

Using the Ottawa Model for Smoking Cessation to
Improve Tobacco Cessation Efforts in Transitional Care

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USING THE OTTAWA MODEL TO IMPROVE TOBACCO CESSATION

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TOBACCO CESSATION EFFORTS IN TRANSITIONAL CARE

By

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by

Laura Schenk

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Dedication

I am dedicating this work to my family and friends who have been my steadfast partners on this educational journey. Without your love and support, I would not have achieved my goal. Thank you for helping me cross the finish line!

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I would like to acknowledge my faculty advisor, Dr. Mary DiBartolo. I am extremely grateful for the mentorship you provided, the expertise that you shared, and the time that you invested in me throughout my doctoral education. Thank you for your consistent support throughout this project. You have taught me the importance of perseverance in the face of challenges. The knowledge and skills I have gained under your guidance are invaluable to my future career as a DNP-prepared nurse leader.

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Abstract

Tobacco cessation improves health and prevents death in patients who smoke. An evidence-based practice (EBP) project was implemented within an outpatient transitional care office to improve tobacco cessation efforts. The purpose of this doctoral project was to determine if the Ottawa Model for Smoking Cessation (OMSC) increased tobacco cessation counseling and referral rates. Counseling rates were defined as the percentage of smokers who received advice about quitting smoking. Referral rates represented the percentage of smokers referred to tobacco cessation services through the Maryland Quitline. The OMSC intervention emphasizes a three-step approach of ask, advise, and act to guide tobacco cessation assessment, counseling, and referral. Additional intervention components included outreach, training, electronic health record (EHR) enhancements, resource materials, and follow-up. The Stages of Change Model provided the theoretical framework for the project, and EBP implementation was guided by the Iowa Model. Participant data was collected from the EHR pre- and post-implementation with a total sample size of 248 participants, (n=125 pre; n=123 post). Data were analyzed using a z-test to compare the two groups' mean counseling and referral rates, a t-test for equality of subgroups, and Chi-square test for analysis of other demographic characteristics. After implementation of the OMSC intervention, counseling rates increased by 22.1% ($p < .001$) and referral rates increased by 6.5% ($p < .002$). Age group and race/ethnicity had a moderate association with referral rates ($p < 0.05$). Project findings provided support for this EBP change within the practice setting.

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Project Overview

Tobacco use contributes to the development of serious health conditions, including cardiovascular disease, lung disease, and cancer. According to the Surgeon General, more than 16 million adults in the United States have a disease caused by smoking cigarettes, and smoking-related illnesses lead to half a million deaths each year (Office of Disease Prevention and Health Promotion, 2021). Furthermore, tobacco cessation significantly decreases the likelihood that a smoker will develop a smoking-related condition. One of the national goals set by Healthy People 2030 is to decrease the morbidity and mortality associated with tobacco use by using evidence-based strategies to help people quit (Office of Disease Prevention and Health Promotion, 2021). A Doctor of Nursing Practice (DNP) project was implemented to address this problem in collaboration with a health system in a suburban area in northeastern Maryland.

Problem Statement

The health system primarily serves residents of a suburban area in northeastern Maryland, where there is a particular need for improved tobacco cessation efforts. The target for Healthy People 2030 is to decrease the total percentage of adults who smoke cigarettes in the United States to 5% (Office of Disease Prevention and Health Promotion, 2021). In 2019, the percentage of adults who smoked cigarettes in the suburban area of northeastern Maryland was 20.6%, which indicated a 3.3% increase from the rate in 2016 (University of Maryland Upper Chesapeake Health et al., 2019; University of Maryland Upper Chesapeake Health et al., 2021). The percentage of adults who smoke cigarettes has been consistently higher in the suburban area in northeastern Maryland than in the state of Maryland every year from 2011 to 2019 (University of

Maryland Upper Chesapeake Health et al., 2021). The most recent data regarding the impact of smoking on health in the state of Maryland indicated that smoking contributes to 7,490 deaths per year and an economic burden of \$2,709,568,436 (American Lung Association, 2022).

It was estimated in 2015 that 68% of smoking adults had a desire to quit (Centers for Disease Control and Prevention [CDC], 2020). To help people quit smoking, Healthy People 2030 recommends increasing the use of tobacco cessation counseling, medications, and advice from health care professionals (Office of Disease Prevention and Health Promotion, 2021). The CDC (2020) reported that only 44% of smokers receive advice from health care professionals about quitting and less than 33% of smokers receive aid in the form of counseling or medications. The Maryland Quitline provides free counseling and medication services 24 hours a day and seven days a week. Service utilization data from 2020 for the Maryland Quitline showed that call volumes decreased and only 23% of callers received counseling and/or medications to quit smoking (CDC, 2021). While health professionals are often cited as a source of referral to the Maryland Quitline, community organizations consistently accounted for less than 1% of referrals (CDC, 2021). Specific data from the health system in Maryland indicated that greater than 90% of smokers admitted to the hospital are not asked if they want to quit or receive counseling.

Purpose of Project

The purpose of this doctoral nursing practice (DNP) project was to use an evidence-based model (Ottawa Model for Smoking Cessation) to increase the percentage of total patients who smoke that receive advice about quitting smoking and are referred to

tobacco cessation services. Advice was measured in the electronic health record by the percentage of total patients who smoke that received counseling to quit smoking.

Referrals were measured in the electronic health record by the percentage of total patients who smoke that were referred to the Maryland Quitline.

Clinical Question - PICOT

The following Population (P), Intervention (I), Comparison (C), Outcome (O) question (PICO) format guided this project:

“For adult patients who smoke cigarettes (P), does the use of the Ottawa Model for Smoking Cessation (OMSC) by primary care practice professionals (I) compared to the current workflow (use of no specific model) (C), increase the percentage of patients who smoke that receive tobacco cessation counseling and referral to tobacco cessation services (O)?”

The specific outcomes that were evaluated included counseling and referral rates. The counseling rate refers to the percentage of patients who smoke that were documented as receiving tobacco cessation counseling. The referral rate refers to the percentage of patients who smoke that were documented as being referred to the Maryland Quitline.

Succinct Synthesis/Analysis of Supporting/Related Literature

The purpose of this synthesis of evidence was to examine current literature and identify themes regarding the use of the Ottawa Model for Smoking Cessation (OMSC) to improve tobacco cessation efforts in healthcare settings. This analysis was used to guide the implementation of an evidence-based project in an outpatient transitional care office within a health system in a suburban area of northeastern Maryland.

PRISMA Diagram

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram that visualizes the search process was utilized and presented in Appendix A (Page et al., 2021). Prior to the search, a list of search words was identified using MeSH terms. The Boolean search method was used to search PubMed, Cochrane Library, and the CINAHL database with the phrase: (smoking cessation/methods) OR (tobacco use cessation/methods) AND (Ottawa model for smoking cessation) OR (OMSC). Results were limited to include articles published within the last five years, written in the English language, studying the human species, and studying adults aged 19 or older. A total of 67 results were produced and an additional four articles were identified through Google Scholar. After duplicates were removed, a total of 66 articles were screened for eligibility. Upon review of the titles and abstracts of the 66 articles, 34 were excluded for studying the wrong intervention and 14 were excluded for studying the wrong population. The remaining 18 articles were further screened by accessing the full text. An additional eight articles were excluded for studying the wrong intervention, and two articles were excluded because they were abstracts of poster presentations. The search process resulted in a total of eight quantitative articles to be included for synthesis.

Synthesis of Relevant Literature

A total of eight articles were reviewed to determine themes and variations as they relate to the evidence-based project. The strength of the evidence is discussed.

Important Themes

Many of the articles discussed OMSC specifically. OMSC was cited as a conceptual framework in four of the articles assessed (Li et al., 2018; Mullen et al., 2017;

Reid et al., 2018; Romano et al., 2019). OMSC was cited as an intervention in five of the articles assessed (Li et al., 2018; Mullen et al., 2017; Papadakis et al., 2016; Reid et al., 2018; Romano et al., 2019). In all articles citing OMSC, it was found to be effective at improving practice-related behaviors related to smoking cessation. Smoking cessation rates were commonly used as an outcome measure. Five of the articles reviewed measured the effect of interventions on smoking status, frequency, or abstinence (Li et al., 2018; Lindson et al., 2021; Reid et al., 2018; Romano et al., 2019; Thomas et al., 2017). Three articles found that OMSC had a positive effect on smoking cessation (Li et al., 2018; Reid et al., 2018; Romano et al., 2019). One systematic review found that adjunctive counseling and tailored printed materials improved smoking abstinence (Lindson et al., 2021). One systematic review reported inconclusive results regarding the effect of system change interventions on smoking abstinence (Thomas et al., 2017).

Variations in Concept Definition or Populations

The definition of smoking abstinence varied. Most studies collected self-reported data regarding smoking abstinence at various time points, including 3- and 6-month follow-ups. One study collected biochemical data with carbon monoxide measurements to verify smoking abstinence (Reid et al., 2018). There was a consistent measure of practice behaviors using the three A's, five A's, or OMSC frameworks. The majority of studies took place in Canada. Inpatient and outpatient settings were included. Specific settings included primary care settings, hospital settings, and an addiction treatment center. Convenience sampling was the predominant method for identifying participants. Most sample sizes were adequate or large.

Variations in Methods or Quality

Variations in the implementation of the OMSC intervention existed. For example, one study assessed the impact of a pharmacist-led intervention (Li et al., 2018). Another study examined differences in practice-related behaviors amongst various types of healthcare workers (Martínez et al., 2017). Significant issues related to bias or potential conflict of interest were mentioned in several articles. Four articles self-disclosed a potential for conflict of interest in authors (Li et al., 2018; Pipe et al., 2017; Papadakis et al., 2016; Reid et al., 2018). One systematic review identified a large proportion of studies with a high risk of bias (Lindson et al., 2021). Two studies had the potential for bias in sampling or recruitment methods which make it more difficult to generalize results (Martínez et al., 2017; Reid et al., 2018). Overall, the quality of evidence was moderate to high. A total of six of the eight articles reviewed discussed the results of experimental studies. The majority of articles reviewed received a level two or above strength rating.

Table of Evidence

A table of evidence that summarizes the evidence included in this synthesis is presented in Appendix B.

Summary

The articles synthesized in this review provided an adequate body of evidence to support the implementation of the OMSC by providers in healthcare settings. Issues related to participant bias should be addressed in future studies. It was determined that the implementation of an evidence-based project based on OMSC would add value to the existing body of evidence regarding tobacco cessation.

Theoretical Framework & EBP Model

Theoretical Framework

The Stages of Change Model is a theoretical framework that was developed specifically for research aimed at tobacco cessation (National Cancer Institute et al., 2005). This framework considers an individual's readiness for change and his/her unique needs. When making a behavioral change, people enter five stages: precontemplation, contemplation, preparation, action, and maintenance (National Cancer Institute et al., 2005). The Stages of Change Model proposes that strategies can be used at each stage to assist people in making the intended behavior change. This project used the Stages of Change Model as a framework to ensure that the intervention assesses the needs of smokers at all stages of readiness for change. The OMSC is the intervention that was used in this project to counsel smokers with the three-step approach of ask, advise, and act to promote tobacco cessation. Asking if someone is ready to quit addresses the precontemplation and contemplation stage. Advising someone to quit addresses the preparation stage. Acting to provide tobacco cessation services addresses the action and maintenance stage.

EBP Model

The Iowa Model was used to promote effective implementation of this project through a multi-step approach that promotes collaboration to enact change (Melnik & Fineout-Overholt, 2019). The application of this EBP model also ensured that critical organizational needs were addressed with consideration for redesign and sustainability (Melnik & Fineout-Overholt, 2019). Since this project involved a change to the current workflow for healthcare professionals, collaboration with various departments was

critical. Physicians, nurses, informaticists, and administrators are a few of the important stakeholders that were included on the team. Using the Iowa Model as a guide, a pilot was designed to target the organization's problem related to tobacco cessation efforts. Data will be used to refine the intervention so that it can be sustainably delivered throughout the organization.

Project Design

An evidence-based project was conducted to determine if the use of the Ottawa Model for Smoking Cessation (OMSC) to guide the workflow of health professionals increased the percentage of total smokers who received advice about quitting smoking and were referred to tobacco cessation services. The project took place in an outpatient transitional care office within a health system in a suburban area of northeastern Maryland.

Methodology

Participants

Participants in the project were patients in an outpatient transitional care office who identified as current smokers. The Centers for Disease Control and Prevention categorizes a current smoker as someone who has smoked at least 100 cigarettes in their lifetime or someone who currently smokes cigarettes. Inclusion criteria included adults (18 years or older) who either identified or were screened as current smokers. Participants in the project were identified by healthcare professionals at the designated outpatient transitional care office using convenience sampling. Patients who smoke were identified in practice through self-report on health history or interview by RN or provider and documented in the EHR. It was estimated that the outpatient transitional care office

would see a total of 20 patients who smoke per month and at least 30% would participate in this project. The intervention was expected to take place over a 3-month period for an estimated sample size of 18 patients.

Intervention

The intervention for this project was based on the OMSC which utilizes a three-step approach of asking patients about current smoking status, advising smoking patients to quit, and acting to provide support in the form of referrals (Papadakis et al., 2016). The OMSC intervention is based on five components, including outreach facilitation, clinician training, EHR tools and prompts, practice tools and patient self-help material, and smoker's follow-up system (Papadakis et al., 2016). The DNP student served as the outreach facilitator and was responsible for performing a needs assessment, developing a protocol, defining roles and responsibilities, and supporting communications and training activities at the designated outpatient transitional care office (Papadakis et al., 2016). Healthcare professionals that were responsible for asking patients about their smoking status during office visits were asked to participate in a training session regarding the use of the OMSC's three-step approach of "ask, advise, act" when completing questionnaires and following up with smoking patients. The DNP student was available at least one day/week within the outpatient transitional care office to provide support.

The OMSC's three-step approach of "ask, advise, act" was used as a framework when providing counseling to patients who smoke. The DNP student worked with information technology specialists within the health system to assess the tools and real-time prompts embedded in the EHR to assist staff in performing the three steps of ask, advise, act during the workflow with smoking patients. For example, staff were

previously only required to document if patients smoke or not, but they were not required to document that they advised them to quit or provided referrals to tobacco cessation services. The designated outpatient transitional care office was given access to tools and materials to support referral to tobacco cessation services, including posters, brochures, and booklets. Lastly, a system for following up with smoking patients was developed.

Data Collection Procedures

The independent variable in this project was the OMSC which was expected to provide measurable outcomes within the dependent variables of counseling and referral rates of admitted smokers. Data was measured and compared pre- and post-intervention. Counseling rates were defined as the percentage of total smokers that were documented in the electronic health record as receiving advice to quit smoking. Referral rates were defined as the percentage of total smokers that were documented in the electronic health record as being referred to the Maryland Quitline. Counseling rates and referral rates were assessed by auditing assessment documentation in the electronic health record for patients who smoke that had an office or telemedicine visit between April 1, 2022 to June 30, 2022. Rates prior to implementation for the designated practice were assessed from January 1, 2022 to March 31, 2022 for comparison. Demographic data including age, race, ethnicity, gender, smoking status, and tobacco use was collected to allow for analysis of data within subgroups. Descriptive and inferential statistics were used to compare post-implementation data to pre-implementation data available from the agency.

Organizational System Analysis (SWOT)

The health system in Maryland identified a need to improve tobacco cessation counseling that is offered to patients that identify as smokers. Recent data showed that

greater than 90% of patients admitted to the health system's acute care hospitals were not asked if they want to quit or receive counseling. The following organizational needs assessment guided the implementation of an evidence-based project to address this problem (see Appendix C).

Strengths

The health system had an established tobacco cessation workgroup that included representatives from the hospital system and community organizations. The manager of the health system's cancer team, which offers tobacco cessation classes, was a member of the workgroup. The Executive Director of a community health organization was also a member. The tobacco cessation workgroup conducted various meetings with organizational leadership and board members to garner support. Leadership champions at various levels of administration were identified. Physician leaders expressed interest in improving outcomes related to smoking patients. The Chief Medical Officer and Vice President of Strategy, Physician Services and Business Development provided verbal support that this problem needed to be addressed and was identified as one of the top priorities for the organization.

The current electronic health record (EHR) had the capability to enhance the documentation and referral processes that currently existed. Additional prompts could be added to existing patient admission questionnaires that would require healthcare professionals to document advice or counseling related to tobacco cessation. Electronic workflows for referrals could be created to streamline tobacco cessation services. Tobacco cessation services were currently being offered by counselors that were experienced in motivational interviewing techniques. The health system's community

outreach division had additional staff trained in motivational interviewing. Lastly, collaboration and support could be provided by existing informatics specialists, data analysts, and education specialists. Their input and expertise could assist in successful project implementation.

Weaknesses

The organization had a number of competing priorities, including the construction of a new medical campus and the expansion of the Emergency Department, cancer center, and an ambulatory surgery center at the existing medical campus. As a result of the COVID-19 pandemic, many staffing issues existed. Staffing shortages existed as a result of increased stress, burnout, and turnover amongst employees. Staffing issues were further exacerbated by recent leadership changes through the resignation of the chief nursing officer and a newly appointed CEO. For this project to be successful, a project leader had to be designated to deal with these compounding challenges. The workgroup had not yet designated a project leader to facilitate system-wide adoption of this initiative.

While healthcare professionals were expected to address tobacco cessation in the EHR with smoking patients, training specific to tobacco cessation counseling did not exist. It was unclear if the organization had adequate resources to support the project's activities related to EHR adaptation and training. Depending on the project's design, financial resources may be necessary. For example, the delivery of the Ottawa model for Smoking Cessation (OMSC) by the University of Ottawa Heart Institute incurs a cost for organizational partners. The EHR was limited in its ability to capture opportunities for advice and counseling related to smoking cessation. Adapting the EHR may require

additional costs, time, and training. Healthcare professionals were inconsistent in the practice of offering advice and counseling for smoking cessation. These human variations had to be considered. Limitations in the frequency, location, and capacity of existing tobacco cessation classes posed a challenge in meeting the demands of increased referrals. A robust system for following up with patients who smoke did not exist.

Opportunities

There are a number of evidence-based practice (EBP) models related to tobacco cessation at the state, national, and global levels. Example organizations that provide EBP models include the Centers for Disease Control and Prevention (CDC), Agency for Healthcare Research and Quality, Healthy People 2030, and County Health Rankings. The OMSC is an EBP model that is based in Canada. The CDC also provides statewide data through its State Tobacco Activities Tracking and Evaluation (STATE) System. Providers are able to bill a patient's insurance company for smoking cessation counseling sessions. This provided a potential source of funding to offset project costs. Existing community partnerships through the local health department could be strengthened to support a holistic approach. Tobacco cessation services offered through the local health department could be incorporated into referral systems. New community partnerships could be established with the chamber of commerce, public school systems, bars and restaurants, and local social clubs.

Tobacco use is linked to a number of chronic diseases, including cardiovascular disease, lung disease, and cancer. Improved tobacco cessation services have the potential to improve health outcomes and result in reduced hospital stays for chronic diseases. The health system could take advantage of national marketing campaigns to guide

communication plans and increase interest this initiative. The American Cancer Society has a nationwide event called the “Great American Smokeout” every year (American Cancer Society, 2021). The website for this event offers tools and resources for health systems to utilize. The Maryland Quitline offers free counseling and nicotine replacement therapy. Providers can refer patients to the Maryland Quitline 24 hours a day and seven days a week. Additional tobacco cessation classes could be provided at the new behavioral health center and expanded cancer center.

Threats

The community was dealing with a number of competing priorities. The COVID-19 pandemic was at the forefront of public health initiatives. Community organizations were largely focused on spreading awareness about reducing the spread of illness with masking, social distancing, and vaccinations. Many community members were dealing with increased mental health issues and a lack of access to adequate resources to deal with them. Stress related to the pandemic may have increased the use of tobacco products as a coping mechanism. Despite recent increases in cigarette prices and an increase in the minimum age of sale of tobacco products, the tobacco industry and cigarette sales have experienced significant recent growth (CDC, 2021; Federal Trade Commission, 2021; U.S. Food and Drug Administration, 2021). Tobacco companies continue to spend money on new products and advertising to increase sales which posed a threat to tobacco cessation efforts. Community organizations were also facing leadership changes which may have impacted the continuation of current initiatives. The Health Officer for the local health department who supported increased tobacco cessation efforts was dismissed

by county officials. Finally, structures for sustainable funding from community organizations to support this initiative did not exist.

Implementation Timeline

The timeline for implementation of the project was four months, from March 1, 2022 to June 30, 2022 (see Appendix D). During the initial two months of implementation, the DNP student worked with the tobacco cessation workgroup at the health system to identify participants, begin outreach facilitation including provider training, and develop systems for embedded EHR processes, tools and materials, and patient follow-ups. Data was measured regarding the impact of the intervention on the designated practice during all four months of implementation.

IRB and Agency Approval

An application for research involving human subjects was submitted to the institutional review board (IRB) at Salisbury University in February 2022. In consideration of the interaction with human participants to apply the standardized EBP interventions, the DNP student co-investigator completed the Collaborative Institutional Training Initiative's (CITI) courses regarding Social and Behavioral Research, the Responsible Conduct of Research, and Information and Privacy Security.

The University's IRB research protocol approval was received on March 2, 2022 (see Appendix E). The IRB determined that the protocol "Using the Ottawa Model for Smoking Cessation to Improve Tobacco Cessation Efforts" qualified for exempt review. A letter from the DNP project site indicating permission to begin implementation effective immediately was received on March 3, 2022.

Project Implementation

Barriers and Facilitators

There were notable barriers and facilitators to the project's implementation. Provider availability was a major barrier to project implementation. The DNP student was present at the outpatient transitional care office one day per week to conduct a needs assessment and provide ongoing support throughout the implementation period. While information was obtained regarding weekdays that would provide optimal interaction with the nurse practitioners and medical doctors in the outpatient transitional care office, the DNP student was not able to provide outreach to all providers. Additionally, the nurse practitioners and medical doctors who provided care in the outpatient transitional care office were not in attendance at the staff meeting when the training module was presented. This limited the impact of outreach facilitation.

During the first month of implementation, the DNP student was not able to access the EHR. This limited the student's ability to conduct a thorough assessment of existing processes for clinical documentation and electronic referrals. Once EHR access was obtained in the second month of implementation, a notable barrier was the inability to gather data related to the patient's readiness to quit, referral to tobacco cessation classes, and prescription of nicotine replacement therapy. While a system for following up with patients who smoke was developed with the tobacco workgroup, the student was unable to conduct patient follow-ups during the implementation period. Therefore, the DNP student was unable to assess the impact of the intervention on changing patient behaviors.

A major facilitator to the project's success was active participation from key personnel within the health system. The tobacco workgroup assisted in obtaining

organizational support to implement a pilot project within the outpatient transitional care office, as well as assisting with the development of EHR tools and prompts to promote tobacco cessation efforts. Practice managers within the outpatient transitional care office provided support and oversight to the DNP student during implementation which increased the acceptance of the EBP change by staff. Within the outpatient transitional care office, the medical assistant and DNP-prepared nurse practitioners served as champions to facilitate the project's goals and objectives. During the needs assessment, staff offered key input and feedback which facilitated the development of an individualized training module. The DNP student was able to collaborate with a data analyst, coding & compliance officer, and informatics specialists to identify robust processes for data collection and tobacco cessation counseling.

Summative Evaluation of Implementation Process

Outcomes

The goal of this project was to determine if the OMSC is an effective intervention to increase the percentage of total patients who smoke that receive advice about quitting smoking through counseling and are referred to tobacco cessation services with the Maryland Quitline. Specific objectives that were established to meet this goal included performing a needs assessment, developing embedded tools and prompts within the electronic health record (EHR), creating and presenting a training module, establishing a system for following up with patients, and providing resources for continued support. The outcome variables of counseling and referral rates were measured by reviewing assessment data that was documented by healthcare professionals in the EHR.

The DNP student spent time during the first two months of the implementation period observing the workflow of the providers, case managers, social workers, and medical assistants within the outpatient transitional care office to identify specific needs related to tobacco cessation. The information that was obtained during these observations assisted in the development of training materials. A key finding was the presence of a best practice advisory within the EHR which prompted providers to submit an electronic referral to connect patients who smoke to the Maryland Quitline. Specific questions that arose during observations included how to correctly bill for tobacco cessation counseling and how to obtain information about the outcome of patient referrals.

The DNP student worked with various personnel within the health system to find answers to these questions, including a coding and compliance coordinator and informatics specialists. The DNP student also worked closely with the health system's established tobacco workgroup, which consisted of representatives from informatics, community outreach and health improvement, the cancer center, health department, and other local partners. The tobacco workgroup assisted in the development of scripted phrasing for clinical documentation to support the billing, referral, and follow-up processes. A training module, consisting of a PowerPoint presentation, was developed and presented at a monthly staff meeting in the outpatient transitional care office during month two of implementation. The presentation was viewed by the outpatient transitional care office managers, nurse case managers, and medical assistant. The medical providers were not in attendance and were offered follow-up support and printed materials with key points from the training module.

The DNP student reviewed assessment data that was documented in the EHR for patients who had an office or telemedicine visit with the outpatient transitional care office from January 1, 2022, through June 30, 2022, and were included in the tobacco registry as a current smoker. Data collected from January 1, 2022, through March 31, 2022, was considered pre-implementation for comparison. Outcome variables included counseling rates and referral rates. Counseling rates were defined as the percentage of total patients who smoke that were documented in the EHR as receiving required counseling for smoking cessation. Referral rates were defined as the percentage of total patients who smoke that were documented in the EHR as being referred electronically to the Maryland Quitline. Data regarding the assessment rates, defined as the percentage of total patients who smoke that were documented in the EHR as being asked if they were ready to quit, was not accessible by the DNP student. Additionally, data regarding the percentage of total patients who smoke that were referred to community-based tobacco cessation classes or prescribed nicotine replacement therapy was not available to the DNP student. The DNP student collaborated with the tobacco workgroup to develop a workbench report to assist the health system in gathering this data in the future.

Target Population

The target population for this project included patients who smoke cigarettes that visited an outpatient transitional care office within a health system in a suburban area of northeastern Maryland. Review of data related to the outcome variables indicates that the implementation of this EBP change was beneficial to the target population. Counseling and referral rates increased post-implementation when compared to pre-implementation. This was the intended outcome. Outcome variables were assessed for three months after

the EBP change. Counseling and referral rates were consistently higher than pre-implementation for all three months of analysis. Demographic data was collected, including age, race, ethnicity, gender, smoking frequency, and tobacco use quantity. Analysis of demographic data across all three months was equitable and comparable to pre-implementation data. There were no perceived negative effects to the target population as the intervention was designed to improve existing standards of care.

Healthcare Delivery

This project attempted to address the problem of sub-optimal tobacco cessation counseling rates within the health system. Specific data from the health system indicated that greater than 90% of smokers admitted to the hospital were not asked if they wanted to quit or receive tobacco cessation counseling. Patients that are hospitalized with a smoking-related illness are in a prime position to receive tobacco cessation counseling and are more receptive to tobacco cessation counseling (Rigotti et al., 2012). In a systematic review, Rigotti et al. (2012) found that tobacco cessation counseling interventions that began during hospitalization and were continued in the outpatient setting resulted in increased cessation rates. The DNP student was able to assist the health system in addressing this problem by implementing a EBP change within an outpatient transitional care office. The delivery of care related to tobacco cessation counseling and referrals was improved using the OMSC as a framework. Specifically, the processes of documentation, electronic referrals, and follow-up were enhanced with the creation of EHR tools and prompts. The staff within the outpatient transitional care office were receptive to the EBP change and served as champions for this initiative. At the end of the

project, the tobacco workgroup planned to use this pilot as a model for future EBP changes throughout the health system.

Analysis and Discussion of Findings

Participants

The clinical setting for the project was a referral-based outpatient transitional health center that provides primary care services to patients with chronic diseases that need follow-up after hospital discharge. The practice employs registered nurses, case managers, and primary care providers. The case manager's responsibilities included assisting in the identification of patients for referral to the outpatient transitional care office and for coordinating services. Registered nurses and primary care providers were responsible for interacting with patients for screening, referral, or treatment.

Participants were identified as patients who were registered as smokers and had an office or telemedicine visit with the outpatient transitional care office during the data collection period. Data was collected from the EHR for analysis. Audits of assessment data documented in the EHR yielded a total of 248 identified participants from January 1, 2022 to June 30, 2022. Data collected from January 1, 2022 to March 31, 2022 was considered pre-implementation for comparison and included a total of 123 participants. Data collected from April 1, 2022 to June 30, 2022 included a total of 125 participants and was analyzed to measure the impact of the project post-implementation.

Statistical Analysis

Data were analyzed using SPSS data analysis software, version 29. Demographic characteristics of the population, pre-implementation and post-implementation, were reviewed regarding age, age group, gender, race, ethnicity, smoking status, and amount of

tobacco used and provided in Table 1. Participants were on average 57.8 years old (SD = 12.8). Slightly more than half ($n = 135, 54.4\%$) of the total participants were male. The majority of participants ($n = 198, 79.8\%$) did not belong to a minority race or ethnicity group. Most participants were current everyday smokers ($n = 187, 75.4\%$) and smoked up to half a pack of cigarettes per day ($n = 127, 51.2\%$).

Table 1

Participant Demographic Characteristics

Characteristics	Pre-implementation ($n = 125$)		Post-implementation ($n = 123$)		Total ($N = 248$)		Statistics
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%	
Age mean (SD)	57.3 (13.8)		58.3 (11.9)		57.8 (12.8)		$t = .621, p = .535$
18-24 years old	1	0.8%	0	0.0%	1	0.4%	
25-34 years old	5	4.0%	4	3.3%	9	3.6%	
35-44 years old	21	16.8%	14	11.4%	35	14.1%	
45-54 years old	23	18.4%	28	22.8%	51	20.6%	
55-64 years old	34	27.2%	41	33.3%	75	30.2%	
65 and over	41	32.8%	36	29.3%	77	31.0%	
Gender							$\chi^2 = .272, p = .602$
Male	66	52.8%	69	56.1%	135	54.4%	
Female	59	47.2%	54	43.9%	113	45.6%	
Race							$\chi^2 = 1.972^a, p = .307$
White/Caucasian	106	84.8%	97	78.9%	203	81.9%	
Black/African American*	18	14.4%	23	18.7%	41	16.5%	
Other	0	0.0%	1	0.8%	1	0.4%	
Unknown	1	0.8%	2	1.6%	3	1.2%	

Characteristics	Pre-implementation (<i>n</i> = 125)		Post-implementation (<i>n</i> = 123)		Total (<i>N</i> = 248)		Statistics
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%	
Ethnicity							$\chi^2 = .468^a$, <i>p</i> = .492
Hispanic/Latino*	5	4.0%	3	2.4%	8	3.2%	
Not Hispanic/Latino	119	95.2%	118	95.9%	237	95.6%	
Unknown	1	0.8%	2	1.6%	3	1.2%	
Smoking Status							$\chi^2 = 3.913^a$, <i>p</i> = .226
Current everyday smoker	90	72.0%	97	78.9%	187	75.4%	
Current someday smoker	16	12.8%	8	6.5%	24	9.7%	
Heavy tobacco smoker	1	0.8%	0	0.0%	1	0.4%	
Light tobacco smoker	18	14.4%	18	14.6%	36	14.5%	
Tobacco Use							$\chi^2 = 2.311^a$, <i>p</i> = .493
0-0.5 PPD	64	51.2%	63	51.2%	127	51.2%	
0.6-1 PPD	33	26.4%	35	28.5%	68	27.4%	
1.1-1.99 PPD	2	1.6%	6	4.9%	8	3.2%	
≥ 2 PPD	8	6.4%	6	4.9%	14	5.6%	
Unknown	18	14.4%	13	10.6%	31	12.5%	

Note. PPD = Pack per day.

* Represents a minority group

^a Reflects instances where > 20% of cells have expected count less than 5.

Demographic characteristics for the 123 participants in the post-implementation group were compared to the 125 participants in the pre-implementation group. An independent samples *t*-test was used to compare the mean ages of pre- and post-implementation groups and it was determined that there was no statistically significant difference (*p* > 0.05). A Chi-square test was performed to compare all remaining

demographic characteristics and it was determined that there was no statistically significant difference ($p > 0.05$) between the gender, race, ethnicity, smoking status, and tobacco used of pre- and post-implementation groups.

The main outcome variables assessed were counseling and referral rates. Counseling rates provided in Figure 1 included the number of participants who were documented in the EHR as being up to date with smoking cessation counseling. Counseling rates increased from pre-implementation (7.2%) to post-implementation (29.3%). Referral rates provided in Figure 2 included the number of participants who were documented in the EHR as being referred electronically to the Maryland Quitline. Referrals were not documented at pre-implementation (0.0%) and increased at post-implementation (6.5%).

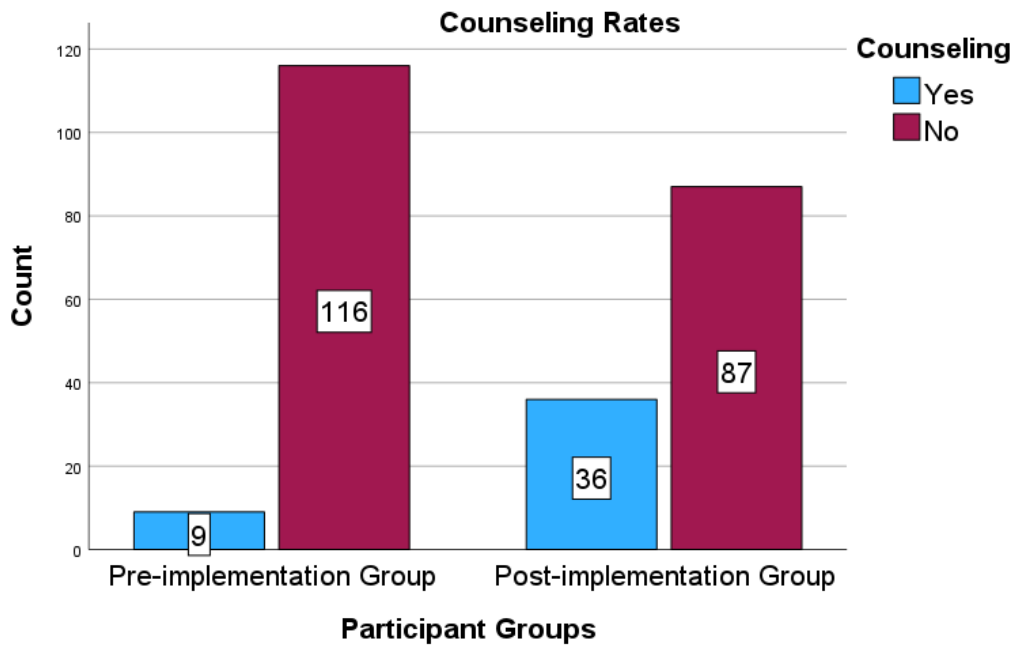


Figure 1. Counseling rates for pre-implementation and post-implementation.

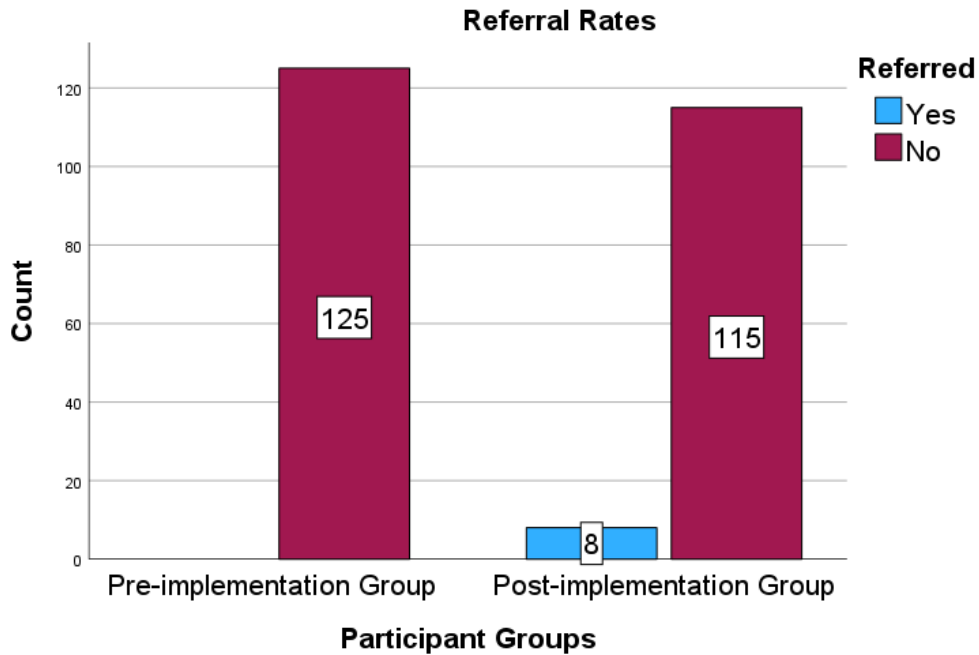


Figure 2. Referral rates for pre-implementation and post-implementation. No participants were referred to the Maryland Quitline pre-implementation.

The observed increase from pre-implementation in counseling and referral rates was analyzed for statistical significance using a z-test for proportions and provided in Table 2. The z-score representing the difference in pre- and post-implementation counseling rates was 4.681 ($p < .001$) while the z-score for referral rates was 2.955 ($p .002$). Since the z-scores were not equal to zero, it can be concluded that the post-implementation counseling and referral rates were not equal to the anticipated mean. The positive z-score values for both counseling and referrals indicate that the rates were higher post-implementation. These findings were expected as pre-implementation referral rates were zero and there was an observed increase in the number of participants that received counseling.

Table 2

Z-Test for Proportions of Outcome Variables

Variables	Pre-implementation		Post-implementation		Test Statistics		
	Count	Proportion	Count	Proportion	SD	z	p
Counseling = yes	9	0.072	36	0.293	0.047	4.681	<0.001
Referral = yes	0	0.000	8	0.065	0.022	2.955	0.002

Note. Sample size is 125 for pre-implementation group and 123 for post-implementation.

A Chi-square test for independence was used to determine the relationship between demographic characteristics for participants and the outcome variables of counseling and referral rates and provided in Table 3. The results suggested that there was moderate evidence ($p < .05$) to support an association between the demographics of age and minority groups and the outcome variable of referral rates. The effect size for the association of age and referrals was strong (Cramer’s $V/\phi = .247$). The effect size for the association of minority group and referrals was moderate (Cramer’s $V/\phi = .144$). There was no statistically significant association between gender, smoking status, or tobacco use and the rate at which counseling and referral were received by participants.

Table 3

Chi-Square Test for Demographics and Outcome Variables

Characteristics	valid cases	Counseling = yes				Referral = yes			
		χ^2		LR		χ^2		LR	
		value	p	value	p	value	p	value	p
Age group	248	9.851 ^a	0.080	10.643	0.059	15.188 ^a	0.010*	12.441	0.029*
Minority	245	0.328	0.567	0.319	0.572	5.066 ^a	0.024*	3.990	0.046*
Gender	248	0.028	0.868	0.028	0.867	0.066 ^a	0.798	0.065	0.798
Smoking Status	248	0.850 ^a	0.837	1.058	0.787	0.125 ^a	0.989	0.152	0.985
Tobacco Use	217	0.856 ^a	0.836	0.844	0.839	1.869 ^a	0.600	2.547	0.467

Note. Cases with unknown values were eliminated from minority and tobacco use groups prior to calculation. LR = likelihood ratio.

^a Reflects instances where > 20% of cells have expected count less than 5.

* $p < 0.05$.

Discussion of Findings

Despite barriers to implementation, the project produced significant results. There was a statistically significant increase in the rate at which tobacco cessation counseling and electronic referrals to the Maryland Quitline were provided to patients. Tobacco cessation counseling rates increased by 22.1% and electronic referrals increased by 6.5%. While the increase in electronic referrals were modest, they are supported by similar findings in the literature. In a study by Baker et al. (2021), the implementation of training and EHR improvements resulted in a 68.4% increase in the assessment of readiness to quit and a 9.6% increase in electronic referrals to the state quitline. The clinical significance of this project's findings were that an additional 35 patients received counseling and referrals to assist them in quitting smoking, which could lead to a significant improvement in overall health. The project's findings provided meaningful results to support the use of the OMSC to improve tobacco cessation efforts in this practice setting.

There were some notable strengths and limitations to the project design which warrant recognition. The participant sample size was large and exceeded the estimate, which allowed for more robust statistical analyses. Pre-implementation and post-implementation groups were comparable to each other and provided a good representation of the typical population of patients seen by the outpatient transitional care office where implementation occurred. However, the participants in this project may not

be representative of the general population. More research is needed in other transitional/outpatient settings to be able to generalize findings. Convenience sampling was used to collect data, which precludes generalizability of results.

The association between age and minority groups to counseling and referral rates needs to be studied further. Arancini et al. (2021) conducted an international study and found that as people age, tobacco use increases and intention to quit decreases. The social determinants of health, including educational level and employment status are associated with smoking status and quit attempts (Poghosyan et al., 2019). Participants in a study conducted by Poghosyan et al. (2019) were more likely to smoke if they were unemployed or reported food or housing insecurity. In this same study, participants were more likely to report a recent attempt to quit if they were non-Hispanic Black or a college graduate (Poghosyan et al., 2019). A sample size that includes a representation of additional demographic characteristics would allow for more robust conclusions regarding any possible relationships between these variables. Additional methods for increasing counseling and referral rates that are supported by the literature should also be considered. For instance, considerations should be made for adopting counseling and referrals as the default for treatment, instead of requiring patients to “opt in,” to strengthen tobacco cessation efforts (Hempel-Bruder et al., 2022).

Recommendations

Economic Considerations

The tobacco workgroup expressed interest in expanding the EBP change to additional outpatient practices within the health system. The DNP student attempted to assist with this outreach during the implementation period through the development of

resources. The training module and printed materials were provided to the tobacco workgroup for use at other practices. As the project is expanded throughout the health system, financial considerations should be considered to promote sustainability. Potential costs may include dedicated personnel to provide outreach and training to additional practices and printing of materials to support training efforts. To offset costs, the benefits of the EBP change should be stressed, including the potential for increased revenue through the proper billing for tobacco cessation services.

Implications for Practice and/or DNP Role as Leader/Innovator

The Doctor of Nursing Practice (DNP) graduate is expected to assume the role of a leader within the healthcare organization. The DNP project is the culminating work of the practice doctorate and affords the student the opportunity for “rigorous and scholarly development of a clinical issue, demonstrating the ability to apply knowledge, translate learning and exhibit evidence-driven outcomes in their areas of practice expertise” (Moran et al., 2020, p. 404). Through completion of the DNP project, the DNP student demonstrated competency in the essential skills required of a DNP-prepared nurse leader as defined by the American Association of Colleges of Nursing (AACN) while translating evidence to practice. Through completion of this project, the DNP student was able to partner with a healthcare organization and lead a EBP change to improve tobacco cessation efforts in an outpatient transitional care practice.

AACN DNP Essentials

Identifying a theoretical model to guide the DNP project was an important first step prior to implementation of the DNP project. OMSC served as the EBP model for the DNP project. The DNP student identified the stages of behavior change model as a

theoretical underpinning for the practice change. The process of identifying a theoretical/EBP model that is congruent with the project is an activity that is aligned with DNP Essential I.

DNP Essential II is focused on organizational and systems leadership for quality improvement and systems thinking. The community health needs assessment identified tobacco cessation as a population health need that affected the organization and its local community. The DNP student leveraged this population health need to support the tobacco workgroup in obtaining leadership buy-in through creation of organizational and departmental goals related to improving tobacco cessation efforts. A pilot project was developed and the DNP student served as a project lead. The activities described also meet DNP Essential VII because the DNP student used local data regarding tobacco use in the community to identify a problem and inform project goals. During implementation, the DNP student collected data related to demographics to assist in the analysis of clinical prevention and population health needs to improve health.

The use of clinical scholarship and analytical methods for EBP is the foundation of DNP Essential III. Prior to implementation, the DNP student performed a thorough literature review and synthesis of evidence with a PRISMA diagram. This helped to narrow the design of the interventions within the DNP project. The DNP student developed a series of guidelines and protocols for the outpatient transitional care office to utilize to improve tobacco cessation efforts, including a training module for providers and electronic health record (EHR) tools and prompts. Through the creation of resources for the outpatient transitional care office, the DNP student was also meeting DNP Essential

IV which requires the use of information systems and technology to improve the delivery of health care.

Throughout implementation, the DNP student regularly demonstrated the essential skills related to healthcare advocacy (DNP Essential V), interprofessional collaboration (DNP Essential VI), and advanced nursing practice (DNP Essential VIII). Attendance was regularly maintained at tobacco workgroup meetings and the DNP student frequently collaborated with data analysts, informatics specialists, compliance officers for billing, and members of the tobacco workgroup team to design the interventions used during the project. Input was gathered from all professionals working at the research site, including the nurse practitioners, medical assistants, nurse case managers, social workers, and practice managers. As the project lead, the DNP student maintained accountability for the implementation of the pilot program. When questions arose or gaps in practice were identified, the DNP student worked to provide solutions. The DNP student served as a resource and a change agent.

Process and Outcome Recommendations

Successful redesign and sustainability of an EBP change considers organizational needs and the use of collaboration to address them (Melnyk & Fineout-Overholt, 2019). To promote sustainability of this project's EBP change beyond implementation, the DNP student collaborated with the health system to identify the need for dedicated personnel to assume the responsibilities of patient follow-up. The DNP student worked with the tobacco workgroup to develop a script for telephone follow-up and phrasing for documentation, as well as a workbench report that could be used to identify patients who smoke that were recently seen within the outpatient transitional care office. However, the

DNP student was not able to conduct patient follow-ups during the implementation period. Future considerations should include establishing someone to conduct regular patient follow-ups within the health system.

Dissemination Plan

Dissemination of scholarly work supports the translation of evidence to practice and provides support for the value of the DNP-prepared nurse (Moran et al., 2020). The outcomes of the DNP project will be disseminated publicly to members of the Salisbury University community and project committee members in December 2022. A written executive summary will be provided to the organization where the project was implemented within three months, accompanied by a PowerPoint presentation shared at a tobacco workgroup meeting. An abstract for a poster presentation will be submitted by February 2023 to the Maryland Action Coalition's virtual leadership summit that is scheduled to take place in May 2023. The DNP project is aligned with the objectives of the summit, which is titled "Collaborating to Meet Challenges and Opportunities: The State of Maryland's Health" and is focused on exploring innovative and collaborative methods to address health care needs in Maryland.

To promote international dissemination, the DNP project paper will be submitted immediately upon completion to the Virginia Henderson Global Nursing e-Repository (Henderson Repository) which provides a framework for sharing evidence-based practice within the nursing community. The Henderson Repository provides a free, open-access, and web-based means for sharing knowledge globally with nurses at all levels.

Submission of a manuscript to suitable nursing publications is being considered,

including the *Journal of Doctoral Nursing Practice*, *Journal of Community Health Nursing*, and *BMC Primary Care*. Manuscript submission will occur within six months.

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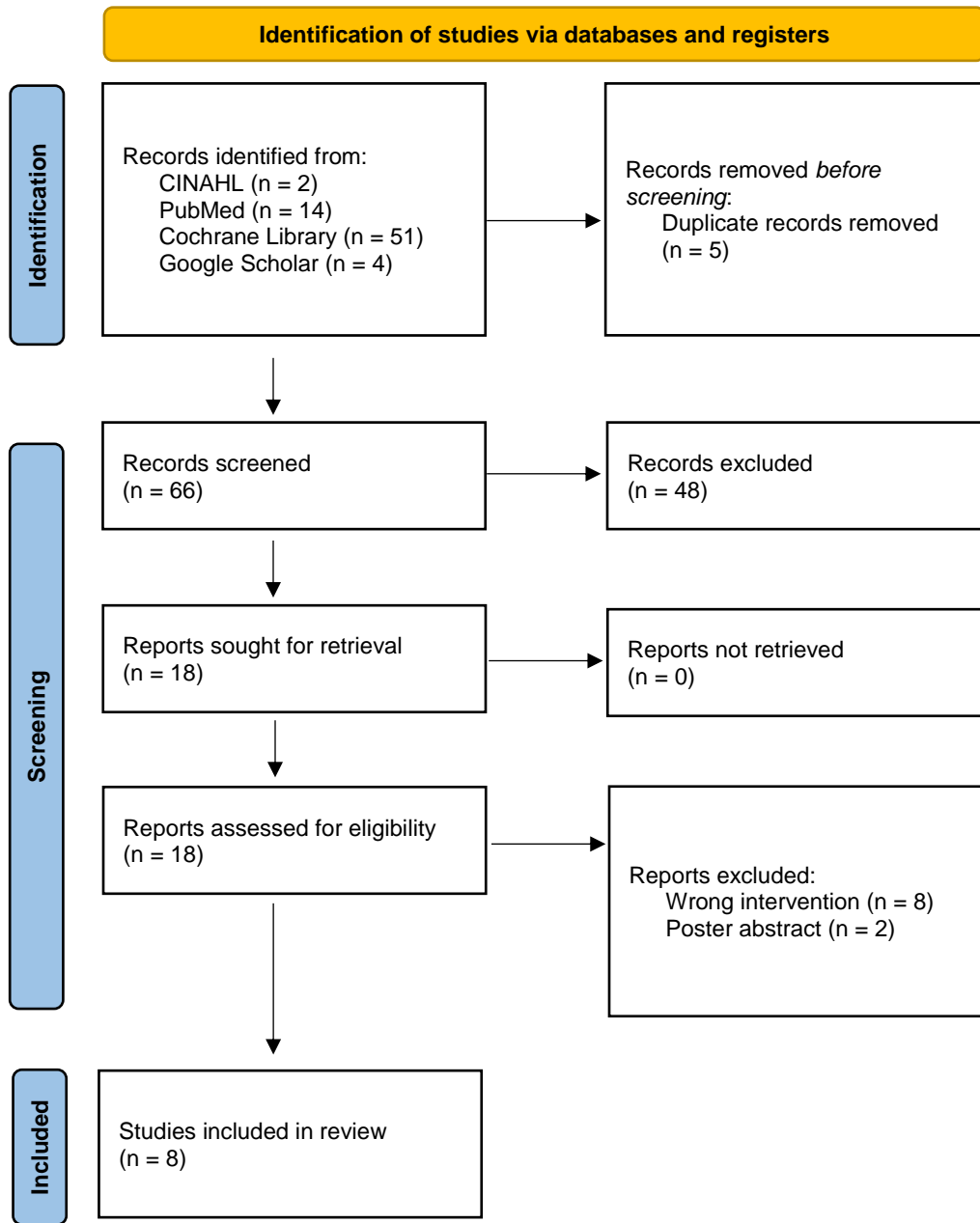
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Appendix A

PRISMA Flow Diagram



From: Page et al. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ* 2021, 372:n71.

<https://doi.org/10.1136/bmj.n71>

Appendix B

Table of Evidence

Citation	Conceptual Framework	Design/Purpose	Sample/Setting	Measurement of Major Variables	Study Findings	Appraisal of Worth to Practice	Strength & Quality of Evidence
The Ottawa Model for Smoking Cessation (OMSC)							
Li, V. W., Lam, J., Heise, P., Reid, R. D., & Mullen, K. A. (2018). Implementation of a pharmacist-led inpatient tobacco cessation intervention in a rehabilitation hospital: A before-and-after pilot study. <i>Canadian Journal of Hospital Pharmacy</i> , 71(3), 180–186.	RE-AIM framework, OMSC	Pre-post pilot study with pre-implementation control group Intervention: OMSC with in-hospital smoking cessation support, in-hospital follow-up, 3-months post-discharge follow-up phone call; pharmacist-led DVs: Self-reported abstinence rates	Setting: large rehabilitation hospital in Toronto, Ontario (Canada) Convenience sampling: patients identified on admission as current smokers (any tobacco use in past 6 months), not receiving palliative care, speak English N = 96 smokers,	Telephone follow-up at 3 months Comparison of abstinence rates using binary logistic regression	Intervention group had higher continuous and 7-day point prevalence abstinence rates Impact of designated provider (pharmacist)	Lack of generalizability of results (setting, provider characteristics) Small sample size due to limited recruitment period Some control Single-site study Self-reported data	Level 2C

			N = 48 intervention, N = 48 control (usual care)			Long-term results not assessed Potential conflict of interest (2 authors)	
Lindson, N., Pritchard, G., Hong, B., Fanshawe, T. R., Pipe, A., & Papadakis, S. (2021). Strategies to improve smoking cessation rates in primary care (Review). <i>Cochrane Database of Systematic Reviews</i> , (9).	Cochrane methods	Systematic review Intervention: strategies to improve implementation of smoking cessation DVs: Smoking abstinence (primary outcome) Quit attempts, healthcare provider performance: asking about smoking status, advising on cessation,	Inclusion: RCTs and cluster-RCTs conducted in primary care settings, include non-pregnant adults, intervention studied in addition or comparison with standard care, smoking abstinence measured at 6 months or more N = 81 studies involving 112,159 participants	Intention-to-treat analysis used to measure smoking abstinence Mantel-Haenszel random-effects methods	Moderate-certainty evidence that adjunctive counseling and cost-free medications increase quit rates Moderate-certainty evidence that tailored printed materials increased 6-month smoking abstinence rates No clear evidence to support biomedical risk feedback,	More evidence is needed to draw more conclusions Inconsistent measurement of outcomes Variation in multi-component strategies did not allow for identification of effective combinations in large proportion of studies (34) Large proportion of studies with high risk of bias (44)	Level 4C

		assessment of readiness to quit, assisting with cessation, arranging follow-up (secondary outcomes)			provider smoker cessation training, or provider incentives (low-very low certainty)	Most studies took place in Europe (39)	
Martínez, C., Castellano, Y., Andrés, A., Fu, M., Antón, L., Ballbè, M., Fernández, P., Cadreira, S., Riccobene, A., Gavilan. E., Feliu, A., Baena, A., Margalef, M., Fernández, E. (2017). Factors associated with implementation of the 5A's smoking cessation model. <i>Tobacco Induced Diseases</i> , 15(41), 1–11.	5 A's framework: <i>ask</i> about smoking, <i>advise</i> to quit, <i>assess</i> willingness to quit, <i>assist</i> with treatment and referrals, <i>arrange</i> follow-up	Cross-sectional survey No intervention DVs: Performance in delivery of 5 A's	Setting: healthcare organizations that belong to CNSFH in Catalonia, Spain Convenience sample: healthcare workers enrolled in online smoking cessation training developed by CNSFH, work in CNSFH member organization N = 580 healthcare workers	63-item online questionnaire with measures at individual and organizational levels Multivariate regression χ^2 analysis to control for healthcare worker characteristics Mann-Whitney U test and Kruskal-Wallis test to assess differences between performance groups	Individual performance of <i>ask</i> , <i>advise</i> , <i>assess</i> was higher than <i>assist</i> , and <i>arrange</i> Doctors reported highest performance Health centers had higher rates of follow-up than hospitals Experience, organizational support, non-smoking status, and training	Individual and organizational factors may influence performance in implementation of smoking cessation interventions Cannot determine causal relationships Adequate sample size No control Self-reported data Potential for participant bias (not a	Level 3B

					increased performance	representative sample)	
<p>Mullen, K. A., Manuel, D. G., Hawken, S. J., Pipe, A. L., Coyle, D., Hobler, L. A., Younger, J., Wells, G. A., Reid, R. D. (2017). Effectiveness of a hospital-initiated smoking cessation programme: 2-year health and healthcare outcomes. <i>Tobacco Control</i>, 26(3), 293–299.</p>	OMSC	<p>Two-group effectiveness study with pre-implementation control group</p> <p>Intervention: OMSC</p> <p>DVs: All-cause mortality, all-cause hospital readmissions (primary outcomes)</p> <p>Smoking-related readmissions, all-cause ED visits, smoking-related ED visits, all-cause physician visits, smoking-related physician visits (secondary outcomes)</p>	<p>Setting: 14 hospitals in Ontario, Canada without a formal cessation intervention in place</p> <p>Consecutive sampling: patients identified on admission as current smokers (smoked ≥ 1 cigarette/day in 6 months prior), > 17 years old, lived in Ontario, qualified for OHIP</p> <p>N = 1,367 smokers,</p>	<p>Data acquired from national databases (RPS, CIHI, OHIP)</p> <p>Comparison to baseline characteristics</p> <p>Competing-risks regression analysis</p>	<p>Intervention group had significant reduction in all-cause readmissions, smoking-related readmissions, and all-cause ED visits at all time points (30-day, 1-year, 2-year); significant reduction in mortality at 1-year and 2-year time points</p>	<p>OMSC hospital-based intervention significantly reduces mortality, readmissions, and ED visits</p> <p>Large sample size</p> <p>Some control</p> <p>Multi-site study</p> <p>Evaluation committee to approve study design and review study findings</p> <p>Blinded initial analysis of data</p> <p>Consecutive nature of recruitment</p>	Level 2B

			N = 726 intervention, N = 641 control (usual care)			limited selection bias Healthcare usage data limited to Ontario Potential conflict of interest (3 authors)	
Papadakis, S., Cole, A. G., Reid, R. D., Coja, M., Aitken, D., Mullen, K. A., Gharib, M., Pipe, A. L. (2016). Increasing rates of tobacco treatment delivery in primary care practice: Evaluation of the Ottawa model for smoking cessation. <i>Annals of Family Medicine, 14</i> (3), 235–243.	3 A's framework: <i>ask</i> about smoking status, <i>advise</i> to quit smoking, <i>act</i> to provide assistance	Pre-post study Intervention: Multicomponent knowledge translation intervention (OMSC) with outreach facilitation visits, clinic staff training, standardized staff and patient tools, real time prompts and EMR tools, follow-up support and counseling, audit and feedback DVs:	Setting: 32 primary care practices in Ontario, Canada with multi-disciplinary family health teams, 481 clinicians Convenience sample: patients ≥ 18 years old, smoked ≥ 1 cigarette/day, scheduled appointment at participating primary care practice,	Patient exit surveys, pre- and post-intervention; Clinician surveys AOR and CI for delivery of 3 A's; Pearson's χ^2 test to control for patient-level variance; ICC to control for clinic- and provider-level variance	Significant increase in delivery of 3 A's post-intervention: 16% increase in <i>ask</i> ; 18.1% increase in <i>advise</i> ; 19% increase in <i>act</i> (p < 0.001) Predictors: physician champion predicted <i>ask</i> ; provider beliefs predicted <i>advise</i> and <i>act</i> ; annual exam appointment	OMSC modified practice behaviors and enhanced tobacco treatment delivery Large sample size No control Multi-site study Self-reported data Lack of generalizability	Level 2B

		<p>Provider performance in delivery of 3 A's</p> <p>Patient-, provider-, and clinic-level predictors of delivery of 3 A's</p>	<p>understands English or French language</p> <p>N = 1,919 patients pre-intervention, 1,951 patients post-intervention</p>		<p>predicted <i>ask, advise, act</i></p>	<p>of results (setting, patient sample)</p> <p>Provider-level variance</p> <p>Role of physician champion</p> <p>Importance of reason for visit</p> <p>Long-term results not assessed</p> <p>Potential conflict of interest (1 author)</p>	
<p>Reid, R. D., Malcolm, J., Wooding, E., Geertsma, A., Aitken, D., Arbeau, D., Blanchard, C., Gagnier, J. A., Gupta, A., Mullen, K. A., Oh, P., Papadakis, S., Tulloch, H., LeBlanc, A. G., Wells, G. A., Pipe, A. L. (2018). Prospective, cluster-</p>	<p>OMSC</p>	<p>Randomized-controlled trial</p> <p>Intervention: OMSC with counseling, discount card for cessation medication, follow-up phone call at 6 months</p>	<p>Setting: DEPs in Ontario, Canada</p> <p>Matched-pair, clustered randomization: DEPs placed into 7 matched pairs, randomized assignment of</p>	<p>Telephone follow-up at 6 months</p> <p>Data was aggregated and analyzed in clusters; ICC to control for variance in sample size at DEPs; weighted</p>	<p>Intervention group had CO-confirmed abstinence rate of 11.1% versus 2.6% for control group</p> <p>DEP staff in intervention group more</p>	<p>Treatment effect on quit rates was significant at 8.5%; practices more likely to advise, assess, assist, and arrange follow-up for patients who smoke</p>	<p>Level 1B</p>

<p>randomized trial to implement the ottawa model for smoking cessation in diabetes education programs in Ontario, Canada. <i>Diabetes Care, 41, 406–412.</i></p>		<p>DVs: CO-confirmed smoking abstinence rates at 6 months (primary outcomes)</p> <p>Behaviors of DEP staff (secondary outcomes)</p> <p>Participant use of medications, electronic cigarettes, smoking cessation resources outside of study (tertiary outcomes)</p>	<p>intervention within each pair;</p> <p>Patients enrolled: smokers age 18-80 years, diagnosed with type 2 diabetes or prediabetes, receiving care in DEP, understands English or French language</p> <p>N = 313 smokers,</p> <p>N = 198 intervention, N = 114 control (usual care for smoking cessation)</p>	<p>estimates determined using random-effects meta-analysis</p>	<p>likely to ask about smoking status, advise to quit smoking, assist to set quit date, assist to select cessation medication, provide written materials, and schedule follow-up</p> <p>Participants in intervention group had higher rates of contacting external telephone quit line and receiving counseling from pharmacist; control group had higher rates of electronic cigarette use and receiving counseling</p>	<p>Low attrition rate: 16.3% of participants lost to follow-up</p> <p>Controlled design</p> <p>Adequate sample size</p> <p>Multi-site study</p> <p>Mostly self-reported data</p> <p>Biochemical verification of smoking abstinence</p> <p>Potential for recruitment bias</p> <p>Limited generalizability (setting, sample, provider characteristics)</p>	
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					from primary care provider	Highlights need to address institutional barriers (lack of guidelines or directives) Potential conflict of interest (4 authors)	
Romano, I., Costello, M. J., Ropp, C., Li, Y., Sousa, S., Bruce, D., Roth, D., MacKillop, J., Rush, B. (2019). Evaluating the short-term impact of a tobacco-free policy in an inpatient addiction treatment setting. <i>Journal of Substance Abuse Treatment, 107</i> , 50–59.	OMSC	3-group quasi-experimental study Intervention: OMSC, campus-wide tobacco ban DVs: Patient smoking status, frequency, amount per day, quit attempts	Setting: 105-bed inpatient addiction treatment center in Ontario, Canada Sample: patients admitted for at least 2 days, reported using tobacco in the last 90 days N = 397 patients (general sample), 218 patients reported using tobacco at	Recovery Questionnaire at admission and discharge Generalized linear mixed modelling Pearson’s χ^2 test to control for patient-level variance	Group with OMSC plus campus-wide tobacco ban was 80% less likely to use tobacco during treatment compared to control group Group with OMSC plus campus-wide tobacco ban had 35% decrease in smoking days and 27% decrease in cigarettes per day compared	The use of an evidence-based cessation intervention plus complete tobacco ban shown to be effective at reducing tobacco use amongst substance use disorder patients Self-reported data Some control Valid assessment tool	Level 2C

			<p>baseline (subsample)</p> <p>N = 35 intervention group with OMSC alone, N = 74 intervention group OMSC + campus-wide tobacco ban, N = 109 control (usual care)</p>		<p>to control group</p> <p>No significant effect on quit attempts</p>	<p>Unclear sampling methods</p> <p>Uneven sample sizes amongst intervention and control groups</p> <p>Limited generalizability (setting, largely homogenous sample)</p>	
<p>Thomas, D., Abramson, M. J., Bonevski, B., & George, J. (2017). System change interventions for smoking cessation (Review). <i>Cochrane Database of Systematic Reviews</i>, (2).</p>	<p>Cochrane methods</p>	<p>Systematic review</p> <p>Intervention: system change interventions for smoking cessation that integrate identification of smokers and offering of evidence-based nicotine dependence treatment</p>	<p>Inclusion: RCTs, cluster-RCTs, quasi-RCTs, and interrupted time series studies</p> <p>N = 7 cluster-RCTs</p>	<p>Standardized form to collect data on settings, participants, interventions, and outcomes</p> <p>GRADE standard used for rating quality of evidence and strength of recommendations</p> <p>Cochrane handbook to</p>	<p>Two studies found that cessation outcomes improved with system change interventions</p> <p>Two studies found that cessation outcomes did not improve with system change interventions</p>	<p>Unable to draw conclusions regarding the effect of interventions on smoking abstinence due to inconsistent results</p> <p>Evidence suggests that system change interventions may improve system-level outcomes</p>	<p>Level 4C</p>

		<p>DVs: Smoking abstinence (cessation outcome)</p> <p>Assessment and documentation of smoking status, provision of advice to quit or cessation counseling, referral and enrollment in quitline services, prescribing of cessation medications (system-level outcomes)</p>		<p>categorize level of bias</p> <p>Narrative synthesis to describe effectiveness of interventions on outcomes</p>	<p>System change interventions did improve rates of assessment, documentation, advice, counseling, and referrals (system-level outcomes)</p> <p>Quality of evidence rated very low or low</p>	<p>Limited available research</p> <p>More high-quality evidence is needed to draw concrete conclusions</p>	
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RE-AIM = reach, effectiveness, adoption, implementation, maintenance

DV = dependent variable

CNFSH = Catalan Network of Smoke Free Hospital

RPS = Registered Persons Database

OHIP = Ontario Health Insurance Plan

CI = confidence interval

ICC = intra-class correlation coefficient

CO = carbon monoxide

GRADE = Grading of Recommendations, Assessment, Development and Evaluation.

OMSC = Ottawa Model for Smoking Cessation

RCT = randomized controlled trial

ED = emergency department

CIHI = Canadian Institutes of Health Information

AOR = adjusted odds ratio

χ^2 = Chi-square

DEP = diabetes education program

Appendix C

SWOT Analysis Chart

<p>Internal analysis →</p>	<p>Strengths:</p> <ul style="list-style-type: none"> • Established tobacco cessation workgroup • Engaged leadership champions • Physician interest in improving outcomes • EHR capabilities • Experienced counselors • Informatics team • Data analyst • Education department 	<p>Weaknesses:</p> <ul style="list-style-type: none"> • Competing organizational priorities • Staffing issues • Leadership changes (CNO resigned, new CEO) • No designated project leader • Lack of training related to tobacco cessation counseling • Limited resources • EHR limitations • Inconsistent practices • Limited tobacco cessation services • Lack of follow-up system
<p>External analysis →</p>	<p>Opportunities:</p> <ul style="list-style-type: none"> • EBP models available to guide • Smoking cessation counseling billing codes • Community partnerships • Reduced hospital stays • National marketing campaigns • Maryland Quitline referrals • Increased tobacco cessation services 	<p>Threats:</p> <ul style="list-style-type: none"> • Competing community priorities (COVID-19 pandemic) • Community stressors due to COVID-19 pandemic • Tobacco industry growth • Leadership changes (recent dismissal of Health Officer) • Lack of sustainable funding

EHR = electronic health record
 EBP = evidence-based practice
 CNO = Chief Nursing Officer
 CEO = Chief Executive Officer

Appendix D

Implementation Time Line

Month	Dates	Activities
1	March 1, 2022 – March 31, 2022	<ul style="list-style-type: none"> • Identify participants • Collect pre-implementation data
2	April 1, 2022 – April 30, 2022	<ul style="list-style-type: none"> • Begin outreach facilitation (needs assessment, develop protocols, define roles and responsibilities, support communications and training activities) • Work with IT specialists to identify systems for embedded EHR tools and prompts • Ensure access to adequate tools and materials to support tobacco cessation referrals • Develop a system for patient follow-ups
3	May 1, 2022 – May 31, 2022	<ul style="list-style-type: none"> • DNP student available at least one day/week to provide support
4	June 1, 2022 – June 30, 2022	<ul style="list-style-type: none"> • Data collection with EHR/record review regarding impact of the intervention (post-implementation data)

Appendix E

IRB Research Protocol Approval

Salisbury University
Institutional Review Board
Committee on Human Research
Phone: (410) 548-3549
Fax: (410) 677-0052
Email: humanresearch@salisbury.edu

IRB Research Protocol Approval Notification

Date: 3/2/2022

To: M. DiBartolo
L. Schenk
RE: Protocol #5
Type of Submission: Exempt
Type of IRB Review: Exempt
Protocol is scheduled to begin 3/2022 end 6/2022

Approval for this project is valid from 3/2/2022 to 6/30/2022.

This letter serves to notify Dr. Mary DiBartolo and Laura Schenk that the Salisbury University (SU) Institutional Review Board (IRB) approved the above referenced protocol entitled, Using the Ottawa Model for Smoking Cessation to Improve Tobacco Cessation Efforts on March 2, 2022.

Pursuant to Federal regulations 21 CFR 56.109, the IRB has determined that this protocol qualifies for Exempt review.

Federal regulation 45 CFR 46.103 (b)(4)(iii) requires Primary Investigators (PI), except when a subject is in immediate danger, to assure any change to an approved protocol is not initiated prior to IRB review and approval. Additionally, the PI must also inform the IRB of unanticipated problems involving risks to participants.

These same federal regulations require continuing review of research be conducted by the IRB at intervals appropriate to the degree of risk. Your research is scheduled to begin 3/2022 and end 6/2022. It is the PI's responsibility to submit continuing review reports in a timely manner (at least 3 weeks prior to scheduled end date on the protocol approval).

The SU IRB is organized and operated according to guidelines of the United States Office for Human Research Protections and the United States Code of Federal Regulations and under Federal Wide Assurance No. FWA00020237.

If you have any questions about this review or questions, concerns, and/or suggestions regarding this process, please do not hesitate to contact the Office of Graduate Studies and Research at 410-548-3549 or humanresearch@salisbury.edu.