheduling visits and increasing the efficiency of completing AWVs significantly increases completion rates. Authors argued for the utilization of EHR tracking to identify eligible patients and document their last AWV, creating future dates for follow-up to aid providers and office staff in scheduling appointments appropriately (Moore et al., 2021). O’Laughlin et al. (2024) echoed that a standardized approach must be adopted within healthcare systems for scheduling appointments, sending reminders, and explaining Medicare benefits and eligibility to patients. Furthermore, if integrated into the EHR, filters must be set to identify high-risk patients for intervention (O’Laughlin et al., 2024). Once patients are identified, individual lists can be drafted for each provider so they may proactively contact and schedule AWVs (Moore et al., 2021).

### **Current Practice**

Simpson et al. (2020) suggested that low health literacy regarding the importance and purpose of preventative services or screenings contributes to decreased AWV participation rates. Multiple studies cited patient misunderstanding of Medicare benefits, as it relates to coverage and cost of AWVs, as a primary driver for underutilization (Jiang et al., 2018; Simpson et al.,

2020). This is further exacerbated when patients receive physical exams or episodic care, leading to the misinterpretation that a follow-up AWV to discuss preventative care is not required as they had just seen a provider for health care services (O’Laughlin et al., 2024).

For providers, barriers included a limited understanding of Medicare benefits, which prevents accurate patient education on coverage for services and screenings (Jiang et al., 2018; O’Laughlin et al., 2024). Additionally, incomplete AWV documentation or misunderstanding of appropriate billing codes contributed to provider ambivalence and underutilization (O’Laughlin et al., 2024). O’Laughlin et al. (2024) identified that many healthcare systems lack sufficient infrastructure within their EHR to identify AWV-eligible patients or a standardized process for scheduling and completing follow-ups with identified patients.

### **Increased AWVs Completion**

Increased rates of Medicare AWVs promoted early identification and action to control risk factors and improve health outcomes, reducing overall healthcare costs (Moore et al., 2021; O’Laughlin et al., 2024). Mirsa and Lloyd (2019) reported that practices that adopt and promote AWVs benefit from increased revenue, more stable patient populations, and stronger provider-patient relationships. Additionally, patients who complete AWVs were found to significantly reduce Medicare spending 12 months following their visit compared to non-users (Mirsa & Lloyd, 2019). Secondary to increasing AWV completion rates, the goal is to demonstrate increased preventative service utilization and screenings following those appointments.

According to Jiang et al. (2018) and Zeiger et al. (2022), AWVs are associated with significantly improving rates of preventative screenings, including mammography, pap smear testing, bone density screening, colorectal cancer screening, prostate screening, and immunization reconciliation. Zeiger et al. (2022) reported that patients who complete an AWV receive 62%

more preventative services than those who do not. These potential metrics align with multiple Healthy People 2030 initiatives that are currently not being achieved. Three examples include the initiative to increase breast cancer screening for females from 75.6% to 80.3%, increase colorectal screening completion from 58.7% to 68.3%, and increase lung cancer screenings from 4.5% to 7.5% (HHS, 2023b; HHS, 2023c; HHS, 2023d).

These outcomes align with various quality metrics published by the U.S. Department of Health and Human Services. According to Healthy People 2030, only 8.5% of adults aged 35 and over received all recommended high-priority clinical prevention services as of 2015, with more recent projections estimating that only 5.3% of adults have completed all screenings by 2020 (U.S. Department of Health and Human Services [HHS], 2023a). These values are well below the target goal of 11.5%. Additionally, the Centers for Disease Control and Prevention (CDC) estimated that less than 50% of people aged 65 and older are currently up to date with all recommended clinical preventative services (Jiang et al., 2018). Improved AWV completion rates could mitigate this outcome. Access to preventive health care services is essential to preventing disease and death, with Medicare AWV as one delivery option.

### **Internal Data**

A private primary care office that serves a primarily geriatric population in rural central Arizona has identified a gap in achieving quality and completion initiatives for Medicare AWVs, reporting only roughly 20% of participants completing their AWV. The organization aims to facilitate provider and patient investment and education to improve AWV utilization. Objective data demonstrates that 37.7% of the total population in this area is 65 years and older, nearly 20% higher than the average for Arizona (U.S. Census Bureau, 2022). This highlights the increased proportion of individuals relying on Medicare services for health coverage, particularly

the percentage of beneficiaries eligible for AWVs. The gap in resource utilization was identified through discussions with local providers, medical staff, and the Operations Manager of the private primary care office. Currently, the office needs an organized method for identifying eligible patients or a standardized approach for scheduling their AWV or providing education on the importance of an AWV. Providers are scheduling patients for AWVs as they see them for chronic disease management, discussing the importance of scheduling appointments, and then delegating the task of scheduling to their medical assistant or secretary in the front office. A practice change is necessary to improve system function.

### **PICOT Question**

A literature review led to the clinically relevant PICOT question: “In rural Medicare patients 65 years and older (P), how does integrating patient education on the importance and role of AWV coupled with integrating EHR scheduling (I) compared to no practice change (C), affect AWV completion rates (O)?”

### **Search Strategy**

Databases searched included PubMed, SageJournals, and the Cumulative Index of Nursing and Allied Health Literature (CINAHL). These databases were selected for their relevance to the topic outlined and their contributions to the medical field. Each database was searched using a combination of key terms addressing aspects of the PICOT question.

### **Keyword Selection**

Original keywords included *Medicare, annual wellness visits, completion, and utilization*. Variations to the key terms to broaden search results included *wellness visit, Medicare wellness visit, outcomes, intervention, Medicare beneficiary, Medicare patient, and annual physical*. Search terms for potential interventions, such as *electronic health records, patient tracking,*

*scheduling reminders*, and *automated messages*, were included. Directional terms, such as increase, improve, or promote, were avoided to prevent bias in search results. The titles and abstracts of articles were assessed for searches with less than 250 results.

### **Initial and Final Search Yields**

An initial search of PubMed using the key terms “*Medicare annual exam OR Medicare annual wellness visit*” AND “*intervention OR practice change*” AND “*utilization OR completion*” yielded 438 results. Filters for the publication date (2018-2024), English language, and peer-reviewed articles were applied, refining the search to 235 results. Additional searches using key terms yielded 500-150 results.

A similar process was used to search the CINAHL database. The keywords “*Medicare*” AND “*annual wellness visit OR annual exam*” were utilized, resulting in 321 articles. Filters, including the publication date (2018-2024) and peer-reviewed articles, were applied, narrowing results to 145. Subsequent searches using alternative keywords, such as “*utilization OR usage*” and “*completion*,” yielded 75 to 110 articles.

For the opening search of SageJournals, the terms “*annual exam OR annual wellness visit OR annual physical*” AND “*utilization OR completion*” AND “*practice change OR intervention*” AND “*Medicare*” were input. This resulted in a broad search with 4,128 results. Subsequent searches were improved by adding key terms from other aspects of the PICOT question, such as “*Medicare beneficiary OR Medicare patient*.” This search populated 635 results but was narrowed to 108 articles after refining by publication year and article type.

### **Limitations, Inclusion, and Exclusion Criteria**

After reviewing the titles and abstracts of articles from final yield searches, additional inclusion criteria were applied to find articles focusing on EHR-based interventions and patient

or provider perceptions that influence Medicare AWW utilization. Full-text copies of 22 articles were obtained and reviewed to address the brief but further refined to ten articles after applying exclusion criteria such as publication before 2018. As previously mentioned, any articles not published within the last five years or without a peer-reviewed history were excluded to obtain the most recent and accurate information.

Rapid critical appraisal (RCA) checklists were used for evaluation and quality control to assess the remaining ten articles chosen for this literature review. Of the ten articles included, five are randomized control trials, one is a qualitative study, one is a cohort analysis, one is a cross-sectional study, and two are quality improvement projects. The chosen studies addressed the PICOT question appropriately. They examined the perceptions of providers and patients that impede Medicare AWW completion and the potential for utilizing EHR tracking and reminders for promoting AWW scheduling and completion.

### **Critical Appraisal and Synthesis of Evidence**

Study quality and the level of evidence were determined using rapid critical appraisal (RCA) tools (Melnik & Fineout-Overholt, 2019). Most studies retained were quantitative (see Appendix A, Table A1), though one qualitative study (see Appendix A, Table A2) was referenced. Of the quantitative studies, five were randomized controlled trials, indicating the results to be a high level of evidence. The combination of ten qualitative and quantitative studies was included in the evaluation and synthesis table (see Appendix A, Table A3) to deduce the role and application of EHRs or automatic messaging interventions to improve Medicare AWW completion rates. Evaluation criteria included study design and level of evidence, study setting, types of interventions employed, and outcomes measured (see Appendix A, Table A3).

Heterogeneity was observed in the study subjects as varying demographics and age groups were represented. Subjects were not primarily Medicare patients, despite that being the target group. Instead, age ranges and insurance coverage varied. Many studies had relatively large sample sizes and were conducted over 6-12 months (see Appendix A, Table 1A). Homogeneity was represented in the study settings, as eight of the ten studies pulled samples from the primary care practice.

Additionally, nine of the ten studies targeted the role of EHR messaging or direct-to-patient text messaging to aid with appointment scheduling or adherence (see Appendix A, Table 3A). Variations in the type and frequency of reminders were present between studies. Halket et al. (2022) reported a 40% increase in screening completion rates using direct-to-patient (DTP) messaging reminders. Wijesundara et al. (2020) endorsed similar success, reporting a statistically significant improvement in the completion of early-season influenza vaccinations among patients receiving outreach via the patient portal with a confidence interval of 95%. Overall, outcomes across all ten studies concluded that EHR interventions aid in increasing AWV completion rates, preventative screening rates, and improved appointment adherence.

### **Theory/Theoretical Framework Application**

The social cognitive theory (SCT) was selected for this QI project because it applies to this type of human behavior change. The SCT consists of three main factors associated with behavior change: personal cognitive, environmental, and supportive behavioral factors (see Appendix B, Figure B1). Each of the three constructs interacts to determine whether healthy behavior change or disease prevention and management will occur.

Elements of behavior factors include self-control, reinforcement, and self-efficacy (Butts & Rich, 2022). Self-efficacy can be defined as a person's confidence in their ability to take an

action and to persist in that action despite encouraging obstacles or challenges (Bandura, 1997). Via the use of automated messaging and EHR reminders, reinforcement of positive behaviors is provided to promote health maintenance. As a result, self-efficacy is cultivated as patients can see the support they have to overcome obstacles. According to SCT, individuals can learn to develop self-efficacy through the setting of small, achievable goals and by monitoring and reinforcing progress made (Butts & Rich, 2022). Concerning this project, success in increasing Medicare AWW completion rates may be impacted by setting the goal to complete an annual appointment and monitoring patient success with frequent reminders and monitoring completion.

The evidence represents personal cognitive factors such as improved attitudes and patient engagement toward completing annual physicals, improved appointment completion rates, and enhanced appointment adherence. Environmental factors may be physical or social and are represented in the evidence as an improved connection via frequent contact via the EHR or automated messaging. Behavioral factors are demonstrated with increased social support from providers and offices, encouraging screening and appointments to be kept and completed to improve health outcomes.

### **Implementation Framework**

The Rosswurm and Larrabee model is frequently used to guide healthcare professionals through the systematic process toward evidence-based practice (see Appendix B, Figure B2). According to Rosswurm and Larrabee (1999), the model supports evidence-based practice changes derived from a combination of quantitative and qualitative data collected via a literature review. The model consists of six linear steps: assessing, linking, synthesizing, designing, implementing/evaluating, and integrating/maintaining. For this practice change, step one included an assessment where the problem was selected, and internal and external data was

collected to back the need for change. Step two, or linking, involved identifying and connecting potential interventions to the issue. Step three, synthesis, included the literature review and identification of appropriate interventions. Steps four through six contributed to intervention design and implementation. This specific model allowed for simple progression between steps to overcome barriers or make corrections, as is likely to happen with any QI project.

### **Implications for Practice Change**

A cost-effective, efficient intervention for primary care practices would be to increase Medicare AWW completion rates via EHR-based interventions. EHR systems can filter through patients and identify those eligible for Medicare AWW versus using staff time to track eligible patients. Next, an EHR reminder can be sent to patients, reminding them to schedule and discuss the benefits included under Medicare, such as preventative screenings and the health-risk assessment. Additional reminders can be sent after an appointment or to continue encouraging patients to schedule and maintain their appointments.

### **Methods**

#### **Project Objective**

The main goal of this QI project was to increase AWW completion rates to roughly 80% among patients at a rural primary care office after initiating an EHR-based intervention. Outcomes were measured by comparing patient tracking reports to determine if completion rates increased. In the end, the evaluation of success was based on whether more AWWs were completed after EHR patient tracking and reminders were sent as opposed to no intervention.

#### **Ethical Considerations**

Three ethical principles will guide this project: respect for person(s), beneficence, and justice. Respect for persons entails acknowledging autonomy for all and protecting those with

diminished autonomy (Miracle, 2016). The project will adhere to this principle by allowing subjects to enter or opt out of the project voluntarily, utilizing physical or virtual consent to register in the facility's EHR portal and services. Additionally, efforts will be taken to protect those with mental disabilities or impairments that would impair an individual's decision-making ability by screening patients based on past medical history and cognition assessments.

The second ethical principle is beneficence, which encompasses the obligation to protect participants from harm and receive maximum benefits with minimal harm (Miracle, 2016). The practical application of this principle relates to applying an EHR intervention, resulting in the most remarkable improvement of health outcomes by optimizing the utilization of medical services available to them through Medicare. However, educating patients on possible adverse consequences due to EHR interventions, such as the release of patient information, is necessary.

The final principle, justice, requires that any intervention or resource be fairly distributed (Melnyk & Fineout-Overholt, 2023). The inclusion of all Medicare patients enrolled as patients at Ponderosa Family Care will address this situation. However, this will be challenging to endorse as some patients may not wish to enroll in the EHR portal. The institutional review board of Arizona State University reviewed all methodologies to ensure that ethical principles were followed and that participants' human rights were protected. An expedited review approval was granted on September 6, 2024 (See Appendix C).

### **Project Design**

A secondary analysis of records collected was conducted at a rural primary care office in Central Arizona during office procedures for scheduling over 16 months. The ASU research project analyzed the effectiveness of the EHR-based intervention used by the primary care office. The initial three months were spent recruiting site stakeholders, reviewing the facility's current

scheduling process, and discussing the impact of this issue. Discussions pertained to planning for initiating patient tracking via the EHR for Medicare AWW eligibility and appointment reminders for scheduling to increase efficiency and reduce the requirements on staff to call and schedule. The next three months included a literature review to identify potential interventions and synthesize findings for site stakeholders, allowing for the selection of an intervention to address the issue. After selecting an EHR-based intervention, the following three months included the development of defined project goals, project implementation, budgeting, and IRB approval. This included meeting with the EHR representative to determine which patient tracking and messaging features were available in the current system and whether implementation was possible.

After the methods for the QI project were clearly defined, the intervention was introduced, evaluated, and adapted over two months. This began with collecting and reviewing consent forms and establishing participation in an EHR patient portal and messaging services for the designated sample, following the application of inclusion and exclusion criteria over two weeks. The sample was evaluated for the last known AWW to establish eligibility.

Initial baseline metrics were collected using a two-tiered, retrospective chart review designed by Siems et al. (2020) (See Appendix D, Figure D1) to determine the pre-intervention AWW completion rates for the same 8-week time period a year before the project. This information was documented using the pre-intervention chart audit tool (see Appendix D, Figure D2). Information was recorded, including the participant's age, date of last AWW, and enrollment in EHR/Messaging. Personal information was de-identified as each patient tracked was assigned a Subject ID number, using the last four digits of their account number with their first and last names' initials (ex. 1234SW).

Once the baseline data was determined, stakeholders, including providers, medical assistants, and receptionists at the project site, collaborated to draft a standardized message outlining eligibility and importance for Medicare AWWs to be automatically sent via the patient portal (See Appendix D, Text D3). The outgoing message was sent securely via the patient portal to a patient's email address, as a text message, and/or as a voicemail to all individuals found eligible daily. This process will be repeated weekly over the following eight weeks.

Next, a chart review was completed to collect records on AWWs completed during the 8-week post-intervention period using the Post-Intervention Chart Audit Tool (see Appendix D, Figure D4). Information including reference to their subject ID (ex. 1234SW), the participant's age, date of last AWW, enrollment in EHR/Messaging, type of message format received, and if AWW is scheduled/completed was recorded. Outcomes were measured and evaluated for success and compared to the initial outcomes set. Analysis for statistically significant changes to patient completion or scheduling rates of Medicare AWW was calculated. Over the final three months of the project, evidence was presented to stakeholders, the practice change to the facility was finalized, and evidence was discussed with outside health professionals. The logic model provides a general project design overview (see Appendix E, Figure E1).

### **Project Sample**

The QI project focused on a private primary care office in rural central Arizona, serving a primarily geriatric population. Objective community data demonstrated that 37.7% of the total population in this area was 65 years and older, nearly 20% higher than the average for Arizona (U.S. Census Bureau, 2022). The office reported providing medical care to 10,000 registered patients, with 3,604 enrolled with Medicare. All project participants will be recruited from the

primary care office, having previously signed a consent form opting into using an EHR and patient portal (n = 1, 692).

Patients are eligible for this project if they (1) have been enrolled with Medicare for at least 12 months, (2) are 65 years and older, (3) have not had an AWV in the last twelve months, (4) are enrolled into the EHR and consented to receive reminders via text message or email via the online portal. These requirements were intended to minimize the inclusion of patients who are not Medicare beneficiaries and will be unable to receive the intended intervention of EHR-based reminders and education. A patient was eligible for inclusion in the EHR portion of the trial if the patient was an active user, defined as having an activated portal with a log-in at least once in the year preceding recruitment.

Patients were excluded if they had a documented AWV in the last twelve months, as Medicare only covers the service once in twelve months. Exclusion criteria also included the presence of (1) an AWV appointment already scheduled in a patient's calendar, (2) no documentation of consent to opt-in to the use of the EHR patient portal and automated messaging, (3) documentation of enrollment in an insurance coverage that was not Medicare.

### **Setting and Stakeholders**

The setting was a private primary care office in rural central Arizona, housed in a small, one-building physical location. The office employed six medical assistants, three receptionists, two medical doctors, two physician assistants, and two family nurse practitioners at the time of the project. The office's medical staff and the Operations Manager initially identified the resource utilization gap. Each employee served as a key stakeholder, with additional buy-in required from the receptionists and medical assistants, as they will be crucial to screening patients and scheduling appointments. All providers were responsible for completing each AWV,

consisting of pre-visit screening, office visits, and documentation. The operations manager was crucial to the longevity of the intervention and tracking of outcomes at the facility. Additionally, buy-in from patients, utilizing a new scheduling and reminder system, with most of the target population experiencing low digital literacy, was a crucial barrier to address.

### **Data Collection**

Outcomes were measured using patient tracking reports within the EHR to see if scheduling and completion rates increased. In the end, the evaluation of success was based on whether, after project implementation, more Medicare AWVs were completed after EHR reminders were sent as opposed to no intervention or continuation of the current practice. The primary data was collected from the eClinicalWorks EHR system via automated and manual chart reviews. The chart review focused on identifying patients eligible for Medicare AWVs based on the last documented AWV and determining a baseline completion rate. After implementing the intervention, an automated chart review was established in the eClinicalWorks charting system, followed by a manual chart review by a qualified person to verify the data automatically collected.

A chart review method designed by Siems et al. (2020), a two-tiered approach that includes data analysis by a primary and secondary reviewer, was applied for data collection and evaluation. The authors advocated that each reviewer follow a structured chart review methodology (See Appendix D, Figure D1), which was applied. The validity of this chart review methodology was determined using post-review surveys by data reviewers. The authors concluded that the reviewers strongly agreed with 93% or more of the reviews, and confidence in the process was 94.2%; therefore, a structured chart review by a two-tiered approach can be valid and reliable (Siems et al., 2020).

**Data Analysis**

Chart review datasets were extracted to evaluate the impact of an EHR-based intervention on the completion and scheduling rates of AWVs before and after the initiation of patient tracking and automated messaging. Demographic data for the pre-and post-intervention groups were collected to support descriptive statistical analysis. Additionally, automated reports detailing the number of AWVs completed in each time period were used to calculate the overall percentage increase in visit completion following the intervention. All data analysis was performed using IntellectusStatistics™.

**Sustainability**

As with any practice change, the process is not linear but requires constant adaptation and commitment. After this initial project is introduced and completed, maintenance will rely on the commitment of staff and the site champion to continue working towards improving the selected outcome metric of increasing Medicare AWV completion rates.

In particular, the Rosswurm and Larrabee model (1999), introduced initially to guide the systematic process toward evidence-based practice, highlights this requirement. This model allows for progression between steps toward change but emphasizes the ability to move back and forth to overcome barriers or make corrections. Concerning the sustainability of this practice change, the steps pertaining to evaluation and maintenance in the Rosswurm and Larrabee model will be revisited repeatedly as additional adjustments are made by the site champion to continue improving the intervention for the site and its needs after the initial introduction by the Doctor of Nursing Practice (DNP) student. Additionally, presenting the financial benefits the intervention would permit for both the private practice and individual providers will aid in the retention of the practice change (See Appendix F, Table F1).

From the beginning, the site champion has been the operations manager at the primary care office, as she has been a vocal supporter of this change and active in developing this intervention. This position's responsibilities historically include monitoring quality outcomes or metrics and initiating practice changes by collaborating with staff. As a result, this individual represents the prime candidate to facilitate the maintenance of this intervention, continue monitoring outcomes, or promote further expansion of the practice change. The operations manager is crucial to maintaining the intervention's longevity and continued tracking of outcomes at the facility.

At the conclusion of this project, the site will be equipped with a new tool to identify eligibility for Medicare AWW, a simplified method for contacting patients to schedule appointments, and a routine tracking of AWW completion rates by optimizing the current EHR system. The interventions and outcomes will continue to be monitored by the operations manager to improve AWW completion rates further. Additionally, the goal is for the patient and appointment tracking to expand further to additional types of appointments and populations at the practice. As a result, efficiency can continue to improve, decreasing practice costs and optimizing revenue.

### **Results**

The project site independently implemented the EHR-based patient tracking and automated messaging on July 7, 2024. Two retrospective chart reviews were conducted for pre-intervention baseline data collection from September 9, 2023, to February 3, 2024, and post-intervention data from September 9, 2024, to February 3, 2025. IntellectusStatistics™ software was utilized to store, manage, and analyze the data. Patient records indicated that (n = 3,604)

Medicare patients were eligible for AWVs for each data collection period; however, only 1,692 were enrolled in the online portal to receive notifications.

Descriptive statistics were used to summarize the characteristics of the Medicare patient samples in the pre- and post-intervention periods, including age and gender. Baseline data was collected for patients who attended an AWV without prompting (n = 243). The average age in the pre-intervention sample was 76 years (SD = 7.51), with ages ranging from 50 to 99 (See Appendix G, Table G1). The sample consisted of 131 females (54%) and 112 males (46%) (See Appendix G, Table G2.). Post-intervention data demonstrated increased Medicare AWV utilization (n = 299). The average age of the post-intervention sample was 75 (SD = 6.84). The ages ranged from 63 to 99 (See Appendix G, Table G3). The sample consisted of 172 females (58%) and 127 males (42%) (See Appendix G, G4). Comparing the pre-intervention and post-intervention AWV completion rates, an 81% increase was calculated (Appendix G, Graph G5). These findings suggest that EHR-based patient tracking and automated messaging increase Medicare AWV completion rates.

Additionally, the intervention was implemented without additional staff involvement or workload required, an initial goal for the practice site. Discussions with stakeholders revealed the intervention was successfully incorporated into the office workflow and supports sustainability beyond the initial project timeframe.

### **Discussion**

Implementing an EHR-based intervention, including automated patient tracking and messaging, was associated with an 81% increase in Medicare AWV completion rates at a rural primary care practice. Pre-intervention completion was recorded at 243 AWVs, while post-intervention completion rose to 299 among the same population sample. These outcomes support

the feasibility and effectiveness of using digital tools to streamline patient engagement and promote preventative care services for Medicare beneficiaries. The intervention showed strong potential for practice-wide healthcare system benefits. Automated reminders reduced scheduling and staff burden, freeing up clinical resources, while increased AWV completion rates supported improved preventative care delivery and boosted practice revenue. Importantly, this approach is scalable and adaptable for use across different care settings and appointment types.

### **Limitations and Barriers**

Several limitations emerged during the implementation of this intervention. First, the sample was limited to individuals already enrolled in the EHR patient portal. This may have excluded patients with limited digital literacy or access, which is common among Medicare beneficiaries. This exclusion may have introduced a selection bias, favoring individuals already inclined toward proactive health behaviors. A significant challenge was extracting consistent data from the EHR system, which limited the level of data analysis that could be completed for this quality improvement project. Additionally, the project did not assess whether patients' understanding or health literacy regarding AWVs improved due to the educational information included in the reminders. As a result, it is unclear whether the increase in AWV completion rates was due solely to the intervention or if patients now fully understood the purpose and value of the visit. Lastly, the intervention did not address other cited barriers to AWV completion, such as limited transportation or appointment availability. These unaddressed factors may still contribute to the underutilization of AWVs, even with automated reminders in place.

### **Relation to Literature**

The findings of this QI project are consistent with the growing body of literature supporting the use of EHR and automated messaging to improve healthcare engagement. Studies

by Halket et al. (2022) and Wijesundara et al. (2020) found significant increases in screening and vaccination rates when patients received DTP messaging. Atlas et al. (2023) highlighted how multilevel interventions, including EHR reminders, outreach, and navigation, improved follow-up rates for overdue screenings. In this project, the success of automated reminders to increase AWW completion rates supports previous research that positions digital outreach as a powerful, scalable strategy to increase appointment adherence.

### **Recommendations for Further Study**

Future research should expand on this project by evaluating the sustainability of EHR-based interventions over time and their impact on broader health outcomes, such as preventative screening rates and chronic disease management. Additionally, studies should focus on the evaluation of patient satisfaction and health literacy in response to automated reminders. Understanding how patients perceive and act on these communications will be vital to refining the approach and fostering long-term engagement in preventive care.

### **Conclusion**

This QI project demonstrated that a low-cost, technology-driven intervention could increase AWW completion rates in a rural primary care practice. By leveraging existing EHR infrastructure, the practice improved patient engagement and adherence to preventative care schedules with minimal disruption to clinic workflows. As healthcare continues to shift toward value-based care models, strategies that enhance preventative service utilization while reducing staff burden will be increasingly essential. While limitations such as digital access disparities and patient health literacy remain, the findings underscore the potential for scalable, tech-enabled solutions to address long-standing Medicare wellness care delivery barriers.

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Appendix A

Evaluation and Synthesis Tables

**Table A1**  
*Evaluation Table for Quantitative Studies*

Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p><b>Author/Title</b> (Tarn et al. 2023), Outcomes of a Virtual Practice-Tailored MC AWV Intervention</p> <p><b>Country:</b> US</p> <p><b>Funding:</b> Grant R61AG068946 from the National Institute on Aging</p> <p><b>Bias:</b> Dr. Tarn has been funded by BMS/Pfizer Alliance ARISTA-USA to conduct un-related research.</p>	<p>Theory of Systems Change (Inferred)</p>	<p><b>Design:</b> Remote practice redesign &amp; EHR support, implemented Practice-Tailored AWV Intervention</p> <p><b>Purpose:</b> Identify interventions to promote utilization of MC AWV to increase PS and preventive health service utilization.</p>	<p><b>N= 1, 513</b></p> <p><b>Demographics:</b> AWV-eligible MC Patients Mean Age: 71</p> <p><b>Setting:</b> 3 Small Community-Based Practices in Colorado</p> <p><b>Exclusion:</b> Non-MC Patients, In-Eligible for AWV</p> <p><b>Attrition:</b> 77%</p>	<p><b>IV1:</b> EHR-Based Tools w/ Practice Redesign</p> <p><b>DV1:</b> Completion of AWV in past 12 months.</p> <p><b>DV2:</b> Fulfillment of Recommended PS</p> <p><b>Definitions:</b> EHR-Based Tools/Practice Redesign: Templates, HRAs, PHP</p>	<p><b>Tools:</b> Feedback Report at 3, 8, and 12 months, EHR data extraction (AWV &amp; PS); Data Extraction</p> <p><b>Validity/ Reliability:</b> Human Margin of Error</p>	<p><b>Statistical Tests Used:</b> Descriptive Statistics Chi-Square <i>t</i> tests</p>	<p><b>DV1:</b> AWV in last 12 months increased from 7-54% after 8 months.</p> <p><b>DV2:</b> PS completion increased from 47.5-53.8%.</p>	<p><b>Level of Evidence:</b> Level 4</p> <p><b>Strengths:</b> Can be replicated in primary care setting.</p> <p><b>Weakness:</b> High Attrition Rate</p> <p><b>Feasibility:</b> Yes, can adjust current EHR system being used to screen patients.</p> <p><b>Application:</b> Yes, dependent on the type of EHR used and settings that can be adjusted.</p>
<p><b>Author/Title</b> (Halket et al., 2022); Targeted</p>	<p>Social Learning</p>	<p><b>Design:</b> Single-Center</p>	<p><b>N= 1,600</b> Control= 800 Intervention= 800</p>	<p><b>IV1:</b> DTP messaging via EHR w/</p>	<p><b>Tools:</b> EHR Tracking</p>	<p><b>Statistical Tests Used:</b></p>	<p><b>DV1:</b> Screening rates</p>	<p><b>Level of Evidence:</b> Level 2</p>

Key: **Appt** Appointment, **AWV** Annual Wellness Visit, **CI** Confidence Interval, **COI** Conflict of Interest, **CRC** Colorectal Cancer, **DTP** Direct-to-Patient, **D/T** Due To, **Dx** Diagnosed, **EHR** Electronic Health Record, **EPP** Electronic Patient Portal, **FIT** Fecal Immunochemical Test, **FU** Follow-Up, **HCV** Chronic Hepatitis C Virus, **HIV** Human Immunodeficiency Virus, **HRA** Health Risk Assessments, **INT** Intervention, **LTFU** Long-Term Follow-Up, **MC** Medicare, **MI** Motivational Interviewing, **PCP** Primary Care Practice, **PHP** Personalized Health Plan, **PPP** Personalized Prevention Plan, **PS** Preventative Screenings, **QI** Quality Improvement, **RCT** Randomized Control Trial, **TM** Text Message, **US** United States, **W/** with, **W/O** Without

Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p>EPP Messaging Increases Hepatitis C Virus Screening in PCP: A Randomized Study</p> <p><b>Country:</b> US</p> <p><b>Funding:</b> Gilead Sciences, Inc. via HCV SCALE Program</p> <p><b>Bias:</b> Authors declined COI.</p>	<p>Theory (Inferred)</p>	<p>Randomized Trial</p> <p><b>Purpose:</b> Determine whether more engaged patients are more likely to respond to a direct-to-patient message with an automated lab order for hepatitis C virus (HCV) screening.</p>	<p><b>Demographics:</b> Stanford PCP Patient, 800 w/ Upcoming Appt in 6 months, 800 w/o Appt, Born from 1945-1965.</p> <p><b>Setting:</b> Stanford PCP</p> <p><b>Exclusion:</b> Documented HCV Viral Load in EHR, Dx of Chronic HCV</p> <p><b>Attrition:</b> 13%</p>	<p>automated lab order.</p> <p><b>DV1:</b> Completion rates of HCV Screening (W/ in 6 months of message send out.</p> <p><b>Definitions:</b> None Provided</p>	<p><b>Validity/ Reliability:</b> Human Margin of Error</p>	<p>Chi-square analysis</p> <p>t-test</p> <p>Univariable Logistic Regression</p> <p>Multivariable Logistic Regression</p> <p>STATA Version 17</p>	<p>increased from 22% in the non-contact group to 62% in the DTP messaging.</p>	<p><b>Strengths:</b> Can be replicated in PCP settings and adjusted to fit needs for DTP messaging.</p> <p><b>Weakness:</b> With the group being split into four groups, it is difficult to state whether increase screening was d/t the DTP message or having an appt scheduled.</p> <p><b>Feasibility:</b> Yes, dependent on settings of the EHR for automated messages.</p> <p><b>Application:</b> Yes, a similar process of EHR messages for appt reminders.</p>
<p><b>Author/Title</b> (Wijesundara et al., 2020) EHR Portal Messages and Interactive Voice</p>	<p>Social Learning Theory (Inferred)</p>	<p><b>Design:</b> Non-Blinded RCT</p> <p><b>Purpose:</b> The goal of this study was to test the effectiveness of</p>	<p><b>N= 118, 253</b> Portal Message w/ Portal User= 19,506</p>	<p><b>IV1:</b> Receive portal message promoting influenza vaccination, listing upcoming</p>	<p><b>Tools:</b> EHR Tracking</p> <p><b>Validity/ Reliability:</b> Margin of Human Error</p>	<p><b>Statistical Tests Used:</b> Frequencies</p>	<p><b>DV1:</b> Increased vaccine completion rates with receiving</p>	<p><b>Level of Evidence:</b> Level 2</p> <p><b>Strengths:</b> Can be replicated in PCP settings and</p>

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p>Response Calls to Improve Rates of Early Season Influenza Vaccination: RCT</p> <p><b>Country:</b> US</p> <p><b>Funding:</b> Pfizer Independent Grants for Learning and Change, National Heart, Lung, and Blood Institute</p> <p><b>Bias:</b> None Declared</p>		<p>portal and interactive voice response outreach in improving rates of influenza vaccination.</p>	<p>Usual Care w/ Portal User= 19,505 Call w/ Non-Portal User=15,000 Usual Care w/ Non-Portal User=43,596</p> <p><b>Demographics:</b> Portal users were more likely to be women, older, and have a higher level of health care utilization.</p> <p><b>Setting:</b> Large Multispecialty Group Practice</p> <p><b>Exclusion:</b> Allergy to the Flu Vaccine, Documented Vaccine Completion, No Listed Phone Number</p> <p><b>Attrition:</b> Not Reports</p>	<p>clinics, and offering online scheduling of vaccination appointments.</p> <p><b>DV1:</b> Percentage of eligible patients w/ flu vaccine documented in EHR.</p> <p><b>Definitions:</b> None Provided</p>		<p>Intention-to-Treat Bivariate Analyses</p> <p>Multivariate Logistic Regression Analyses</p>	<p>EHR reminder messages vs. non-recipients (CI 1.02-1.12).</p>	<p>adjusted to fit needs for DTP messaging.</p> <p><b>Weakness:</b> Portal non-users are less likely to have had an office visit or engage in their health care overall.</p> <p><b>Feasibility:</b> Yes, dependent on settings of the EHR for automated messages.</p> <p><b>Application:</b> Yes, a similar process of EHR messages for appt reminders.</p>

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p><b>Author/Title:</b> (Malcolm et al., 2021); Factors Influencing Implementation of PPP among AWV Patients Using the Theory of Planned Behavior: A Quantitative Study</p> <p><b>Country:</b> US</p> <p><b>Funding:</b> Not Declared</p> <p><b>Bias:</b> None Declared</p>	Theory of Planned Behavior	<p><b>Design:</b> Cross-Sectional Design</p> <p><b>Purpose:</b> To identify factors clinical pharmacists can use to influence adoption of PPPs in primary care practices.</p>	<p>N= 77</p> <p><b>Demographics:</b> Mean Age 74, 59% Black, 27% HS Education, 45% &lt;25,000/year</p> <p><b>Setting:</b> Two out-patient PCP offices.</p> <p><b>Exclusion:</b> Mini-Mental Status Exam Score &lt;23, Visual Impairment, AWV w/ in last 12 months.</p> <p><b>Attrition:</b> 1.3%</p>	<p><b>IV1:</b> Completion of a Theory of Planned Behavior based questionnaire.</p> <p><b>DV1:</b> Behavior Engagement</p> <p><b>DV2:</b> Past Behavior</p> <p><b>DV3:</b> Intention</p> <p><b>Definitions:</b></p> <p>“Behavior Engagement”: Whether patients are in the process of implementing PPP behaviors.</p> <p>“Past Behavior”: Implementation of PPP in last 12 months.</p> <p>“Intention”: Plan to completing PPP.</p>	<p><b>Tools:</b> 5-Point Bipolar Scale Dichotomous Scale 7-Point Bipolar Semantic Differential Scales</p> <p><b>Validity/ Reliability:</b> Not Reported</p>	<p><b>Statistical Tests Used:</b></p> <p>Statistical Package for the Social Sciences</p> <p>Descriptive Statistics</p> <p>Cronbach’s alpha</p> <p>Pearson Correlation</p> <p>Multiple Regression Analysis</p>	<p><b>DV1:</b> 66.2% report working to implement PPP.</p> <p><b>DV2:</b> 51% report implementing in the past 12 months.</p> <p><b>DV3:</b> 44% report they will “likely” implement PPP.</p>	<p><b>Level of Evidence:</b> Level 4</p> <p><b>Strengths:</b> Can be replicated in PCP settings and adjusted to fit needs for AWVs.</p> <p><b>Weakness:</b> High response rate and completion may be due to assistance from staff versus patient buy-in.</p> <p><b>Feasibility:</b> Yes, can be replicated in other PCP settings.</p> <p><b>Application:</b> Yes, a similar process could be adopted for AWV and PPP recreation.</p>
<p><b>Author/Title</b> (Kershaw et al., 2018) Use of an electronic medical</p>	Social Learning Theory (Inferred)	<p><b>Design:</b> Retrospective Cohort Analysis</p>	<p>Patient’s w/ Visits Before = 27,729 Patient’s w/ Visits After = 20,640</p>	<p><b>IV1:</b> EHR-based reminder for HIV screening.</p>	<p><b>Tools:</b> EHR Tracking</p> <p><b>Validity/</b></p>	<p><b>Statistical Tests Used:</b></p> <p>Generalized Estimating</p>	<p><b>DV1:</b> Increase in HIV screening rates from</p>	<p><b>Level of Evidence:</b> Level 4</p> <p><b>Strengths:</b> Highlights the use</p>

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p>record reminder improves HIV screening.</p> <p><b>Country:</b> US</p> <p><b>Funding:</b> None</p> <p><b>Bias:</b> None Listed</p>		<p><b>Purpose:</b> Evaluate the impact of the EHR reminder on rates of screening for HIV at an academic, hospital-based PCP. Identify patient characteristics associated w/ the likelihood of HIV screening.</p>	<p><b>Demographics:</b> Aged 18-65, Previous Visit to PCP, Not Previously Tested for HIV</p> <p><b>Setting:</b> Academic, hospital-based PCP.</p> <p><b>Exclusion:</b> No Demographic Data Available in Chart</p> <p><b>Attrition:</b> Not Reported</p>	<p><b>DV1:</b> HIV screening completion</p> <p><b>Definitions:</b> None Provided</p>	<p><b>Reliability:</b> Margin of Human Error</p>	<p>Equations w/ Log Link and Binary Error</p> <p>Cox's Proportional Hazards Model</p>	<p>15.3% of patients to 30.7% after an EHR-based reminder (p&lt;0.0001, CI 1.95-2.09).</p>	<p>of passive EHR reminders to increase screening completion rates.</p> <p><b>Weakness:</b> Limited discussion of study design and type of EHR intervention used. Attrition was not reported.</p> <p><b>Feasibility:</b> Yes, could use a similar EHR reminder for Medicare AWWs.</p> <p><b>Application:</b> Yes, a similar process could be adopted for AWW reminders.</p>
<p><b>Author/Title</b> (Bauer et al., 2021) Improving follow-up attendance for discharged emergency care patients using automated phone system to self-schedule: A</p>	<p>Social Learning Theory (Inferred)</p>	<p><b>Design:</b> RCT Prospective Randomized Open, Blinded End-Point Trial</p> <p><b>Purpose:</b> Determine is a bidirectional, automated phone and text messaging</p>	<p><b>N= 278</b> Control= 128 Intervention= 150</p> <p><b>Demographics:</b> Avg. Age 40, 63.7% Female, 67.3% African American</p> <p><b>Setting:</b> Barnes Jewish Hospital</p>	<p><b>IV1:</b> Self-scheduling text or phone message to automatically schedule a FU appt and send appt reminders.</p> <p><b>DV1:</b> Time to Appt/FU Adherence</p>	<p><b>Tools:</b> CareSignal Automated Self-Scheduling Text/Phone Messaging System</p> <p>EHR Tracking</p> <p><b>Validity/ Reliability:</b> Margin of Human Error</p>	<p><b>Statistical Tests Used:</b></p> <p>Grey's Test</p> <p>Cox's Proportional-Hazards Model</p> <p>Chi-Square Test</p>	<p><b>DV1:</b> Adherence increased from 23.4% in control vs. 49.3% in intervention group. (p&lt;0.001, CI 1.6-3.7)</p>	<p><b>Level of Evidence:</b> Level 2</p> <p><b>Strengths:</b> Design and interventions are well-described, could be replicated.</p> <p><b>Weakness:</b> Intervention was tested at a single emergency</p>

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
randomized controlled trial.  <b>Country:</b> US  <b>Funding:</b> Washington University Institute of Clinical and Translational Sciences Grant, CareSignal Unrestricted Educational Grant  <b>Bias:</b> Used a self-schedule text/phone call system designed by CareSignal who provided project funding.		system help discharged patients schedule their own FU appts.	Emergency Dept.; St. Louis, Missouri  <b>Exclusion:</b> Declined Participation, Unable to Consent, Can't Contact via Phone/Text, Admission to Hospital, Referral Provider Called to Schedule Appt.  <b>Attrition:</b> 14%	<b>DV2:</b> Time to Return to Emergency Department w/ in 120 days of Discharge.  <b>Definitions:</b>  <i>FU Adherence:</i> Recorded visit in EHR within 120 days from discharge from Emergency Department.			<b>DV2:</b> No significant differences.	department, may not be generalizable.  <b>Feasibility:</b> Variable, would require use of an automated messaging system that is not widely available w/ all EHRs.  <b>Application:</b> Intervention could be adjusted to send reminders for AWWs.
<b>Author/Title</b> (MacDonald et al., 2022); Text Message Reminders to Improve Immunization Appointment Attendance in Alberta, Canada: The Childhood	Social Learning Theory (Inferred)	<b>Design:</b> Non-Blinded RCT  <b>Purpose:</b> Aimed to assess the effectiveness and acceptability of using SMS text messages containing a link	<b>N= 638</b> (Edmonton, INT) <b>N= 388</b> (Edmonton, Control) <b>N= 1471</b> (Lethbridge, INT) <b>N= 904</b> (Lethbridge, Control)	<b>IV1:</b> Two SMS text message reminders sent to parents (Booking reminder 3 months before child's 18-month appt & 3 days before scheduled appt. Booking reminders	<b>Tools:</b> Web-Based Survey (Not Defined)  EHR Tracking  <b>Validity/ Reliability:</b> Margin of Human Error w/ EHR Tracking	<b>Statistical Tests Used:</b>  Compare Absolute No-Show Rates  REDCap Tools  Descriptive Statistics	<b>DV1:</b> Edmonton had a reduction of 6.4% (95% CI 3%-9.8%) in appointment no-shows, with no change at the	<b>Level of Evidence:</b> Level 3  <b>Strengths:</b> Diverse population in study, looked at urban and rural settings. Can be generalized.  <b>Weakness:</b> Variation in control

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p>Immunization Reminder Project Pilot Study</p> <p><b>Country:</b> Canada</p> <p><b>Funding:</b> Public Health Agency of Canada through an Immunization Partnership Fund grant.</p> <p><b>Bias:</b> Katherine Atkinson is a cofounder and the chief operating officer of CANImmunize Inc.</p>		<p>to web-based immunization information in different languages to remind parents of their child’s 18-month immunization appointment.</p>	<p><b>Demographics:</b> Children w/ 18-month appt. Edmonton-High Density Urban City Lethbridge – Small City w/in rural area</p> <p><b>Setting:</b> Two public health centers, one in Lethbridge and Edmonton (Mill Woods), Alberta, Canada.</p> <p><b>Exclusion:</b> Appt was canceled/ outside pre-INT /post-INT periods or were aged &gt;24 months.</p> <p><b>Attrition:</b> Not Reported</p>	<p>included a link to website w/ immunization info in 9 languages.</p> <p><b>DV1:</b> Absolute attendance no-show rates before the intervention vs. after the intervention.</p> <p><b>DV2:</b> Acceptability of the intervention by parents.</p> <p><b>Definitions:</b> <i>No-Shows:</i> Children who missed their scheduled appt, including those who rescheduled missed appt.</p>	<p>Web Survey was not specified, unable to confirm validity/reliability.</p>		<p>Lethbridge Health Center (0.8%, 95% CI –1.4% to 3%).</p> <p><b>DV2:</b> &gt;95% respondents state the reminders were helpful.</p>	<p>vs. INT group sizes, unclear how participants were recruited.</p> <p><b>Feasibility:</b> Variable, dependent on if EHR has an automated messaging feature available.</p> <p><b>Application:</b> Intervention could be adjusted to send reminders for AWVs or as reminders to schedule for an appt.</p>
<p><b>Author/Title</b> (Ulloa-Pérez et al., 2022) Pragmatic Randomized Study</p>	<p>Social Learning Theory (Inferred)</p>	<p><b>Design:</b> Randomized QI Project</p> <p><b>Purpose:</b> Compare the</p>	<p>N= 125,076 PCP Appt. w/ No-Show Risk &gt;5.1% (62,519 1 TM, 62,557 2 TM)</p>	<p><b>Control:</b> 1 TM Appt Reminder</p> <p><b>IV1:</b> 2 TM Appt Reminder</p> <p><b>DV1:</b> No-Shows</p>	<p><b>Tools:</b> 10-Variable No-Show Prediction Model No-Show Predictions are Generated</p>	<p><b>Statistical Tests Used:</b> Relative Risk</p>	<p><b>DV1:</b> Additional TM reduced the chance of no-show by</p>	<p><b>Level of Evidence:</b> Level 3</p> <p><b>Strengths:</b> INT was used for PCP and mental health visits,</p>

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p>of Targeted TM Reminders to Reduce Missed Clinic Visits</p> <p><b>Country:</b> US</p> <p><b>Funding:</b> Conducted as part of the Kaiser Permanente Washington’s Learning Health System Program.</p> <p><b>Bias:</b> None Declared</p>		<p>effect of 1 TM reminder (sent 2 business days prior to the appointment) with 2 TM reminders (sent 2- and 3-days prior) on no-shows and same-day cancellations for patients w/ high no-show risk.</p>	<p>N= 33,593 Mental Health Appt. w/ No-Show Risk &gt;21.1% (16,830 1 TM, 16,763 2 TM)</p> <p><b>Demographics:</b> Visits scheduled 4+ days in advance, classified as “high-risk” for no-show, defined as an Epic no-show risk in the top 40% of risk predictions for that type of visit.</p> <p><b>Setting:</b> Kaiser Permanente Washington</p> <p><b>Exclusion:</b> Did not meet high-risk no-show criteria, appt not scheduled 4+ days in advance to receive TM.</p> <p><b>Attrition:</b> None Reported</p>	<p><b>DV2:</b> Same-Day Cancellations</p> <p><b>Definitions:</b> <i>High-Risk No-Show:</i> Visits with no-show risk above 5.1% for PCP and 21.1% for mental health visits were classified as high risk.</p>	<p>w/in Epic.</p> <p><b>Validity/ Reliability:</b></p> <p>Prediction Model: High Discrimination</p>	<p>G-Computation with Logistic Regression</p>	<p>7% (RR = 0.93, 95% CI: 0.89–0.96).</p> <p>DV2: Additional TM reduced same-day cancellations by 6% (RR = 0.94, 95% CI: 0.90–0.98).</p>	<p>demographics allow for generalization.</p> <p><b>Weakness:</b> Study does not use a true “control” group where no INT was used.</p> <p><b>Feasibility:</b> Variable, dependent on if EHR has an automated messaging feature available.</p> <p><b>Application:</b> Intervention could be adjusted to send reminders for AWVs or as reminders to schedule for an appt.</p>

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
<p><b>Author/Title</b> (Atlas et al., 2023) A Multilevel PCP INT to Improve FU of Overdue Abnormal Cancer Screening Test Results: A Cluster RCT</p> <p><b>Country:</b> US</p> <p><b>Funding:</b> Grant U01CA225451 (National Cancer Institute) &amp; Grant CRP-22-080-01-CTPS (American Cancer Society)</p> <p><b>Bias:</b> None Reported</p>	<p>Social Learning Theory (Inferred)</p>	<p><b>Design:</b> Pragmatic, Cluster Randomized Clinical Trial</p> <p><b>Purpose:</b> To test INT to improve timely FU of overdue abnormal breast, cervical, colorectal, and lung cancer screening results.</p>	<p>N= 2,702 (Usual Care) N=3,254 (EHR Reminder) N=2,560 (EHR Reminder w/ Outreach) N=3,455 (EHR Reminder, Outreach, &amp; Navigation)</p> <p><b>Demographics:</b> 15.4% Medicare Insured, recruited if overdue for FU after abnormal cancer PS.</p> <p><b>Setting:</b> 44 PCP w/in 3 health networks in the US.</p> <p><b>Exclusion:</b> History of Cancer, Non-English Speaking</p> <p><b>Attrition:</b> Not Reported</p>	<p><b>IV1:</b> Usual Care</p> <p><b>IV2:</b> EHR Reminders</p> <p><b>IV3:</b> EHR Reminder &amp; Outreach</p> <p><b>IV4:</b> EHR Reminder, Outreach, &amp; Navigation</p> <p><b>DV1:</b> Complete recommended FU w/in 120 days of enrollment across 4 INT.</p> <p><b>DV2:</b> Complete recommended FU w/in 240 days of enrollment &amp; completion of recommended FU w/in 120 days and 240 days for specific cancer types and levels of risk</p> <p><b>Definitions:</b> <i>EHR Reminders:</i> Reminder letter</p>	<p><b>Tools:</b> EHR algorithms to identify patient eligibility and determine recommended FU period and appropriate diagnostic FU.</p> <p><b>Validity/Reliability:</b> Margin of Human Error w/ EHR Algorithm Creation</p>	<p><b>Statistical Tests Used:</b></p> <p>Mixed Logistic Regression Models</p> <p>Kaplan-Meier Time-to-Event Curves</p> <p>Pairwise Test</p>	<p><b>DV1:</b> Completion of FU w/in 120 days was higher among patients exposed to EHR reminders, outreach, and navigation (31.4%) or EHR reminders and outreach (31.0%) than those exposed to EHR reminders only (22.7%) or usual care (22.9%).</p> <p><b>DV2:</b> FU completion proportions at 240 days showed similar results.</p>	<p><b>Level of Evidence:</b> Level 3</p> <p><b>Strengths:</b> Study design was well-explained and could be replicated in alternative settings for alternative topics.</p> <p><b>Weakness:</b> “Usual Care”/Control was not clearly defined.</p> <p><b>Feasibility:</b> Variable, dependent on if EHR has an automated messaging and other outreach features available.</p> <p><b>Application:</b> Intervention could be adjusted to send reminders for AWWs or as reminders to schedule for an appt.</p>

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to Practice; Generalization
				through EHR patient web portal or via postal mail.  <i>Outreach:</i> Patient letter sent at week 2 and a phone call at week 4.  <i>Navigation:</i> Navigator outreach phone call at week 4.			<b>Other:</b> EHR reminders alone did not improve FU; limited ability of passive reminders to increase FU.	

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**Table A2**  
*Evaluation Table for Qualitative Studies*

Citation	Theory/ Conceptual Framework	Design/ Method/ Sampling	Sample/ Setting	Major Themes Studied/ Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Themes	Level/Quality of Evidence; Decision for/ Application to Practice; Generalization
<p><b>Author /Title</b> (Simpson et al., 2021), Enhancing AWW Outcomes: Patient Perceptions and Provider Practices</p> <p><b>Country:</b> United States</p> <p><b>Funding:</b> None</p> <p><b>Bias:</b> None Listed</p>	Health Belief Model	<p><b>Design:</b> Descriptive Exploratory</p> <p><b>Method:</b> Phone Calls, MI, Behavioral Counseling</p> <p><b>Purpose:</b> Identify factors that impede or support implementation of AWW recommendations and to provide ongoing support for health promotion behaviors through monthly phone calls.</p>	<p><b>Sample:</b> (n= 47)</p> <p><b>Demographics:</b> Ages 65-83 Predominantly white women. Dx w/ 5.82 medical conditions. 73% of sample was obese 99% report health as “good”, “very good”, or “excellent”.</p> <p><b>Setting:</b> Large Accountable Care Organization</p> <p><b>Attrition:</b> 0%</p>	<p>RQ1: Current Practice Issues w/ AWW Implementation</p> <p>RQ2: Current Provider Issues w/ AWW Implementation</p> <p><b>Definitions:</b> None Provided</p>	<p><b>Data Collection:</b> Written Summaries of Phone Calls, Review of Instrument/Tools used to Collect AWW Data, Patients AWW Documentation, Discussions with Wellness Program Providers</p> <p><b>Data Dependability:</b> None Listed</p>	Qualitative Content Analysis	<p>Q1: Vague language w/ instructions, difficulty accessing patient portals, limited to no contact after AWW to remind of goals.</p> <p>Q2: Incomplete charting, short appointment times, omission of AWW requirements. EHR modification.</p>	<p><b>Level of Evidence:</b> Level 4</p> <p><b>Strengths:</b> Limited other studies in literature on topic.</p> <p><b>Weakness:</b> Limited explanation on how conclusions were drawn/ verified.</p> <p><b>Feasibility:</b> Can complete phone call FU to assess barriers.</p> <p><b>Application:</b> Identifies practice and provider factors impacting AWWs.</p>

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**Table A3**  
*Synthesis Table*

<b>(Author, Year)</b>	(Tarn et al., 2023)	(Halket et al., 2022)	(Wijesundara et al., 2020)	(Malcolm et al., 2021)	(Kershaw et al., 2018)	(Bauer et al., 2021)	(MacDonald et al., 2022)	(Ulloa-Pérez et al., 2022)	(Atlas et al., 2023)	(Simpson et al., 2021)
<b>Design</b>	QI	RCT	RCT	CSD	CA	RCT	RCT	QI	RCT	DE
<b>LOE</b>	Level 4	Level 2	Level 2	Level 4	Level 4	Level 2	Level 3	Level 3	Level 3	Level 4
<b>Sample</b>										
<i>(N) subjects</i>	1,513	1,600	118,253	77	48,369	278	3,401	158,669	11,971	47
<i>Medicare Patients</i>	X								X	X
<i>Other Insurance</i>		X	X	X	X	X	X	X	X	
<b>Setting</b>										
<i>PCP</i>	X	X	X	X	X			X	X	X
<i>ED</i>						X				
<i>PHC</i>							X			
<b>Interventions</b>										
<i>EHR INT</i>	X				X				X	
<i>DTP PM/TM</i>		X	X				X		X	
<i>PPP/PB QA</i>				X						
<i>SS TM or PC</i>			X			X				
<i>AR TM</i>							X	X	X	
<b>Outcomes/ Themes</b>										
<i>Completion of AWV</i>	↑									
<i>Completion of PS</i>	↑	↑			↑				↑	
<i>Vaccine Completion</i>			↑							
<i>Patient Engagement</i>				↑						
<i>Appt Adherence</i>						↑	↑	↑	↑	

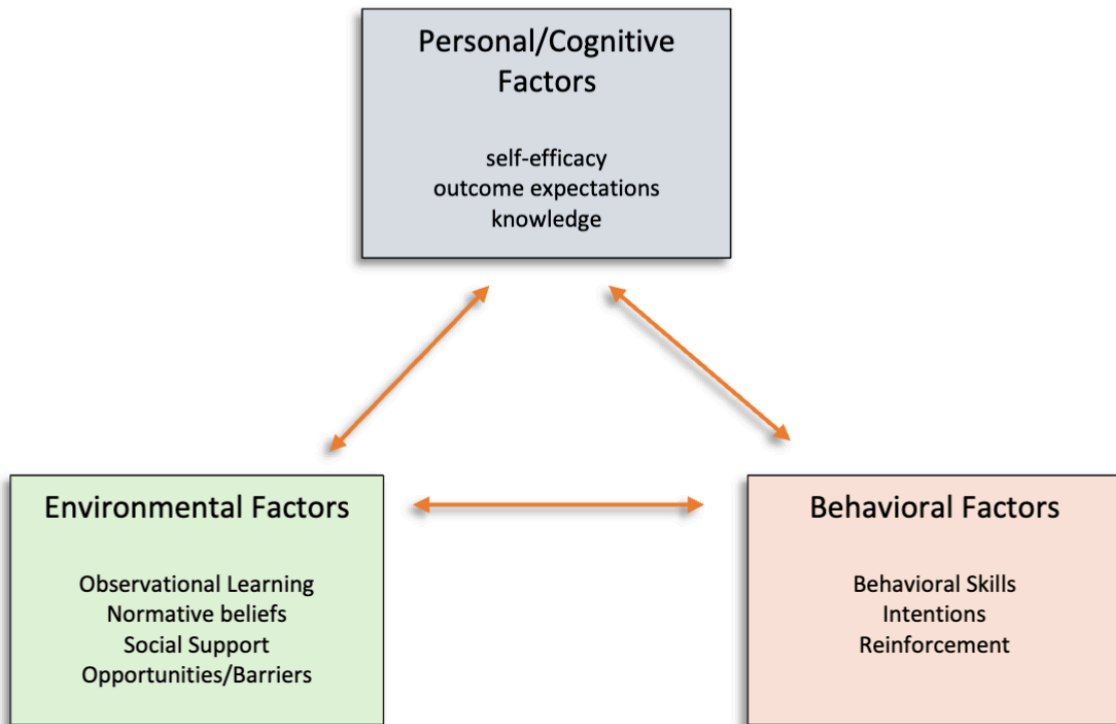
**AR** Appointment Reminder, **AWV** Annual Wellness Visit, **CA** Cohort Analysis, **CSD** Cross-Sectional Design, **DE** Descriptive Exploratory, **DTP** Direct-to-Patient, **ED** Emergency Department, **EHR** Electronic Health Record, **INT** Interventions, **LOE** Level of Evidence, **PC** Phone Call, **PCP** Primary Care Practice, **PB** Planned Behavior, Public Health Center, **PM** Portal Message, **PPP** Personalized Prevention Plan, **PS** Preventative Screening, **QA** Questionnaire, **QI** Quality Improvement, **RCT** Randomized Control Trial, **SS** Self-Schedule, **TM** Text Message

**Appendix B**

**Models and Frameworks**

**Figure B1**

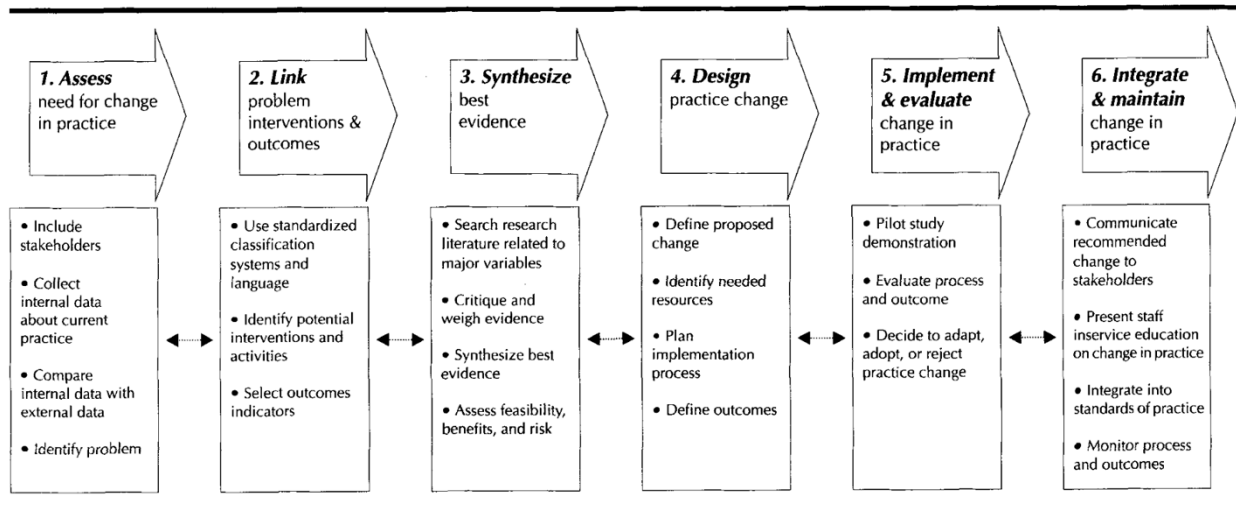
*Social Cognitive Theory*



Bandura (1986).

**Figure B2**

*Rosswurm and Larrabee's Model for Evidence-Based Practice*



**Figure 1. A model for evidence-based practice.**

Rosswurm & Larrabee (1999).

Appendix C

Arizona State University Institutional Review Board Approval



APPROVAL: EXPEDITED REVIEW

[Monica Rauton](#)

EDSON: DNP

-

monica.rauton@asu.edu

Dear [Monica Rauton](#):

On 9/6/2024 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Medicare Metrics: Overcoming Barriers to Increase Utilization of Annual Wellness Visits
Investigator:	<a href="#">Monica Rauton</a>
IRB ID:	STUDY00020634
Category of review:	5
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> <li>• Rauton CITI Training Cert 1, Category: Vitaes/resumes of study team;</li> <li>• Rauton CITI Training Cert 2, Category: Vitaes/resumes of study team;</li> <li>• Sara Weinke CITI Training Cert, Category: Vitaes/resumes of study team;</li> <li>• Site Support Letter, Category: Other;</li> <li>• WeinkeS_ChartAuditTemplate, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li> <li>• WeinkeS_Consent, Category: Other;</li> <li>• WeinkeS_IRBSocialBehavioralProtocol, Category: IRB Protocol;</li> </ul>

The IRB approved the protocol effective 9/6/2024. Continuing Review is not required for this study.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

It is the research team’s responsibility to notify the IRB of ‘reportable new information.’ (an RNI) During a research study, any adverse events, unanticipated problems involving risk, and non-compliance **must** be reported to the IRB as an RNI. Please see the following link for details:

<https://researchintegrity.asu.edu/human-subjects/reportable-events>. This does not include risks previously identified and listed in the IRB protocol and consent. Any serious events **must** be reported within **24 hours**. Non-serious adverse events **must** be reported within 5 business days.

Sincerely,

IRB Administrator

cc:

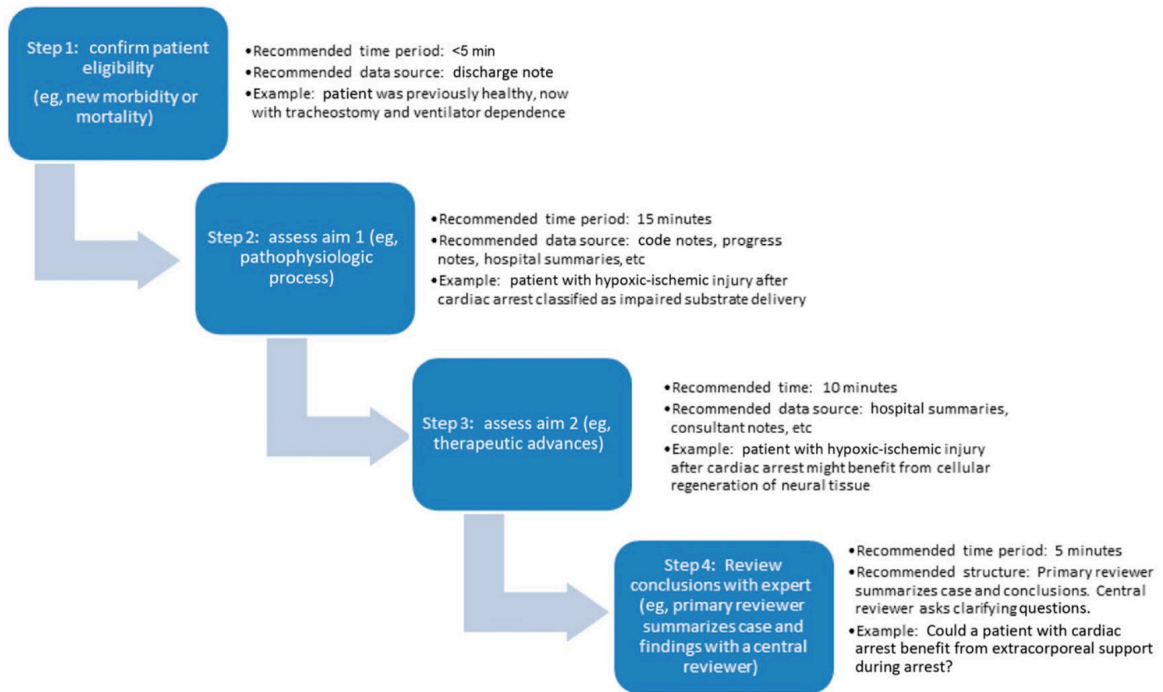
Johannah Uriri-Glover  
Sara Weinke

## Appendix D

### Instruments

**Figure D1**

*Process for the Structured Chart Review*



(Siems et al., 2020).



**Text D3***Standardized Electronic Health Record Message*

“Dear {{patient\_first\_name}}, Medicare offers an Annual Wellness Visit benefit because it is an important part of your overall health. Our records show that you have not seen us for an annual well-check in the past 12 months. Please contact us to schedule an appointment. You can call our office during business hours at {{facility\_phone}} or send us a message anytime. The Yearly Wellness Visit is free of cost to you and is covered once every 12 months by Medicare. This visit includes a comprehensive review of your medical history, current medications, treatment plan, and preventive screenings. Don't delay screening this important visit today!”



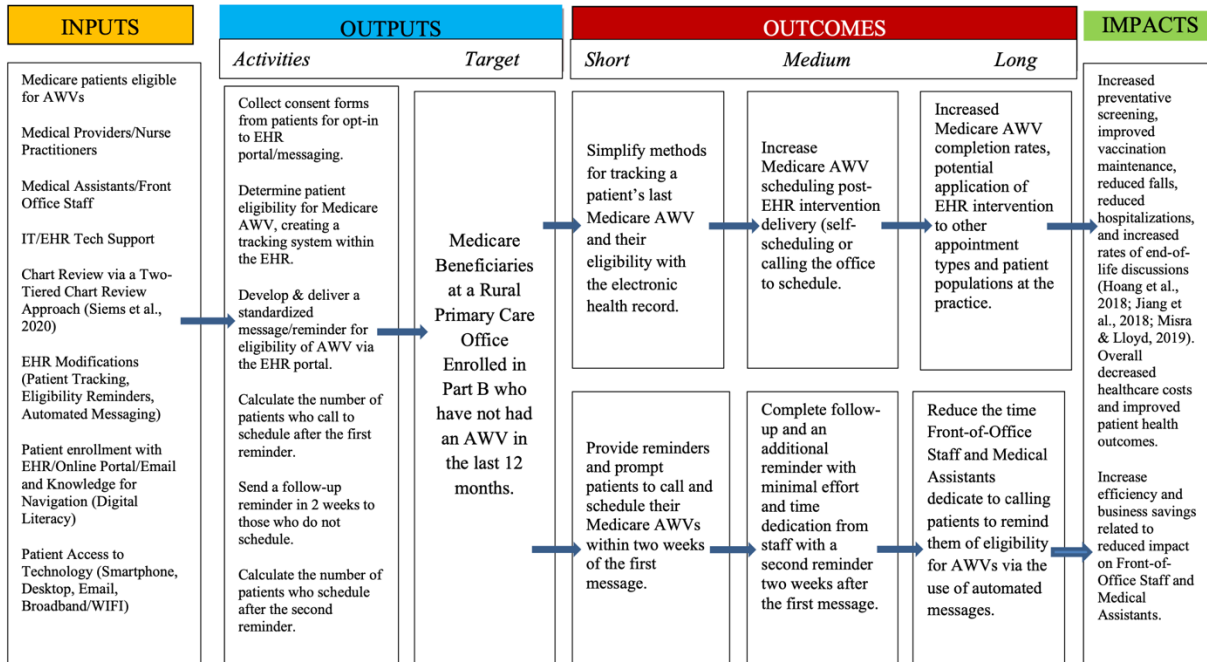
## Appendix E

### Logic Model

**Figure E1**

#### *EHR Interventions to Increase Medicare Annual Wellness Visits (AWV)*

**Goals:** The purpose of this project is to implement an electronic health record-based intervention to engage Medicare beneficiaries in increasing completion rates of the Medicare annual wellness visits (AWV) at a rural primary care office in Arizona to 80% of the patient population.



**Assumptions:** The patient population will be enrolled and understand how to utilize the EHR/Patient Portal. The patients will understand the importance of Medicare AWVs and the services provided at these appointments. After receiving a reminder of their eligibility, the patients will independently schedule or call to schedule their Medicare AWV. Office providers will have time in their schedules to accommodate the longer appointment times associated with Medicare AWVs.

## Appendix F

### Project Budget

**Table F1**

*Medicare Metrics: Proposed Project Budget with Project Savings*

Phase	Activities	Cost	Income	Total
Preparation	Attend Stakeholder Meeting (Snack – Crumbl 12 Pack of Cookies) (Staff Time – Donated) Direct Cost	≈ \$60 (Student) ≈ \$0		≈ \$60
	Operational Costs -WIFI, Electricity, Phone Services, Rent for Office Space (Donated) Indirect Cose	≈ \$6,000		≈ \$6,000
	Operational Cost - EHR System x8 Providers (Donated) Direct Cost	≈ \$4,000		≈ \$4,000
	Collaborate with EHR IT to Create and Implement Intervention (4 hrs @ \$30/hr. – IT, Donated) 4 hrs – Personal Time) Direct Cost	≈ \$120		≈ \$120
	Educational Inservice on AWV Scheduling (1 hr @ \$20/hr. x 10 Employees – MAs & Receptionists, Donated) (1 hr – Personal Time) Direct Cost	≈ \$200		≈ \$200
	Collection of Baseline Metrics from EHR (Baseline Statistics - Intellectus, Donated) (6 hrs – Personal Time) Direct Cost	≈ \$60 ≈ \$0		≈ \$60
	Subtotal			
Delivery	Transportation to Clinic (120 miles x 0.50 cents/mile x 4 trips) Direct Cost	≈ \$240		≈ \$240
	Receptionist / MA Schedule Patients for Appointments (12 hrs @ \$20/hr.) Direct Cost	≈ \$240		≈ \$240
	NP/PA/MD Conducting Medicare AWV (\$55/hr – Avg. Salary/Employees x 22 AWV/Week x6 weeks) Direct Cost	≈ \$7,300		≈ \$7,300
Subtotal				<b>\$7,780</b>
Evaluation	Annual Wellness Visit Reimbursement Rates (\$145/AVW x 22/Week x 6 Weeks)		≈ \$19,200	≈ \$19,200
	Collection of Outcome Metrics from EHR (Baseline Statistics - Intellectus, Donated) (6 hrs – Personal Time) Direct Cost	≈ \$60		≈ \$60
	Time Saved by Staff - Patient Tracking & Scheduling (≈48hrs/week x 6 weeks @ \$20/hr.)		≈ \$6,000	≈ \$6,000
	Subtotal			

Total: **\$6,920**  
(Potential Savings)

**Appendix G****Results****Table G1***Pre-Intervention Descriptive Statistics Table for Age*

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	Min	Max
Age	75.68	7.51	243	50.00	99.00

*Note.* '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

(Intellectus Statistics, 2023).

**Table G2***Pre-Intervention Frequency Table for Gender*

Variable	<i>n</i>	%
Gender		
M	112	46.09
F	131	53.91

*Note.* Due to rounding errors, percentages may not equal 100%.

(Intellectus Statistics, 2023).

**Table G3**

*Post-Intervention Descriptive Statistics Table Age*

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	Min	Max
Age	74.88	6.84	299	63.00	99.00

*Note.* '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

(Intellectus Statistics, 2023).

**Table G4***Post -Intervention Frequency Table for Gender*

Variable	<i>n</i>	%
Gender		
F	172	57.53
M	127	42.47

*Note.* Due to rounding errors, percentages may not equal 100%.

(Intellectus Statistics, 2023).

**Graph G5**

*Comparison of Pre- and Post-Intervention AWW Completion Rates*

