A PRACTICE IMPROVEMENT PROJECT IMPROVING TOBACCO AND NICOTINE DEPENDENCE TREATMENT EDUCATION IN A DOCTOR OF NURSING PRACTICE PROGRAM

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The Supervisory Committee certifies that this ***disquisition*** complies with North Dakota State University's regulations and meets the accepted standards for the degree of

DOCTOR OF NURSING PRACTICE

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ABSTRACT

Tobacco use is a global epidemic and the leading cause of preventable mortality and morbidity in the United States (Centers for Disease Control and Prevention [CDC], 2022h). Approximately 5.4 million people die annually due to tobacco-related illnesses. About 70% of tobacco users visit primary care clinics annually and even brief advice from clinicians can improve cessation rates (United States Department of Health and Human Services [USDHHS], 2020). However, four out of nine adult smokers who visited healthcare providers did not receive any advice or counseling on quitting smoking. Lack of training and confidence were identified as a barrier among providers as to why they were not providing regular counseling or pharmacologic intervention (Meijer et al., 2019).

This practice improvement project improved the tobacco and nicotine dependence treatment education curriculum in North Dakota State University's (NDSU) Family Nurse Practitioner (FNP)/ Doctor of Nursing Practice (DNP) program based on the recommendation provided by former DNP student, Dr. Doan (Doan, 2023). Dr. Doan first incorporated tobacco and nicotine dependence treatment education into the DNP curriculum in 2022. This project was implemented in NURS 810 class among DNP students. The education consisted of an online program (NDQuits QuitLogix) and an in-class presentation. Students were provided with toolkits.

NDSU DNP students' knowledge, motivation, confidence in helping people quit tobacco and nicotine, and comfort with providing information about cessation medications, programs and services, and referrals for evidence-based tobacco and nicotine dependence treatment were assessed through pre- and 2-month post-education questionnaires. Motivation to help users quit was high before the intervention began and did not have a significant increase post-intervention. Significant increases in knowledge, confidence, and comfort were observed in helping patients

quit and in providing information about cessation medications, programs and services, and referrals for tobacco and nicotine dependence treatment. The results of this practice improvement support the effectiveness of formal tobacco and nicotine dependence treatment curriculum for DNP programs. Additionally, this project serves as a guide for DNP and other primary care programs for adding tobacco and nicotine dependence treatment curriculum into DNP and other primary care professional programs.

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This work would not have been possible without the support and contributions of each individual mentioned above. I am profoundly grateful for their assistance, encouragement, and belief in the significance of this research.

DEDICATION

I dedicate this to my family with the most heartfelt thanks to my dear husband Dr. Bikash Poudel, whose unwavering support, understanding, and encouragement have sustained me through the highs and lows of this academic journey. And to my cherished son, Adhirit Poudel, for bringing immense joy and purpose to life. As I navigate the challenges of academia, their presence has been my constant pillar of strength and inspiration.

I also want to dedicate this to my late father, Hom Nath Bhattarai, whose wisdom and guidance in the power of education continue to inspire me. This dissertation is a tribute to his memory and his guidance on the path of knowledge and growth.

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LIST OF ABBREVIATIONS

CDC	Centers for Disease Control and Prevention
NDDHHS	North Dakota Department of Health and Human Services
USDHHS	United States Department of Health and Human Services
USSGR	United States Surgeon General Report
FDA	Food and Drug Administration
NRT	Nicotine Replacement Therapy
NDSU	North Dakota State University
FNP	Family Nurse Practitioner
DNP	Doctor of Nursing Practice
WHO	World Health Organization
ENDS	Electronic Delivery System
TTM	Transtheoretical Model
CINAHL	Cumulative Index to Nursing and Allied Health Literature
LGBTQ	Lesbian, Gay, Bisexual, Transgender, Queer/Questioning
CMS	Centers for Medicare and Medicaid Services
EVALI	E-cigarette or Vaping Use Associated Lung Injury
THC	TetraHydroCannabinol
nAChRs	nicotinic Acetyl Cholinergic Receptors
FTND	Fagerstrom Test for Nicotine Dependence
HER	Electronic Health Record
U.S.	United States
USPSTF	United States Preventative Services Task Force

CI	Confidence Interval
EAGLES	Evaluate Adverse Events in a Global Smoking Cessation Study
USPHS	United States Public Health Service
TCN	Tobacco Control Network
AAR	Ask, Advise, and Refer
AAC	Ask, Advise, and Connect
ACA	Affordable Care Act
CPT	Current Procedural Terminology
E/M	Evaluation and Management
TPCP	Tobacco Prevention and Control Program
IRB	Institutional Review Board
N.D.	North Dakota

CHAPTER 1: INTRODUCTION

Background and Significance

Tobacco is the leading cause of preventable mortality and morbidity in the United States (Centers for Disease Control and Prevention [CDC], 2022h) and North Dakota (North Dakota Department of Health and Human Services [NDDHHS], 2021a). Tobacco also remains the major cause of preventable death worldwide, with approximately 5.4 million people dying annually due to tobacco-related illnesses (CDC, 2021b). More than 480,000 people die annually from tobacco-related diseases in the United States (CDC, 2022h), while North Dakota reported the death of 1,000 adults in 2021 (NDDHHS, 2023b).

In 2020, an estimated 47.1 million U.S. adults (19%) reported currently using commercial tobacco products, including cigarettes (12.5%), e-cigarettes (3.7%), cigars (3.5%), smokeless tobacco (2.3%), and pipes (1.1%) (Cornelius et al., 2022). Approximately 79.6% of adults reported currently using combustible tobacco products such as cigarettes, cigars, and pipes, whereas 17.3% reported using other tobacco products. In 2021, in North Dakota, 15.0% of adults aged 18 and over smoked cigarettes at least once in the past 30 days (NDDHHS, 2023b). Among middle and high school students, e-cigarettes have been found to be the most used tobacco product since 2014 in the United States (Cooper, 2022). In 2022, 2.55 million U.S. middle and high school students reported current use of e-cigarettes. In North Dakota, in 2021, about 21.2% of high school students (grades 9 - 12) used e-cigarettes at least once in the past 30 days while 38.6% had ever tried e-cigarettes (NDDHHS, 2023b). The use of e-cigarettes at least once in the past 30 days by North Dakota adults was 19.3% in 2021 (NDDHHS, 2023b).

According to the U.S. Surgeon General (U.S. Department of Health and Human Services [USDHHS], 2016), both combustible and non-combustible tobacco products may have a

detrimental effect on the body. Each year, more than 16 million adults suffer from tobacco-related diseases (CDC, 2022i). Tobacco use remains one of the most important modifiable risk factors for lung cancer, chronic obstructive lung disease, heart disease, stroke, asthma, infertility, low-weight birth, diabetes, macular degeneration, and 10 other types of cancer (American Lung Association, 2024). In addition to health effects, the financial burden on individuals and society for the care of individuals with smoking-related illnesses is exponentially high, with medical costs of more than $240 billion per year in 2018 (CDC, 2022i). North Dakota spends $326 million annually in direct healthcare costs related to tobacco use (NDDHHS, 2021b).

Tobacco cessation treatment has numerous health benefits. Quitting tobacco before the age of 40 can significantly reduce the risks and mortality by about 90% (American Cancer Society, 2020). However, tobacco treatment at any age is beneficial in reducing the overall risk of cancer and cardiovascular events. Quitting tobacco and nicotine can be challenging due to the highly addictive properties of nicotine. Many tobacco users attempt to quit but do not achieve abstinence or have a period of relapse due to unpleasant withdrawal symptoms. In 2018, 55.1% of adult smokers attempted quitting in the past 12 months, however, only 7.5% of them were successful (Creamer et at., 2019). In 2021, 65.3% of middle and high school students reported thoughts of quitting tobacco products, with 60.2% able to quit for one day or longer (Gentzke et al., 2022).

Many evidence-based tobacco cessation interventions, tools, and treatment strategies are available to assist with quitting tobacco (USDHHS, 2020). Moreover, the public policies of higher taxes and smoke-free workplaces, mass media campaigns on smoking hazards, and telephone quitlines have helped reduce the number of tobacco users over the past decades. Current treatment approaches to smoking cessation include behavior treatments including

individual, group, and telephone counseling, and pharmacologic therapies (USDHHS, 2020). The Food and Drug Administration (FDA)-approved pharmacologic therapies include five forms of Nicotine Replacement Therapy (NRT) and two non-nicotine medications. Despite the availability of evidence-based behavioral and pharmacological interventions, more than two-thirds of adult cigarette smokers who wanted to quit did not use either of the therapies in the process of quitting smoking (USDHHS, 2020).

Tobacco treatment begins with conversation and support. Primary healthcare providers play an important role in the contribution of tobacco and nicotine dependence treatment. Healthcare providers can assess tobacco and nicotine use and counsel them on the harmful effects. Counseling and assistance provided by the healthcare provider in quitting tobacco have been shown to increase the desire to quit tobacco among tobacco users (Tucker et al., 2018). Moreover, the U.S. Preventative Services Task Force (2021) recommendation on treating tobacco use states that healthcare providers should ask all adults about tobacco use, advise all tobacco users to quit tobacco during every visit advocating the use of the brief intervention "5 A's" framework: (1) ask about tobacco use, (2) advise tobacco users to quit, (3) assess willingness to make quit attempt, (4) assist in quit attempt, and (5) arrange for follow up. However, few providers assess, refer, and provide evidence-based treatment options to the patient consistently and effectively (Rojewski et al., 2019). Lack of training and confidence were identified as a barrier among different groups of providers as to why they were not providing regular counseling or pharmacologic intervention (Meijer et al., 2019). Tobacco cessation education and training among healthcare professionals increase their confidence, knowledge, and comfort in providing interventions for tobacco cessation (Coovadia et al., 2020).

Problem Statement

Tobacco use continues to be the leading cause of preventable morbidity and mortality in the United States (CDC, 2022h) and in North Dakota (NDDHHS, 2021a). Tobacco cessation at any age may add years to life (American Cancer Society, 2020). About 70% of tobacco users visit primary care clinics annually and even brief advice from clinicians can improve cessation rates (USDHHS, 2020). However, four out of nine adult smokers who visited healthcare providers did not receive any advice or counseling on quitting smoking (USDHHS, 2020). In addition, only one-third to one-half of the children and adolescents were assessed for tobacco use and only one-fourth of them were advised to quit. A practice gap among providers in using the clinical practice guidelines was associated with a lack of time, skills, training, and inadequate knowledge (Manolios et al., 2021). Healthcare professionals who received training on smoking cessation are more likely to counsel and assist with tobacco cessation as compared to untrained providers (Carson et al., 2012). Providing up-to-date information and education to clinicians and future providers is crucial, as up-to-date information and education can increase knowledge, comfort, and motivation to assist the patient in quitting tobacco and nicotine. Therefore, a quasi-experimental quantitative study improving tobacco and nicotine dependence treatment education in a Family Nurse Practitioner (FNP)/ Doctor of Nursing Practice (DNP) program at North Dakota State University (NDSU) was conducted.

Purpose

The purpose of this evidence-based practice improvement project was to determine if improving tobacco and nicotine dependence treatment educational curriculum in a Family Nurse Practitioner (FNP)/ DNP program at NDSU will increase participants' (a) knowledge, (b) motivation and confidence in helping people quit tobacco and nicotine, and (c) comfort with

providing information about cessation medications, program and services, and referrals for evidence-based tobacco and nicotine dependence treatment.

Objectives

1) Increase knowledge on tobacco and nicotine dependence treatment among FNP/DNP students by implementing a modified tobacco and nicotine dependence treatment education curriculum into NDSU's FNP/DNP curriculum by October 2023.
2) Improve students' motivation, confidence, and comfort in counseling patients to quit tobacco and nicotine through completion of a tobacco and nicotine dependence treatment education curriculum, as measured by pre- and 2 months post-education questionnaires.

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Chapter 2 includes a list of definitions, a description of the Transtheoretical Model (TTM, Prochaska & DiClemente, 1983), and a review of the literature on tobacco cessation in primary care. The definitions of tobacco, nicotine, cessation, and education are provided. The TTM is used in this project, as it helps providers to identify and support the stages of the tobacco cessation decision-making process (Prochaska & DiClemente, 1983). The review of literature is divided into the following sections: (a) tobacco and nicotine use, (b) health effects of tobacco and nicotine, (c) emerging tobacco and nicotine products, (d) nicotine addiction and withdrawal, (e) current tobacco treatment practice and practice gap, (f) 5 A's brief counseling interventions, (g) provider's role, and (h) provider's education. A brief overview of the tobacco and nicotine dependence treatment education program, NDQuits QuitLogix, which will be implemented in the NDSU FNP/DNP curriculum for this project is provided. Detailed information on NDQuits QuitLogix education will be discussed in the Methods section.

Definitions

Tobacco

Oxford University Press (n.d.d., p. 1) defines tobacco as "the dried leaves of the tobacco plant that are used for making cigarettes, smoking in a pipe, etc." According to the National Institutes of Health (2022), tobacco contains nicotine that can lead to addiction and difficulty to quit. Different forms of tobacco use include pipe or hookah (water pipe), cigars, cigarillos, roll-your-own tobacco, bidis, kreteks, and cigarette smoking (World Health Organization, 2023). As of August 8, 2016, U.S. Food and Drug Administration [FDA] classified electronic delivery system (ENDS) as a tobacco product because ENDS uses "e-liquid" derived from tobacco plants (US FDA, 2021). Electronic nicotine delivery systems (ENDS) include vaporizers, vape pens, hookah pens, electronic cigarettes (e-cigarettes), e-cigars, and e-pipes (CDC, 2022f). American

Indians and Alaskan Natives use traditional tobacco for ceremonial or medicinal purposes and tobacco is considered a sacred plant (CDC, 2022a). The operational definition of tobacco for this study is any product that contains nicotine that is used for commercial and recreational purposes.

Nicotine

Oxford University Press (n.d. c., p. 1) defines nicotine as "a poisonous substance in tobacco that people become addicted to, so that it is difficult to stop smoking." Nicotine is the main addictive component derived from the tobacco plants (US FDA, 2022b). Most tobacco products are derived from the tobacco plant, however, there is nicotine called synthetic nicotine, which is crafted from the manufacturing process in the lab, not from the tobacco plant (US FDA, 2022b). The "e-liquid" in e-cigarettes is mostly derived from tobacco plants but manufacturers are starting to use synthetic nicotine in the "e-liquid." FDA reports that no nicotine is safe regardless of the source. On July 13, 2022, FDA announced that tobacco products, including synthetic nicotine products, cannot be legally marketed without authorization (US FDA, 2022a). The operational definition of nicotine for this study is nicotine that is derived from plants and manufactured synthetically.

Cessation

Oxford University Press (n.d. a) defines cessation as a "the stopping of something; a break in something." The operational definition of term "cessation" in this study is used for quitting or stopping the use of tobacco or nicotine-containing products. The USDHHS (2020) assessed tobacco cessation based on various surveys among adults and youths including past year quit attempts, smoking cessation for one day or longer, or smoking at the time of the survey. The definition of cessation in this study is based upon the materials provided by Rx for Change

(University of California Regents, n.d.) Therefore, the operational definition of cessation for this study is stopping tobacco use for the past six months.

Education

Oxford University Press (n.d. b., p. 2) defines education as "a particular kind of teaching or training." The operational definition of education in this study is improving and updating the educational modules of the tobacco and nicotine dependence treatment curriculum in the NDSU FNP/DNP program.

Theoretical Framework

Transtheoretical Model (TTM)

The TTM model is the model of intentional change and focuses on the decision making of the individual (Prochaska & DiClemente, 1983). The TTM model assesses an individual's readiness to change habitual behavior and provides effective strategies to achieve long-lasting behavior change. Prochaska and DiClemente developed the TTM model after examining the experiences of 872 adults who were changing their smoking habits on their own. TTM model identifies a series of five stages that an individual moves through and interventions to support behavior change. The stages of change in TTM model includes precontemplation, contemplation, preparation, action, and maintenance. Even though completion is the ultimate objective of TTM model, an individual can relapse into old behavior at any time during the change process leading to disappointments or feelings of failure. The TTM model was originally used to help addictive behavior such as alcohol, drug, or smoking. Utilizing TTM model helps us understand that change in addictive or habitual behavior occurs continuously through the cyclical process rather than in a quick or decisive manner. Therefore, once the provider identifies which TTM stage a patient is in, the provider can assist patient effectively to move on to the next stage and achieve successful treatment. The provider role is included below for each stage of TTM.

Table 1

Transtheoretical Model of Change

Stage	Description
1. Precontemplation Stage	Patient has no intention to quit tobacco use in near future
2. Contemplation Stage	Patient is contemplating quitting tobacco use.
3. Preparation Stage	Patient intend to quit tobacco use soon.
4. Action Stage	Patients have quit tobacco use.
5. Maintenance Stage	Patient has been tobacco-free for at least six months; the goal is to prevent relapse.

Note. Adapted from "Stages and processes of self-change of smoking: Toward an integrative model of change," by J. Prochaska & C. DiClemente, 1983, Journal of Consulting and Clinical Psychology 51(3), 390–395.

In the first stage of precontemplation, individuals do not intend to take any action or make any changes in the future, usually in the next six months (Prochaska & DiClemente, 1983). Individuals in the precontemplation stage may be unaware or have less information about the negative consequences of smoking and focus on the negative side of the change (Raihan & Cogburn, 2022). In this stage, providers should establish trusting relations with the patient, listen to, acknowledge, and educate the patient on the benefits of tobacco cessation (Singer, 2007). Building trusting relationships and providing insight on the health consequences is the key to moving from pre contemplation stage (Raihan & Cogburn, 2022).

The second stage, contemplation, is a stage where a person is seriously considering change within the next 6 months (Prochaska & DiClemente, 1983). Individuals are thinking about their risky behavior and aware of tobacco related health consequences, however, uncertain if the change is worthy (Raihan & Cogburn, 2022). For example: Individual is aware of their health consequences but ambivalent with the thought of unpleasant withdrawal. A person in this stage is open to education and information about smoking and cessation intervention (Prochaska

& DiClemente, 1983). During this stage, a primary provider can further discuss all the benefits of tobacco cessation, explore the barriers, support system and coping strategies (Singer, 2007).

The third stage, preparation, is a stage where an individual is willing to act in the future, usually within the next 30 days (Prochaska & DiClemente, 1983). In this stage, a person fully understands the cons of tobacco use over the pros and starts collecting information and making plans (Raihan & Cogburn, 2022). In this stage, a primary provider can provide more information on social support systems, quitlines, treatment strategies, and encourage patients in facilitating the change.

The fourth stage, action, is the stage where a person modifies their behavior, and changes are happening (Prochaska & DiClemente, 1983). For example: In the action stage, an individual has made changes in health risk behavior and stopped tobacco and nicotine use. In this stage, an individual continues to learn the importance of change and uses self-liberation. During action stage, primary providers should organize frequent follow up visits to provide education on health benefits, identify potential barriers and triggers, and assist in planning interventions to tackle with the triggers (Raihan & Cogburn, 2022). Assistance from social support and the providers can help prevent relapse.

The last stage of TTM is the maintenance stage where the individual has adopted changes and remained tobacco free for six months (Prochaska & DiClemente, 1983). In maintenance stage, individuals become more confident and are less tempted to use tobacco and nicotine products and relapse. An individual is aware of the potential triggers and has developed a skill to counteract with those triggers. In this final stage, it is important that providers should continuously support and reinforce the behavior change.

Literature Review

Search Strategy

An in-depth literature review was conducted to search for articles on tobacco use, the health effects of tobacco use, health care providers' role in tobacco cessation, and recommended treatment guidelines for tobacco cessation. Three databases - Cochrane Database of Systemic Review (Cochrane), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and PubMed were used. The keywords used during the search included, “tobacco cessation”, AND “healthcare”, AND “smoking cessation "AND “counseling,” AND “e-cigarette” AND “nicotine.” An additional review of grey literature was conducted including government sources and factsheets. Additionally, research articles were also reviewed from other sources such as hand searching, Google Scholar, and subject matter experts. The search criteria included systemic reviews, meta-analysis, randomized controlled trials, peer-reviewed journals, and articles published in the English language and were limited to the articles that were published from 2017 to 2023. Please refer to Appendix A for the Prisma Flow diagram.

Use of Tobacco and Nicotine in General Population

Global Data

Tobacco is a major cause of preventable morbidity and mortality globally (CDC, 2021b). Approximately 5.4 million people (about twice the population of Arkansas) die every year from tobacco-related diseases. It is expected that the number of deaths from tobacco-related diseases may increase to more than 8 million a year by the year 2030. A comprehensive tobacco prevention and control program is a systematic surveillance program conducted by the CDC in collaboration with the World Health Organization (WHO) in developing and conducting programs to reduce tobacco-related deaths.

National Data

Even though there has been a steady decline in the number of tobacco users over the past 50 years, 19% of U.S. adults in 2020 were still using some form of tobacco products (Cornelius et al, 2022). Among all forms of tobacco, cigarettes were the most used tobacco products. Approximately, 12.5% (30.8 million) of U.S. adults reported currently using combustible tobacco "cigarette smoking" in 2020.

E-cigarettes are electronic vaping devices that produce aerosol formed by heating e-liquid (CDC, 2022d). Nicotine salts are added to the liquid in the e-cigarette devices increasing its palatability attracting youths (Leventhal et al., 2021). Nicotine salts contain higher nicotine concentrations than older free-base nicotine, leading to more dependency. E-cigarettes are becoming more popular among youths and young adults. Among youth (grades 9 – 12), e-cigarettes are primarily used for exploring taste and are incorrectly perceived as non-harmful (USDHHS, 2016). In 2022, 2.55 million U.S. middle and high school students currently used e-cigarettes (Cooper et al., 2022). In 2022, 14.1% of high school students and 3.3% of middle school students reported the current use of e-cigarettes nationally (Cooper et al., 2022). Among current users, 27.6% reported using e-cigarettes daily, including 37.1% of high school students and 11.7% of middle school students. Among current e-cigarettes users, Puff Bar was mostly used (29.7%) in the past 30 days followed by Vuse (23.6%), JUUL (22.0%), SMOK (13.5%), NJOY (8.3%), Hyde (5.5%), and Blu (6.5%). Therefore, e-cigarettes remain a serious public concern that has drawn the attention of many policymakers.

In addition, tobacco use, and dependence is more prevalent among individuals with low socioeconomic status, lower education, and those living with mental health illnesses such as anxiety and depression (CDC, 2023b). In addition, certain groups including men, American

Indians/Alaska Natives, and LGBTQ people have a high prevalence of using tobacco, lower cessation rates, and poor health outcomes.

Moreover, African Americans have the highest rate of tobacco-related cancer among all racial and ethnic groups (Truth Initiative, 2020). More than 72,000 African Americans are diagnosed with tobacco-related cancer every year. Nicotine has a higher affinity to melanin (Uematsu et al., 1995); therefore, it is hypothesized that melanin level can affect the dependency and metabolism of nicotine (Liakoni et al., 2019). However, a recent study conducted by Liakoni et al. found no significant correlations between melanin and the pharmacogenetics parameters of nicotine or tobacco dependence measures.

North Dakota Data

In North Dakota, an estimated 15.0% of adults aged 18 years and older smoked cigarettes at least once in the past 30 days in 2021 (NDDHHS, 2023b). In 2021, the prevalence of cigarette smoking was slightly higher among men (18.1%) as compared to females (16.0%) (NDDHHS, 2021b). Like the national data, ENDS use is also more popular among high school students in North Dakota. Among youths in high school (grades 9 – 12), about 5.9% smoked cigarettes while 21.2% used e-cigarettes at least once in the past 30 days in 2021 (NDDHHS, 2023b). In addition, 38.6% and 26.9% of high school students (grade 9 - 12) and adults had tried e-cigarettes respectively in 2021. The use of smokeless tobacco in North Dakota is higher than the national average. In 2020, approximately 6.4% of adults aged 18 years and older used smokeless tobacco in North Dakota (Truth Initiative, 2022) as compared to the national average of 2.3% (CDC, 2022g). Moreover, health disparities related to tobacco are also prevalent in North Dakota (NDDHHS, 2021a). Tobacco is more commonly used by American Indians/Alaska Natives, and individuals with lower education and low-income status in North Dakota. In 2021,

cigarette smoking among American Indian adults at 35.8% in North Dakota was more than doubled the general population (NDDHHS, 2023a). Overall, data suggest that the use of cigarette smoking in North Dakota has fallen in the past 5 years (2016 – 2021), however, the numbers are still high and about 1,000 adults die each year from smoking (NDDHHS, 2021b).

Health Equity and Tobacco Use

Health equity means attainment of the highest level of health for all people regardless of race, ethnicity, disability, sexual orientation, gender, socioeconomic status, geography, language, or any other determinants that can affects the access to care (Centers for Medicare & Medicaid Services [CMS], 2022). CDC's Best Practices (2015, p.4) defines tobacco related disparities as, "Differences that exists among populations group with regards to key tobacco-related indicators, including patterns, prevention, and treatment of tobacco use; the risk, incidence, morbidity, mortality, and burden of tobacco related illness; capacity, infrastructure, and access to resources; and secondhand smoke exposure." Smoking prevalence is higher among the subgroups and minority populations including those living in poverty, homeless, incarcerated, living with mental health disorders, and LGBTQ communities (CDC, 2022c). Cigarette smoking is more common among American Indian and Alaska Native people as compared to any other racial or ethnic group in the United States (CDC, 2023a). More than 1 in 4 (27.1%) American Indian/Alaska Native adults smokes cigarettes. In addition, people living in rural areas have a higher rate of smoking than urban areas. Some of the major factors causing tobacco-related disparities include social determinants of the health, tobacco industry targeting minority groups, and gap in comprehensive tobacco policies. CDC recognizes that tobacco control policy interventions at the state and local level are cornerstones in reducing tobacco related disparities. Creating a smoke-free environment, increasing the price of tobacco products, reducing exposure

to tobacco industry sponsorships, and improving accessibility of cessation treatments should be the goals at the state and local level to reduce the disparities.

Health Effects of Tobacco and Nicotine Use

Tobacco use has detrimental effects on nearly every organ of our body (USDHHS, 2014). Tobacco can worsen numerous other diseases and co-morbidities. The USSGR on Smoking Cessation (USDHHS, 2020) identified that quitting tobacco helps to mitigate the effects of cancer and other cardiovascular diseases, coronary heart diseases, chronic respiratory diseases, and reproductive diseases. The report described that smoking cessation reduces the risks of 12 different types of cancer including cancer of the lung, laryngeal, oral cavity, esophageal, pancreatic, bladder, stomach, colorectal, liver, cervical, kidney, and acute myeloid leukemia. In addition, all-cause mortality increased by 51% among smokers who continued to smoke after cancer diagnosis as compared to those who quit. Smoking cessation also reduces the morbidity and mortality related to stroke. The USSGR on Smoking Cessation concluded that smoking cessation improves overall well-being, enhances the quality of life, and reduces the risk of premature death. In addition to combustible tobacco (cigarettes), many health problems are associated with smokeless tobacco (CDC, 2022b). Smokeless tobacco causes oral diseases and cancer of the mouth, esophagus, and pancreas. Among pregnant women, smokeless tobacco can lead to stillbirth or early delivery. Moreover, the risk of cardiovascular disease and stroke increases with the use of smokeless tobacco.

Evidence suggests that nicotine in combustible, smokeless, or other forms of tobacco, such as e-cigarettes, has adverse health effects (USDHHS, 2016). High doses of nicotine can cause acute toxicity and activate the pathway through which smoking increases disease risk. Nicotine exposure is toxic to the fetus during pregnancy and can result in sudden infant death. A

fetus exposed to nicotine can develop hearing deficit, obesity, and problems with behavior and cognition later in life. Youth and young adults' brains are more vulnerable to nicotine exposure leading to addiction, chances for use of other addictive substances, reduced impulse control, attention deficit, poor cognition, anxiety, and mood disorder. Furthermore, lab-created synthetic nicotine, which is mostly used in e-cigarettes, can still cause high dependence on nicotine, and have negative effects on brain development among adolescents (American Lung Association, 2023b).

E-cigarette or vaping use-associated lung injury (EVALI) is a newly recognized condition related to using e-cigarettes that can be life threatening (CDC, 2021c). Vitamin E acetate that is found in THC-containing e-cigarettes is strongly linked with EVALI. As EVALI is new, CDC and FDA continue to investigate. EVALI was initially recognized in 2019. During the outbreak of EVALI in February 2020, a total of 2807 hospitalized EVALI cases and deaths were reported from all 50 states in the United States, District of Columbia, Puerta Rico, and Virgin Islands (CDC, 2021c). North Dakota reported 10 - 49 cases of EVALI cases or death during the outbreak.

Emerging Tobacco and Nicotine Products

Heated tobacco products and nicotine free lozenges are emerging in the United States. Heated tobacco products are sold under the brand name IQOS and Eclipse and marketed as "heat-not-burn" products (CDC, 2022d). Tobacco leaves are heated on heated tobacco products thus, it is different than e-cigarettes. As heated tobacco products are new, research on short-term and long-term health effects is being conducted. Heated tobacco products also contain nicotine, and there are known adverse effects of nicotine on health, discussed previously. Therefore, healthcare professionals should ask about all forms of tobacco use and advise them to quit. In

February 2022, FDA authorized IQOS and Eclipse heated products for sale in the United States (CDC, 2022d). However, FDA reported that no claim can be made that IQOS and Eclipse reduce disease risk or that either are safe. Heated tobacco products are used by some smokers as an alternative to cigarettes for smoking cessation. However, a systemic review of 13 studies (n = 2666) reported insufficient evidence of cigarettes smoking cessation using heated tobacco products (Tattan-Birch et al., 2022).

Nicotine pouches and lozenges are another new category of tobacco products with brands such as Zyn, On!, Lucy, and Velo (Truth Initiative, 2019). Nicotine pouches contain salt-based nicotine derived from tobacco and add flavorings to attract youth. A significant increase in the sale of nicotine pouches has been reported. FDA does not strictly regulate nicotine pouches.

Nicotine Addiction and Withdrawal

Understanding the dynamics of nicotine in the brain is important before implementing tobacco cessation. Tobacco users can have difficulty with tobacco cessation because of addiction, tolerance, dependence, withdrawal effects, and cue-induced cravings for nicotine (USDHHS, 2020). Initiation of the addiction process starts once nicotine binds to nicotinic acetyl cholinergic receptors (nAChRs) in the midbrain (USDHHS, 2020). The nAChRs increase the efflux of dopamine to the midbrain activating the brain's rewarding sensory signal and reinforcing nicotine exposure and addiction. The nAChRs also cause long-term activation, upregulation, and desensitization of the receptors leading to the requirement of greater nicotine dosage to achieve the same responses, which can be termed nicotine tolerance (Wittenberg et al., 2020). Similarly, norepinephrine, a neurotransmitter, can also contribute to nicotine reward or resumption (Fitzgerald, 2013). Nicotine takes 10 - 20 seconds to reach the brain (Houezec, 2003). The six-item Fagerstrom Test for Nicotine Dependence (FTND) is a reliable tool for

assessing the intensity of physical dependence on nicotine (Haighton et al., 2013). A FTND score of 7 - 10 indicates being highly dependent on nicotine while less than four points indicates being minimally dependent.

Abstinence from nicotine causes withdrawal symptoms such as irritability, anxiety, craving to use tobacco, difficulty concentrating, increased appetite, restlessness, depressed mood, and insomnia (American Psychiatric Association, 2013). After cessation of nicotine, withdrawal symptoms can begin as soon as 90 minutes after the last dose, peak within a week, and last up to two to four weeks (Hughes, 2007). An unpleasant symptom from nicotine withdrawal leads to nicotine dependence as nicotine is taken to relieve or avoid withdrawal symptoms. In addition, environmental cues such as sights, sounds, or other sensations associated with nicotine can trigger the craving and induce the relapse of tobacco use which is termed cue-driven smoking urges or situational cravings.

Current Tobacco and Nicotine Dependence Treatment Methods

Many tobacco users want to quit. In 2018, 55.1% of adult smokers attempted quitting in the past 12 months, however, only 7.5% of them were successful (Creamer et al., 2019). Although many tobacco and nicotine dependence treatments are available, they have been underutilized. In 2015, 68% of adults wanted to quit but only 31.2% reported using counselling or medication when trying to quit (Babb et al., 2017). A CDC practice guideline recommended promoting health system changes and supporting State Quitlines to bridge the practice gap (National Center for Chronic Disease Prevention and Health Promotion, 2020). Health systems change targets to screen every patient for tobacco and nicotine use and offer help to quit at every visit. Screening for tobacco use should be like assessing vital signs. Health system change aims to make automatic tobacco screening and treatment rather than having providers remember. CDC

recommends a) educating healthcare leaders, providers, and staff on tobacco cessation, b) integrating screening and treatment into the workflow, c) creating alerts in Electronic Health Record (EHR) or medical chart stickers, making cessation treatment and result as quality improvement initiatives, d) reimbursing providers for tobacco treatment. Supporting quitline helps to provide cost effective health plans. The EHR can also be utilized in referring patients to Quitlines. Currently, hospitals in North Dakota can utilize their EHRs and EPIC e-Referral system for referring patients to the NDQuits (K. Backer, personal communication, October 10, 2022).

Behavioral Interventions and Supports for Tobacco and Nicotine Treatment

Behavioral interventions assist smokers in avoiding triggers and cravings thereby preventing relapse while attempting to quit smoking (USDHHS, 2020). United States Preventative Services Task Force (USPSTF) (2021) recommends that clinicians ask all adults about tobacco use, advise them to stop using tobacco, and provide behavioral counseling interventions and pharmacotherapy for cessation. The USPSTF noted high certainty evidence that behavioral interventions for tobacco cessation in adults were effective as a single therapy and combined with pharmacotherapy. USPSTF (2021) also noted that combined use of behavioral and pharmacotherapy interventions has shown to increase tobacco cessation rates compared with either usual care/brief cessation interventions alone or pharmacotherapy alone.

A systemic review and meta-analysis of 3 Cochrane reviews (n = 250,563) provided high-certainty evidence that the behavioral intervention smoking cessation increases the quit rates at six months or longer (Hartmann-Boyce et al., 2021). Therefore, integration of behavioral interventions along with pharmacotherapy into primary care is fundamental in providing effective tobacco-dependence care.

Behavioral therapy for smoking cessation can be delivered through different modalities. Behavioral interventions that increase the likelihood of quitting include advice from a physician and nurse, face-to-face counseling (individual/group), and advice from telephone or quitlines (USPSTF, 2021). A Cochrane review of 17 trials found significant increase in the rate of quitting (relative risk 1.66, 95% confidence interval (CI) 1.42 -1.94) with brief advice from the physician as compared to no advice (Stead et al., 2013). In this study, brief advice of less than 20 minutes with at least one follow up visit was provided to the participants.

A systemic review of 44 trials (n = 20,000) determining the effectiveness of nursing-delivered smoking cessation interventions in adults compared to no intervention found moderate certainty evidence that the behavioral support provided by the nurses increases the likelihood of quitting at 6 months or longer as compared to those who received usual care (Rice et al, 2017). Therefore, providers, including physicians, nurse practitioners, and nurses should provide behavioral support/counseling while assisting patients in quitting smoking.

Face-to-face Counseling. Face-to-face counseling has traditionally been a gold standard technique for behavioral intervention (USDHHS, 2020). Lancaster and Stead (2017) reported high-quality evidence that found individual counselling to be more effective than no advice. Individual counselling of at least 10 minutes increased the chance of quitting by 40% to 80% compared to brief or no advice.

A systemic review of 66 trials that examined the effect of group therapy on smoking cessation showed quit rates increased by 50% - 130% by group therapy compared to self-help programs (Stead et al., 2017). Additionally, there was no significant difference in smoking cessation between individual and group therapy. Therefore, face-to-face counseling, either

individual or group, should be utilized based on cost, patient preferences, and other barriers (e.g., time, schedule, and transportation).

Motivational Interviewing. Motivational interviewing is a patient-centered counselling approach, designed to enhance a patient's motivation and commitment to change (CDC, 2022e). In motivational interviews, clinicians are not assertive and do not advise patients on why and how they should change their behaviors. Clinicians help patients to explore reasons why they want to quit and resolve ambivalence about the change. Clinicians are non-confronting, listen reflectively, and help patients to develop plans of action for achieving the set goals. The USDHHS (2020) noted motivational interview as an evidence-based approach in helping people to quit when delivered by trained clinicians or counsellors.

Quitline. Quitlines are free and confidential telephone-based tobacco cessation resources, available in every state of United States (CDC, 2022h). Quitlines are operated by cessation specialists who typically offer cessation resources and mail self-help materials. Quitlines also provide web-assisted tobacco interventions and text messaging to all U.S. residents. Individuals without access to health care services can easily utilize quitlines. Quitlines can be accessed by calling 1-800-QUIT-NOW. Other Quitting and web-based programs available are: (a) "This is Quitting" where teens and young adults can join by texting "DITCHVAPE" to 88709 (Truth Initiative, n.d.). Parents of young adults who vapes can also text "QUIT" to 202 - 899- 7550 to receive text messages designed for parents of vapers (Truth Initiative, n.d.).

A Cochrane systematic review of 104 trials (n = 111,653) found moderate certainty evidence that telephone counseling increases the chance of quitting smoking despite of smoker's willingness to quit (Matkin et al., 2019). The quit rates were 1.38 times higher among smokers who contacted quitlines and received proactive counseling as compared to those who received

self-help material and brief counseling. In addition, the cessation rates were 1.35 times higher among those who did not call a quitline but received telephone counseling than those who did not receive telephone counselling. Since quitlines are cost effective and evidence-based, primary care providers, without tobacco cessation counseling education and when treatment is not available within their organization, should refer or connect patients to the quitlines services to aid smoking cessation.

NDQuits. North Dakota's quitline is a cessation resource that provides free assistance via phone and web-based programs (NDDHHS, 2021a). NDQuits counselors are live 7 a.m. to 9 p.m., Monday through Friday except during major holidays. North Dakota quitline's vendor is National Jewish Health from Colorado and takes the first intake call before the participants are scheduled with the NDQuits coach. NDQuits can also be accessed by calling 1 -800 - QUIT-NOW. In 2021, NDQuits invested $8.85 per smoker as compared to the national average of $2.28 (Truth Initiative, 2022). In 2021, approximately 1,976 patients were enrolled in NDQuits and seven months after enrolling in the program, 32.8% of the participants quit tobacco use, which is above the national quitline goal of 30% (NDDHHS, 2023a).

NDQuits provides eight weeks of NRT twice a year to uninsured or underinsured (having insurance but NRT is not covered) to North Dakota residents (K. Backer, personal communication, October 10, 2022). NRT includes nicotine patches, nicotine gum, and nicotine lozenges. NDQuits also provides counseling through tobacco treatment specialists. In addition to the phone and web-based assistance, NDQuits offers three special programs based on priority populations. For youth, "My Life My Quit" is an online, e-chat, and texting program where an individual can call 1- 855 - 891- 9989 or text "Start My Quit" to 36072. Pregnant woman who calls for quitting receives $20 gift card and postpartum woman receives $30 gift card. NDQuits

also provides 10 coaching calls and culturally tailored educational material to American Indian under American Indian Commercial Tobacco Program. To qualify for NDQuits service, one should have set a quit date within two to four weeks of enrollment. Primary care providers in North Dakota can refer tobacco users to NDQuits through Electronic Health Records (EHRs), online NDQuits Referral, and NDQuits fax referral system. In April 2022, Tobacco Free North Dakota launched a brand-new text-to-quit service called "This is Quitting" for youth aged 13 - 24 who use vape products. North Dakota is the 11th state in the nation to utilize "This is Quitting" quit service. "This is Quitting" is anonymous and easy to use where individuals can get started by texting VAPEFREEND to 88709 (Tobacco Free North Dakota, 2022).

Pharmacotherapy

First-line medications approved by FDA are safe and effective in aiding tobacco cessation (USDHHS, 2020). USPSTF (2021) recommends combined behavioral interventions with pharmacotherapy for successful cessation. The first line pharmacotherapy treatments for smoking cessation are NRT - patches, gum, lozenge, nasal spray, oral inhaler, and non-nicotine oral medications - Bupropion and Varenicline.

Nicotine Replacement Therapy. Nicotine replacement therapy is a nicotine-based medication that includes patches, gums, lozenges, nasal sprays, and oral inhalers (USPSTF, 2021). NRT delivers nicotine, reducing the urge to smoke and withdrawal symptoms while quitting smoking (USDHHS, 2020). Nicotine patches are long-acting NRTs that deliver nicotine steadily while gum, nasal sprays, oral inhalers, and lozenges are short-acting NRTs that deliver nicotine to the brain more quickly than patches (Hartmann-Boyce et al., 2018).

A Cochrane systemic review of 136 trials (n = 64,640) determining the effectiveness and safety of any form of NRT for long-term smoking cessation compared to placebo or no NRT

treatment concluded that any form of NRT increases the rate of quitting by approximately 50% to 60% as compared to control group with placebo or no NRT treatment (Hartmann-Boyce et al., 2018). The study included participants smoking at least 15 cigarettes a day, motivated to quit, and cessation rates after at least 6 months of follow-up. As all five forms of NRT are similar in efficacy, any NRT can be considered based on patient preferences, availability, or cost.

In addition, a systemic review of 63 randomized controlled trials (n = 41,509) found high certainty evidence that the combination of the fast-acting NRT and long-acting patch would increase the chance of cessation rate by 15% to 36% as compared to the single form (Lindson et al., 2019). Therefore, combined NRT therapy (short-acting and long acting) should be considered to combat withdrawal symptoms and increase the chances of cessation.

Varenicline. Varenicline is one of the FDA-approved prescription medications marketed as Chantix for tobacco dependence treatment (FDA, 2016). Varenicline partially binds with the alpha-4-beta-2 nicotinic receptors in the brain and diminishes the dopamine reward system associated with nicotine addiction (Singh & Saadabadi, 2022). Thus, varenicline makes smoking less rewarding and decreases cravings and withdrawal that occurs during tobacco cessation attempts. Anthenelli et al. (2016) conducted the largest clinical trials to Evaluate Adverse Events in a Global Smoking Cessation Study (EAGLES) on varenicline, bupropion, and nicotine patch. In the study, 8144 participants were randomly recruited with 4116 to psychiatric cohort and 4028 to non-psychiatric cohort. The rate of abstinence at 6 months follow up was 25.5% for varenicline, 18.8% for bupropion, 18.5% for nicotine patch and 10.5% for placebo among non-psychiatric patients. In psychiatric cohort, abstinence rate was 18.3% for varenicline, 13.7% for bupropion, 13.0% for nicotine patch, and 8.3% for placebo. Thus, varenicline is more effective than placebo, nicotine patch, and bupropion in assisting smokers with quitting. The EAGLES

study also showed no increase in neuropsychiatric events among patients taking varenicline after which FDA removed the boxed warning requirement for varenicline (US FDA, 2018).

Varenicline is prescribed to patients who are 18 years or older. Treatment starts one week before the target quit date with a starting dose of 0.5 mg/day and increases to 0.5 mg twice/day on day 4 and on day 7 to 1 mg twice daily (Singh & Saadabadi, 2022). The most common side effects of varenicline are nausea, insomnia, abnormal vivid dreams, and headaches (Singh & Saadabadi, 2022).

Bupropion. Sustained release bupropion is an FDA-approved approved medication for smoking cessation. Bupropion is a norepinephrine-dopamine reuptake inhibitor and is thought to act on nicotinic receptors (Huecker et al., 2022). Bupropion increases the production of dopamine which is reduced with nicotine withdrawal. Thus, bupropion aids in smoking cessation by blocking the effects of nicotine and alleviating withdrawal symptoms.

A systemic review of 115 randomized controlled trials to assessing the efficacy, safety, and tolerability of antidepressants medication bupropion in long term smoking cessation concluded that bupropion monotherapy increased the quit rate by approximately 52% to 77% than placebo or no treatment (Howes et al., 2020). Bupropion was as effective as NRT, however, varenicline had 27% to 56% higher chances of quit rate than bupropion. Similarly, combining bupropion with NRT did not improve the cessation rates as compared to using NRT alone. Thus, bupropion does is a good option for individuals who want to quit but do not prefer NRT.

Bupropion is started one week before the quit date with a 150 mg/day dose. If the initial dose is tolerated, it is increased on day 4 to 300 mg/day otherwise, 150 mg/day is also effective (USDHHS, 2020). The recommended treatment is at least 12 weeks and can be used up to a year if needed (Lexicomp, n.d). In 2016, after reviewing the clinical trials, the FDA removed the box

warning of neuro psychiatric side effects from bupropion (US FDA, 2018). Bupropion is contraindicated in patients with seizure disorder as it can reduce seizure threshold.

Behavioral Interventions with Pharmacotherapy

As previously discussed, USPSTF (2021) noted that combined use of behavioral and pharmacotherapy interventions has shown to increase tobacco cessation rates compared with either usual care/brief cessation interventions alone or pharmacotherapy alone. A Cochrane systematic review of 83 studies (n= 29,536) found high-certainty evidence that providing behavioral support in person or via telephone for the patient using pharmacotherapy significantly increased the quit rates (Hartmann-Boyce et al., 2019). In addition, the study found that increasing the amount of behavioral support to the patient who are being treated with pharmacotherapy increases the quitting success rate by about 10% to 20%. Therefore, clinicians should always consider combining behavioral interventions and pharmacotherapy to help successfully quit tobacco.

Alternate Cessation Methods

Alternative cessation interventions include but are not limited to, e-cigarettes, hypnotherapy, cold turkey, acupressure, and acupuncture (USDHHS, 2020). Alternative tobacco cessation is not FDA-approved; therefore, all the alternate methods will not be discussed in this paper except e-cigarettes because e-cigarettes are becoming popular among youth, younger adults and adult populations.

E-Cigarettes. E-cigarettes are commonly used as an alternative to smoking cessation among adult smokers. 84% of ENDS users who called NDQuits reported using ENDS as a quit aid (NDDHHS, 2021a). However, e-cigarettes are not an FDA-approved cessation method (USDHHS, 2020). Hartmann-Boyce et al. (2021) conducted a systemic review of 61 studies (n =

16,759) to examine the effectiveness, tolerability, and safety of using e-cigarettes in helping people achieve long-term smoking cessation. The study found moderate-certainty evidence that the quit rates were higher among the smokers using nicotine e-cigarettes than those who were using NRT or nicotine free e-cigarettes for at least six months. Therefore, there is a controversy about whether e-cigarettes may be a safer alternative to combustible cigarettes, but more evidence is needed for the safety and efficacy of e-cigarettes. ENDS additives, flavors, and metal non-particles add additional negative effects to the respiratory system leading to airway infections, asthma, chronic pulmonary disease, and lung cancer (Bravo-Gutiérrez et al., 2021). E-cigarettes contain substantial levels of nicotine causing increased dependence and leads to cigarette smoking initiation among adolescents (O'Brien et al., 2021). Long-term safety profile for ENDS is not established, therefore, USPSTF (2021) does not recommend the use of e-cigarettes for tobacco cessation, including for pregnant women.

5A's Brief Intervention

The USDHHS (2020) identifies the 5A's model as a gold standard intervention in assisting the tobacco cessation rate. The 5A's model was first adopted as a clinical practice guideline for treating tobacco use and dependence in 2008 by U.S. Public Health Service (USPHS) (Fiore et al., 2008). USPSTF (2021) recommends all clinicians deliver 5A's intervention to all adult smokers. The 5A's model guides providers in identifying appropriate interventions based on the patient's tobacco use status and willingness to quit (Fiore et al., 2008). The strategies used in 5A's model are designed to be brief requiring 3 minutes or less (Fiore et al., 2008).

The 5A's model consists of five major steps facilitating tobacco cessation in primary care settings (USPSTF, 2021). The five steps in 5A's model includes Ask, Advise, Assess, Assist and

Arrange. A systemic review of 81 randomized controlled trials (n = 112,159) assessing the effectiveness of strategies that increase smoking abstinence rate in primary care settings found moderate-certainty evidence that adjunctive counseling provided by allied health care professionals increased smoking cessation rate in primary care (Lindson et al., 2021). The adjunctive counseling provided by all the health care professionals included 5A's approach. Thus, incorporating the 5A's approach by healthcare professionals is effective in tailoring individualized cessation plan. However, in real practice, clinicians do not consistently utilize 5A's approach and address tobacco dependence (Siddiqi et al., 2022).

Barriers to 5A's Approach

Despite robust evidence on the effectiveness of 5A's approach, providers do not consistently address tobacco use with full 5A's approaches (Martinez et al., 2017). The cross-sectional study conducted by Martinez et al. (2017) showed a higher level of performance in ask, advice, and assess, but lower in assist and arrange. Low level of preparedness, knowledge, and confidence in assisting patient with smoking, lack of previous positive experiences helping to quit, perceived lack of time, perceived importance of competing diagnosis, and lack of organizational support were identified as a barrier to consistently implementing brief cessation intervention (Martinez et al., 2017; Siddiqi et al., 2022). To overcome identified barriers of time constraints, certain steps of 5A's approach can be delegated to allied health care providers besides the primary providers (USDHHS, 2020). In addition, tobacco cessation education and training among healthcare professionals will increase their confidence, knowledge, and comfort in providing interventions for tobacco cessation (Coovadia et al., 2020).

Moreover, systems change within organizations helps health care professionals embrace the changes and is extremely important. CDC's Tobacco Control Best Practices Guide 2020

recommends various health system change strategies to facilitate tobacco treatment including identification and documentation of tobacco use at every visit, incorporating treatment model into clinical workflow, creating EHR alerts or chart stickers that remind providers to talk about quitting, create referral system to state quitline or tobacco treatment specialist, develop a process of follow up system with a patient who received tobacco treatment, create a system to regularly track the progress and share data with leaders and staff, integrate cessation into chronic disease management protocols, develop reimbursement coding and billing practices for providers, develop tobacco use registry in EHR to follow up with patients who reported tobacco use, and integrate cessation treatment into existing quality improvement, accreditation, and performance efforts (National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2020). Other entities and documents provide support and enhance these recommendations (USDHHS, 2020 & Tobacco Control Network [TCN], 2022).

Alternate to 5A's Approach

As few providers are assisting quit attempts with all five components of 5A's method, an alternate method to 5A's has been established (USDHHS, 2020). The 5A's approach has been streamlined into three steps including AAR (Ask, Advise, and Refer) and AAC (Ask, Advise, and Connect). Both AAR and AAC approaches assist clinicians in guiding conversations with the patient toward tobacco cessation. AAR approach guides providers to *Ask* patients about tobacco use, *Advise* patients to quit, and *Refer* interested patients to other cessation resources, such as quitline, to complete other steps of cessation. AAC approach guides clinicians to *Ask* patient about tobacco use, *Advise* to quit, and *Connect* directly to the quitlines using electronic referral.

NDQuits AAR/C

NDQuits has adopted the AAR/C method and uses an AAR/C algorithm that provides guidance to clinicians in each step (K. Backer, personal communication, April 6, 2023). The NDQuits AAR/C algorithm was created by Kara A. Backer, Nicotine Dependence Treatment Coordinator of the NDDHHS Tobacco Prevention and Control Program. The AAR/C algorithm in NDQuits is heavily drawn from the recommendation provided by USPSTF (2021) and Treating Tobacco Use and Dependence: 2008 Clinical Practice Guideline (K.Backer, personal communication, March 8, 2023). After the first two steps of AAR/C, clinicians can *Refer/Connect* interested patients to the cessation resources through online NDQuits Referral, NDQuits fax referral, or EPIC E- Referral/Electronic Health Records (EHRs) (K. Backer, personal communication, October 10, 2022). The revised AAR/C algorithm is provided in Appendix B with permission to use from Kara A. Backer Appendix C.

Practice Gap and Provider Role

About 70% of tobacco users visit primary care clinics annually and even brief advice from clinicians can improve cessation rates (USDHHS, 2020). However, four out of nine adult smokers who visited healthcare providers did not receive any advice or counseling on quitting smoking (USDHHS, 2020). In addition, only one-third to one-half of the children and adolescents were assessed on tobacco use and only one-fourth of them were advised to quit. Among North Dakota Medicaid patients, about 75.2% were being advised to quit, which is equal to or exceeds the national average but does not meet the 75^{Th} percentile in 2020 (NDDHHS, 2023a, p. 45). However, discussing cessation medication and strategies with tobacco users is 51.8% and 50.0% respectively, which is at lower benchmarks than the national average. In addition, according to the 2022 ND Adult Tobacco Survey, 57% of the patient were not advised

by their healthcare providers to quit tobacco, an increase from 49% in 2019 (K. Backer, personal communication, May 18, 2023). Moreover, out of 87 behavioral health facilities in North Dakota, 67% did not offer cessation medications in 2020 (NDDHHS, 2023a, p. 46).

As previously discussed, screening and identifying every patient for tobacco use and offering help to quit at every visit is crucial (USPSTF, 2021). Evidence has also shown the proven benefits of counseling and pharmacotherapy in assisting long-term success with quitting compared to no intervention (USDHHS, 2020). When assessing patients for tobacco use, providers should be aware that patients may not be completely honest about their smoking habits because of the fear of being discriminated against and judged (Hymen et al., 2020). Therefore, providers should be non-judgmental and compassionate when assessing/identifying every patient, every time, for tobacco use, creating safe space for open communication and honest disclosure.

Various Provider Settings and Cessation Impacts

Healthcare providers are critical resources to connect tobacco users to cessation medication and counseling. Providers from every discipline play a vital role in helping patients quit tobacco use (CDC, 2021d). Screening for tobacco use should be like assessing vital signs. Numerous professional organizations including American Academy of Family Physicians, American College of Obstetricians and Gynecology, and American College of Physician recommend screening tobacco use and providing tobacco cessation interventions (USPSTF, 2021). In addition, the TCN (2022) Policy Workgroup also recommends (a) integrating tobacco screening and treatment into routine care in all care settings, including behavioral health settings and (b) increasing the accessibility and availability of tobacco cessation treatment to the patient. Therefore, healthcare professionals from all specialties, across disciplines and care settings are

equally important in addressing the tobacco epidemic by ensuring all tobacco users have access to evidence-based tobacco treatment interventions. Healthcare providers in any setting including cardiology, oncology, pulmonology, and maternal and infant care should proactively assess patients for tobacco use and provide tobacco treatment interventions (CDC, 2021d).

Benefit to Healthcare System or Clinic

The Affordable Care Act (ACA) required private health plans, including all health plans sold under federal or state exchanges, to cover all the costs of clinical preventative care that is listed as "A" or "B" under USPSTF (CDC, 2020). As both tobacco cessation medications and counseling meet ACA criteria, these services are covered by insurance. Medicaid and Medicare also provide comprehensive tobacco cessation benefits offering free coverage to treatments. Reimbursement for tobacco treatment can be seen as a barrier by the providers, therefore, the provider should be educated about the appropriate use of the codes to be fully compensated. Counseling can be delivered and billed as an individual service. Joint Commission hospital and CMS quality measures include tobacco use screening and intervention as a quality measure in the Quality Payment Program information (National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2020). Therefore, discussing how treating tobacco use can help meet other goals, such as reimbursement through the CMS Quality Payment Program, can help build support among providers.

Billing and Current Procedural Terminology (CPT) code. Preventative counseling CPT depends on the length of the appointment (Treating Tobacco Use and Dependence, 2008). CPT code 99407 is used for intensive counseling that lasts greater than 10 minutes and CPT code 99406 is used for brief counseling lasting between 3 - 10 minutes. The billing must include a diagnostic code of nicotine dependence, F17.20, for reimbursement purposes. The preventative

counseling codes, 99406 and 99407, can be billed along with an evaluation and management (E/M) code such as 99213 and 99214.

Provider Education

Tobacco cessation education and training among healthcare professionals increase their confidence, knowledge, and comfort in providing interventions for tobacco cessation (Coovadia et al., 2020). Dr. Jillian Doan, former NDSU DNP student, conducted a practice improvement project incorporating a tobacco cessation curriculum in a DNP program in 2022 (Doan, 2023). An increase in comfort and confidence among DNP students' ability to provide information on cessation medication, and program services and referrals was found after the implementation of educational intervention. Approximately 90% of the participants responded either being somewhat or very comfortable and confident after educational intervention as compared to 25% - 40% pre-educational intervention.

Doan (2023) provided recommendations for educational institutions and for future research. For an educational institution, Doan (2023) recommended including formal tobacco cessation counseling education into the curriculum of all future primary care providers that includes pharmacological and behavioral interventions, interactive patient scenarios, local tobacco cessation resources, and coding and billing for tobacco treatment.

NDQuits QuitLogix. Education National Jewish Health

NDQuits offers free online, on-demand modules on tobacco cessation for the healthcare providers via QuitLogix (NDQUITS, 2023). NDQuits QuitLogix education was created in collaboration between the North Dakota Tobacco Prevention and Control Program (TPCP) and ND quitline vendor, National Jewish Health. Each module in NDQuits QuitLogix is accredited by National Jewish Health. This program provides resources to providers in North Dakota to

deliver approved cessation treatment by accessing Medicaid, NDQuitlines, and evidence-based treatment approach. NDQuits QuitLogix includes evidence-based pharmacotherapy guidelines and behavioral interventions. NDQuits QuitLogix can be taken by healthcare providers, pharmacists, social workers, or anyone who is serving patients to quit tobacco. There are no pre-requisites and no fee to participate in the activity and receive the certificate.

Rx for Change

Rx for Change: Clinician-Assisted Tobacco is a comprehensive tobacco cessation training program designed by Purdue College of Pharmacy that provides information on tobacco use and evidence-based treatment strategies to assist patients with quitting (University of California Regents, n.d.). Rx for Change is heavily based on the USPHS Clinical Practice Guideline for Treating Tobacco Use and Dependence (University of California Regents, n.d.), therefore, focuses on the delivery of behavioral counseling interventions together with pharmacotherapy. Rx for Change has a module for specialties including primary care, cardiology, behavioral health, and respiratory care. In 2022, Dr. Jillian Doan, a DNP student incorporated Rx for Change - Behavioral Counseling and Pharmacology module into NDSU DNP program as a dissertation project in NURS 810 class (Doan, 2023).

Million Hearts

A Million Hearts initiative was launched by the USDHHS co-led by CDC and CMS to reduce the burden of heart attacks and stroke (CDC, 2016). As smoking is one of the causes of heart attacks and stroke, CDC developed the Million Hearts action guide. The Million Hearts Action guide provides evidence-based strategies to identify tobacco use and intervention to help quitting. Million Hearts is also heavily based on USPHS- Clinical Practice Guidelines Treating Tobacco Use and Dependence (2008, CDC, 2016). The Million Hearts Action guide provides

resources on improving tobacco cessation delivery system design, evidence–based tobacco cessation brief interventions, and patient resources.

Others

Many other clinical education and training resources that provide evidence-based information are available to help patients quit (CDC, 2021a). CDC (2021a) provides link to the following training resources for clinicians to help patient quit tobacco:

- Videos for Clinicians (UW Center for Tobacco Research and Intervention, n.d): Medscape Video
- A Brief Intervention to Help Patients Quit Smoking (McAfee, T. 2013): Medscape Video
- Smoking and HIV: A Risky Combination (Brooks, 2014)
- About Freedom from Smoking (American Lung Association, 2023a) offers a structured and systematic approach to quitting with evidence-based approaches.

CHAPTER 3: METHODS

Overall Project Design

The design of this evidence-based practice improvement project was a quasi-experimental, quantitative, educational intervention with pre- and post-education questionnaires. This project educated NDSU FNP/ DNP students who will be future providers on effective and evidence-based tobacco and nicotine dependence counseling and treatment. The purposes and objectives of this project are included in chapter one.

Implementation Plan

Evidence-Based Practice Model and Logic Model

The evidence-based model guiding my project was the Iowa model revised: evidence-based practice to promote excellence in health care (Iowa Model Collaborative, 2017). The Iowa model is a framework that provides a systematic approach to the implementation of evidence-based practice in healthcare. I chose this model because it guides clinicians in the application of evidence-based findings into real practice through the step-by-step process. These steps include identifying a triggering issue/opportunity, stating the purpose, forming a team, synthesizing a body of evidence, designing the practice change, integrating/sustaining the practice change, and disseminating results. The Iowa model also provides an opportunity to reevaluate the approach with feedback questions on each activity. See Appendix D and E for a visual representation of the Iowa model and approval to use the Iowa Model from The University of Iowa Hospitals and Clinics.

The initial step of the Iowa Model is to identify issues or opportunities for an organization (Iowa Model Collaboration, 2017). The triggering issue identified in this project is the lack of confidence and education among the providers as to why they were not providing

evidence-based treatment for tobacco cessation (Meijer et al., 2019). In 2018, 55.1% of adult smokers attempted quitting in the past 12 months, however, only 7.5% of them were successful (Creamer et al., 2019). In addition, four out of nine adult smokers who visited healthcare providers did not receive any advice or counseling on quitting smoking (US, 2020). Coovidia et al. (2020) found that tobacco cessation education and training among healthcare professionals increases their confidence, knowledge, and comfort in providing interventions for tobacco cessation. The NDSU FNP/DNP program prepares future nurse practitioners to provide evidence-based treatment. Former NDSU DNP student, Dr. Jillian Doan, implemented formal tobacco cessation education as a dissertation project in 2022 for the first time and found significant improvement in motivation and confidence among DNP students in helping people quit tobacco and comfort by providing evidence-based treatments (Doan, 2023). Per Dr. Doan's recommendation for educational institutions, it was decided that a revised curriculum should be implemented and evaluated. The co-investigator identified the new education module, NDQuits QuitLogix, with the guidance of Dr. Kelly Buettner Schmidt. Dr. Mykell Barnacle, who teaches the course, agreed to replace Rx for Change modules with the new evidence-based educational module provided by NDDHHS, NDQuits QuitLogix, into the FNP/DNP coursework. Dr. Doan also recommended including a comprehensive and stronger emphasis on ENDS use. NDQuits QuitLogix provides a separate module covering detailed information on ENDS.

The second step is to state the question or purpose of the project (Iowa Model Collaboration, 2017). The purpose of this project was to (a) increase education among FNP/DNP students on tobacco and nicotine dependence treatment by implementing a modified tobacco and nicotine dependence education curriculum into NDSU's FNP/DNP program by October 2023, as measured by post-education questionnaire and student's submission of a certificate of completion

of each model from NDQuits QuitLogix and b) improve student's motivation, confidence, and comfort in counseling patients to quit tobacco and nicotine use through completion of a tobacco and nicotine dependence treatment education curriculum, as measured by pre-and two months post-education questionnaires.

The next step in the Iowa Model is to determine if the topic is a priority for the organization (Iowa Model Collaboration, 2017). The co-investigator discussed with the dissertation chair of the project, Dr. Kelly Buettner-Schmidt, the importance of reviewing and modifying the current tobacco and nicotine dependence treatment curriculum based on new evidence and the previous project's recommendation after implementation of the tobacco cessation course in NDSU DNP program. Dr. Buettner-Schmidt agreed upon the need to update/modify the curriculum. Dr. Mykell Barnacle, NDSU DNP Associate Professor of Practice, also expressed enthusiasm for modifying/updating the tobacco and nicotine dependence treatment education curriculum into NDSU FNP/ DNP program with evidence-based findings. In 2022, the first tobacco cessation curriculum was implemented in Dr. Barnacle's class NURS 810 Health Promotion and Disease Prevention. Dr. Barnacle has agreed to keep tobacco and nicotine dependence treatment education curriculum in NURS 810 Health Promotion class.

After NDSU DNP program faculty deemed that modifying tobacco and nicotine dependence treatment curriculum was a priority, a team of stakeholders was formed to help develop, evaluate, and implement the practice change. The project team, who also were the dissertation committee, includes:

1. The co-investigator who is a NDSU DNP student- Kanchan Bhattarai, BSN, RN

2. The dissertation committee chair, and primary investigator, who is a NDSU professor of nursing with an extensive background in tobacco prevention and control research - Kelly Buettner-Schmidt, PhD, RN, FAAN.
3. An NDSU associate professor of practice in nursing - Dr. Mykell Barnacle, DNP, FNP-BC
4. An NDSU assistant professor of practice in nursing - Dr. Allison Peltier, DNP, APRN, FNP-C
5. An NDSU associate professor in NDSU's communications department with expertise in tobacco prevention - Dr. Elizabeth Crisp Crawford, PhD

The co-investigator also worked closely with nicotine dependence and treatment coordinator at NDHHS, Kara A. Backer, who arranged funding for the co-investigator to attend tobacco treatment specialist training by Mayo Clinic and continuously supported the co-investigator by providing updated information on tobacco prevention and control in North Dakota.

The next step in the Iowa Model is to assemble, appraise, and synthesize a body of evidence. The co-investigator conducted an extensive literature search using the Cochrane database of systematic reviews, PubMed, CINAHL, grey literature, and government documents. Inclusion and exclusion criteria with search strategy are discussed in chapter two and detailed in the PRISMA flow diagram.

The next step in the Iowa Model is to design and pilot the proposed change in practice (Iowa Model Collaborative, 2017). The co-investigator developed the project to modify tobacco and nicotine dependence treatment education into the NDSU FNP/DNP coursework with guidance from committee members. After the project proposal and the institutional review board

(IRB) approval, this co-investigator implemented modified tobacco cessation education into the NDSU FNP/ DNP coursework in September 2023 for the graduating class of 2026. The co-investigator provided an online module and in-person education on tobacco and nicotine dependence treatment and counseling. After implementing the tobacco and nicotine dependence treatment education, students submitted a certificate of completion for each module. In addition, pre- and post-education questionnaire data on motivation, confidence, and comfort were collected and the results were analyzed. Post-questionnaire assessment of the students' perceived increased knowledge and abilities to support patients in quitting was also collected. Optional open-ended questions, to allow students to expand on their answer choices from the Likert scale questions, were included in both the pre- and post-questionnaire.

The next step of Iowa Model is to integrate and sustain the practice change (Iowa Model Collaborative, 2017). Modified tobacco and nicotine dependence treatment education will be adopted in the NDSU FNP/ DNP program coursework. Continuous evaluation of the curriculum will be necessary in the future as well to identify the gap and stay up to date with new evidence-based guidelines.

Dissemination of the results is the last step of the Iowa Model (Iowa Model Collaborative, 2017). Dissemination of the results is important for professional learning and benefits other clinicians. The results were shared with the dissertation committee during the final defense. Poster presentation was done at NDSU in 2023 and the results will be published in the NDSU ProQuest dissertation and theses global. The NDDHHS was notified of the project's completion and informed how to access the dissertation through NDSU ProQuest dissertation and theses global. Publishing project in a peer-reviewed journal and presenting at a national tobacco conference will be considered.

Figure 1

Logic Model

NAME OF PROGRAM/PROJECT:
A Practice Improvement Project Improving Tobacco and Nicotine Dependence Treatment Education into a Family Nurse Practitioner (FNP)/ Doctor of Nursing Practice Program

OBJECTIVES:
Increase knowledge on tobacco and nicotine dependence treatment among FNP/DNP students by implementing a modified tobacco and nicotine dependence treatment education curriculum into NDSU's FNP/DNP curriculum by October 2023. Improve students' motivation, confidence, and comfort in counseling patients to quit tobacco and nicotine through the completion of a tobacco and nicotine dependence treatment education curriculum, as measured by pre- and 2 months post-education questionnaires.

INPUTS	OUTPUTS		OUTCOMES		
	Activities	Outputs	Short-term	Medium-term	Long-term
-Participating DNP Students enrolled in NURS810 course -Tobacco and nicotine dependence treatment education modules -ND specific tobacco treatment resources -Dissertation Committee -NDSU DNP Student -Nicotine Dependence and Treatment Specialist at NDDHHS -NURS 810 course faculty -NDSU Statistician	-Develop and implement an evidenced-based tobacco and nicotine dependence treatment and counseling education to NDSU's FNP/DNP students -Assessment of student's knowledge, motivation, confidence, and comfort on tobacco and nicotine dependence treatment pre- and post-education intervention. -Report findings -Disseminate Project	-NDSU DNP students completing the tobacco and nicotine dependence treatment education modules -Assessment completed -Data analysis conducted -Findings reported	100% of the cohort completes the tobacco and nicotine dependence treatment education	-Increase in students' knowledge of tobacco and nicotine dependence treatment 2 months post-education. -Improve student motivation, confidence, and comfort in their ability to provide tobacco and nicotine dependence treatment 2 months post-education	-The tobacco and nicotine dependence treatment education is embedded into future NDSU DNP coursework -Increased rate of utilizing evidence-based tobacco and nicotine dependence treatment, increased rates of quit attempts, and increased rates of successful tobacco and nicotine use treatment among patients taken care of by NDSU DNP graduates. -Decreased morbidity and mortality from tobacco and nicotine product use and exposure

Settings

This practice improvement project was conducted in NDSU FNP/DNP program. NDSU offers FNP/DNP program in two locations - Fargo and Bismarck, N.D. The NDSU FNP/DNP program prepares students for eligibility for certification as a family nurse practitioner. The NDSU FNP/DNP program is accredited by the commission on collegiate nursing education (North Dakota State University, n.d.). The NDSU's FNP/DNP program accepts 18 - 20 students annually after the completion of the application and interview process. The NDSU's FNP/DNP program provides on-campus learning opportunities with direct interaction with faculty. In 2022, the tobacco cessation curriculum was first implemented by one of the FNP/DNP students as a dissertation project (Doan, 2023) in NURS 810 health promotion and disease prevention class. As per the recommendation provided by Dr. Doan, tobacco cessation curriculum was revised/modified, implemented, and adapted in NURS 810 class in September 2023.

Sample

The purposive sample population included an entire cohort or class of first year NDSU FNP/DNP students who will graduate in May of 2026. The targeted FNP/DNP students participating in the project were in their first out of eight semesters of the NDSU FNP/DNP program. All the students are bachelor prepared nurses with current unencumbered license as Registered Nurses. The sample size was 19 students. All the students in the first semester of NDSU FNP/DNP program were invited to participate without any exclusion criteria.

Recruitment

Tobacco and nicotine dependence treatment education is a mandatory coursework of the NDSU FNP/DNP program in NURS 810 class, therefore, recruitment of the NDSU FNP/DNP students occurred through their NURS 810 class. The co-investigator attended the class two

weeks before the project began and recruited students by verbally explaining it. At this time, the co-investigator also verbally recruited students to voluntarily complete the pre-education questionnaire. See Appendix F for the oral script. The questionnaires, including a Qualtrics link, were distributed via the student's school email address (Appendix G for the e-mail) on the recruitment day just before the co-investigator attended the class. The questionnaire also collected demographic data from the participants including years of nursing experience, any form of tobacco or nicotine use in the last year, and previous tobacco and nicotine dependence treatment training. All students presented in the class were given five to eight minutes to complete the pre-education questionnaire to ensure they have time to complete it before the education. Since tobacco and nicotine dependence treatment education is mandatory in the NURS 810 class, all the students' received points upon completion of the NDQuits QuitLogix modules. The students' required coursework in tobacco and nicotine dependence treatment education did not include completion of the pre- and post-education questionnaire. The pre-and post-education questionnaire was optional and was not associated with a grade.

The co-investigator also attended the students' course two months after the education to recruit voluntary participation in the post-education questionnaire. The questionnaire, that included a Qualtrics link, was again distributed via the students' school email address on the same day just prior to the co-investigator attending the course. Similar to the pre-education questionnaire, all students in the course were allowed five to eight minutes in class to complete the questionnaire.

The co-investigators' contact information was provided to the students via Blackboard and email for any queries. There was no compensation to the students. However, students were eligible to claim contact hours for continuing education upon completion of the modules without

any costs from National Jewish Health. The accrued contact hours may be beneficial for participants, who are registered nurses, while renewing their nursing license.

Ethical Considerations

Prior to implementation of this project, NDSU IRB approval was obtained (Appendix H). Pre- and post-questionnaires were voluntary while participants were required to complete the online education modules, as it is mandatory coursework. Participants were able to choose to not participate in pre-and post-questionnaire or withdraw without any consequence. The participant's choice to complete or not complete the questionnaire was anonymous and was not made known to the co-investigator or course faculty. On the recruitment day, two weeks prior to in-class education, the co-investigator explained to the students that completion of pre- and post-questionnaire implies consent to participate in the study and that participation is voluntary and anonymous. See Appendix I for consent. Students were provided with five to eight minutes in their course to complete the questionnaire. Since students typically use their laptops during class time, other students, including the co-investigator, and faculty did not know who is or is not completing pre- and post-questionnaire. Even if students chose to not participate in the survey, they were asked to remain seated in the classroom during survey time. Students who do not wish to participate could choose to work on their other coursework. The participants in this project were not part of a vulnerable population.

Educational Intervention

In this practice improvement project, previously incorporated online education Rx for Change was modified with evidence-based tobacco and nicotine dependence treatment through NDQuits QuitLogix (3 hours online video) along with about 60 - 90 minutes in-class session

presented by the co-investigator to first year NDSU DNP graduate students enrolled in NURS 810. NDQuits QuitLogix is a free, online educational program that consists of 8 modules:

1. North Dakota cessation program 101
2. Best practices for tobacco cessation using medication and behavior support
3. Special Quitline programs for tobacco cessation
4. Connecting the harms of tobacco use to chronic health conditions
5. Tobacco cessation for behavioral health populations
6. Vaping and e-cigarettes devices: what are they and how do they harm
7. Treating tobacco use and dependence during pregnancy
8. Conversations for screening, responding, and preventing vaping

Each module consists of an accreditation, learning module, and evaluation form. The accreditation provides information on the learning objectives, credit available, course description, accreditation, and time to complete. Once this section is reviewed and marked, the next session is the learning module. The learning module consists of a powerpoint video with activity and knowledge check questions throughout. Participants must view the activity, answer knowledge check questions and complete evaluation form to receive certificate of completion and credit hours. Permission to use NDQuits QuitLogix was obtained from the NDDHHS's tobacco prevention and control program and National Jewish Health (Appendix J).

Module 1

Module 1, North Dakota cessation programs 101, is 15 minutes in length with two knowledge check questions. The objectives of this module are to describe tobacco cessation benefits available through North Dakota Medicaid and understand how NDQuits can support patients to quit. Key concepts covered in Module 1 include: the epidemiology of tobacco, ND

tobacco use prevalence, health disparities in tobacco, tobacco cessation benefits, including counseling and medication coverage available through North Dakota Medicaid, how NDQuitlines support patients, Quitline special services, quitline enrollment, provider referral to quitline with the overview of AAR/C model, and quitline referral methods.

Module 2

Module 2, best practices for tobacco cessation using medication and behavioral support, is 30 minutes in length with an interactive AAR/C patient scenario. The key objectives of this module are to learn how to use brief tobacco intervention with all patients who use tobacco, ways to connect patients who are ready to quit to Quitline using e-referral, phone referral, fax referral, and web, and describe FDA-approved pharmacotherapy. This module consists of interactive patient simulation activity that allows participants to implement brief AAR/C interventions with patients who use tobacco. In simulation activity, there are series of questions on how patients should be approached using motivational interviewing technique and AAR/C model. This model also provides a link to frequently asked questions about brief tobacco intervention with the answers.

Module 3

Module 3, special quitline programs for tobacco cessation, is 15 minutes in length with examples of phone counselling interaction. The key objectives of this module are to describe how alternative and adapted Quitline programs can help patients who use tobacco and implement referrals to alternative and adapted Quitline programs. This education activity describes the evidence for online quitlines programs and how tobacco disparities for American Indians, pregnant and postpartum women, and youth can be addressed through adapted quitline programs. This module consists of examples of coaching interaction in American Indian commercial

tobacco program, pregnancy postpartum program, and my life my quit program (teens). There are no knowledge check questions in this module.

Module 4

Module 4, connecting the harms of tobacco use to chronic health conditions, is 15 minutes in length with interactive counseling response practice questions. The objectives of this module are to describe how tobacco use causes and worsens chronic health conditions and explain how tobacco cessation can benefit patients with tobacco-related conditions. This educational activity provides an overview of how tobacco use causes and worsens heart and vascular disease, respiratory diseases, and cancers, discusses 2014 surgeon general report briefly and provides information on how cessation can reduce the risk of developing diseases and benefits of cessation after diagnosis.

Module 5

Module 5, Tobacco Cessation for Behavioral Health Populations, is 15 minutes in length with four knowledge check questions and one case scenario (one question). The objectives of this module are to describe tobacco use disparities for patients with behavioral health conditions and explain how quitline can help patients with behavioral health conditions stop tobacco use. This education activity discusses the disparity of tobacco use for behavioral health conditions populations, the importance of tobacco cessation, myths about quitting, and how quitline can help behavioral health providers deliver tobacco treatment.

Module 6

Module 6, vaping and e-cigarette devices: What are they and how do they harm, is 15 minutes in length with two knowledge check questions. The objectives of this module are to describe e-cigarettes and nicotine vaping devices and identify the risks associated with electronic

cigarette use. This education activity provides an overview of types of ENDS, how they work, contents of e-liquid (including unlisted ingredients)/nicotine dose, and the known health impacts associated with vaping.

Module 7

Module 7, treating tobacco use and dependence during pregnancy, is 60 minutes in length. The objectives of this educational activity are the learner will be able to recognize the risks of tobacco use and benefits of cessation during pregnancy, identify best practices for the treatment of tobacco dependence during pregnancy, and describe a brief tobacco treatment intervention. This module will review clinical practice guidelines and best practices for treating tobacco during pregnancy and helps to guide the provider select appropriate brief tobacco cessation treatment interventions in clinical settings including the selection of FDA approved pharmacotherapy. This module provides 1.0 contact hours for the registered nurses.

Module 8

Module 8, conversations for screening, responding, and preventing vaping, is 15 minutes in length with case scenario questions (three questions). The objectives of this module are the learners will be able to take a vaping history for the patients who use e-cigarettes, apply the AAR/C model for tobacco treatment to e-cigarette use and vaping, and understand common recommendations about e-cigarettes from major health professional associations. This education activity introduces conducting a history of electronic cigarette use with framework for screening and preventing vaping, alternative terminology of ENDS, how to communicate with patients previously smoking who are using ENDS and expands an evidence-based tobacco treatment approach to address electronic cigarette use.

In-Class Presentation

All eight modules were completed by students prior to the co-investigator's in-class presentation during the scheduled class time. The class time was about 60 - 90 minutes; during which the co-investigator mostly focused on PowerPoint presentation reviewing the following topics briefly:

- Tobacco use and its prevalence
- Health effects of tobacco
- FDA-approved pharmacotherapy for tobacco treatment
- Motivational Interview

Class-presentation was primarily focused on practicing motivational interviews and solving patient case scenarios. Patient case scenarios in primary care clinics, obtained from National Jewish Health, Sanford Health, and Mayo Clinic, were presented for practice. Permission to use cases in-class presentation was obtained (See Appendix K , Appendix L, and Appendix M). The scenario was an interactive patient scenario requiring responses from the students on how they would address the patient, as recommended by Doan (2023). The co-investigator also briefly discussed local resources specific to North Dakota including NDQUITS and ND Medicaid benefits. Before beginning the class, the co-investigator provided students a toolkit adapted from Doan's (2023) toolkit with new updates from Rx for change (University of California Regents, n.d.). Permission to use the toolkit and handouts was obtained from both Rx for Change and Dr. Doan. The toolkit includes:

- 5 A's tobacco cessation counseling guide sheet
- Cognitive and behavioral strategies to cope with quitting
- Withdraw symptom information sheet

- Fagerstrom test for nicotine dependence
- NDQuits information
- Billing and coding for tobacco cessation in primary care
- Pharmacologic product guide
- Drug interactions with tobacco smoke
- Planning for Change: Thinking about Quitting

See Appendix N for the toolkit. See Appendix O and P for permission to use tool kits from Rx for Change (University of California Regents, n.d.) and Dr. Doan (2023) respectively. See Appendix Q for the in-class presentation slides.

Incorporation of Doan's Recommendations

Of Doan's (2023) recommendations (Appendix R) for educational institutions and future research, this project incorporated the following:

- Include formal tobacco cessation counseling education into the coursework of all future primary care providers with pharmacological interventions, behavioral interventions, interactive patient scenarios, local tobacco cessation resources, and coding and billing for tobacco treatment.
- Pair pre- and post- education data sets to enable determination of statistical significance and, thereby, effectiveness of the intervention.
- Include a comprehensive and stronger emphasis on ENDS use regarding cessation and harm reduction.
- Include information about new and emerging tobacco products.

- Potentially delete questions related to secondhand smoke exposure. Alternatively, the secondhand smoke questions could be measured separately from motivation and confidence in helping people quit tobacco use.

This project was not able, or it was not appropriate, to incorporate the following recommendations by Doan (2023):

- Examine the effect tobacco cessation education for primary care providers has on patient's tobacco cessation success
- Tobacco cessation treatment knowledge questions should be included in the course's final exam
- Evaluate participants confidence and comfort in prescribing tobacco cessation medications

Resources

Personnel

Personnel for this project were numerous. All personnel were identified in the Iowa Model including Dr. Kelly Buettner-Schmidt, Dr. Mykell Barnacle, who also taught the course NURS 810, Dr. Allison Peltier, and Dr. Elizabeth Crawford. The NDSU statistics department faculty, Dr. Megan Orr, and her research assistant, Nazia Riasat, assisted with data analysis. The outside tobacco expert included Ms. Kara Backer, tobacco cessation coordinator, NDDHHS tobacco prevention and control program. Ms. Backer holds a national certificate in tobacco treatment practice. Moreover, the participation of the NDSU DNP students, class of 2026, was important to evaluate the results of the project.

Technology

Development and dissemination of the online questionnaires were done through NDSU Qualtrics. The co-investigator used NDSU email to communicate with the students about the pre- and post-education questionnaire and to provide instructions on how to access NDQuits QuitLogix. Instructions on how to access NDQuits QuitLogix were posted on the Blackboard by the course instructor, Dr. Mykell Barnacle, because it is required coursework. The participants accessed the NDQuits QuitLogix website online to complete the modules. Powerpoint was used by the co-investigator to present information in the in-class session. Data analysis included software as determined by the statistician.

Budget

The project required no expenses to create and implement it. A grade was attached after the completion of the modules in the assigned course as tobacco cessation education is mandatory coursework. Therefore, monetary compensation was not provided. Moreover, participation in the study was voluntary for DNP students. Qualtrics link was used for the pre- and post-questionnaire available at no cost through NDSU. Signing up on the NDQuits QuitLogix and accessing modules was free of cost. For statistical work, funding and support was provided by the Biostatistics and Bioinformatics Core of the COBRE Center for Diagnostics and Therapeutic Strategies in Pancreatic Cancer (Grant: P20GM109024).

Timeline

This project development and implementation was planned to take place between August 2022 and March 2024. See Table 2 for specific dates and objectives. The table divides the project into pre-implementation, implementation, and evaluation steps.

Table 2

Project Implementation Plan

Completion Date	Pre-Implementation	Implementation	Evaluation
August - October 2022	Meet with stakeholders to identify support.		
October 2022 - April 2023	Develop project proposal		
April 2023	NDSU dissertation committee proposal meeting		
May - June 2023	Obtain NDSU IRB approval		
September 2023		Co-investigator attend class to recruit participants	Administer pre-education questionnaire to evaluate motivation confidence in helping people quit tobacco and nicotine and comfort with providing information about cessation medications, programs and services, and referrals for tobacco and nicotine dependence treatment
September 2023		Students complete NDQuits QuitLogix Modules	
September 2023		Co-investigator to hold in class education session	
November 2023			Administer post-education questionnaire to evaluate student's perception of increased knowledge and abilities to support patients who wants to quit and to evaluate participants' motivation and confidence in helping people quit tobacco and nicotine and comfort with providing information on about cessation medications, programs and services, and referrals for evidence-based tobacco and nicotine dependent treatment
December 2023 - February 2024			Analyze data and write results and discussion chapters of the dissertation
February 2024			Defend and begin dissertation dissemination

Clinical Evaluation/Outcomes/Data

The short-term outcome of this project included 100% of the cohort participation would complete the tobacco and nicotine dependence treatment education. The number of participants were determined at the time of implementation of the educational intervention and again at the end of the intervention. With tobacco and nicotine dependence treatment education being a mandatory coursework in NURS 810, it was assumed that all the students enrolled in this class will participate and complete the tobacco and nicotine dependence treatment education.

One intermediate outcome was to increase students' knowledge of tobacco and nicotine dependence treatment. This was assessed through the successful completion of each module from NDQuits QuitLogix, and students submitted certificate of completion of each module on Blackboard as required coursework in NURS 810, therefore, graded. Each module has an activity and/or knowledge check questionnaire to complete the module and receive a certificate of completion. In addition, one Likert scale question adapted from Coovadia et al. (2020) was on the post-education questionnaire to assess the student's perception of increased knowledge to support patients who would like to quit. The permission to use the questionnaire from Coovadia et al. (2020) was obtained from Lisa Di Prospero, correspondence writer (Appendix S).

The other intermediate outcome was to improve students' motivation, confidence, and comfort in their ability to provide tobacco and nicotine dependence treatment two months post-education. An adapted 11-item questionnaire, originally developed by Cunningham et al. (2015), and previously used to evaluate the implementation of tobacco cessation curriculum into the NDSU DNP program (Doan, 2023), was used to compare the participant's motivation and confidence in helping people quit tobacco and nicotine use, and students' comfort and confidence in providing information about cessation medications, programs, and services, and

referrals for evidence-based tobacco and nicotine dependence treatment. The items in the original questionnaire, adapted from Cunnigham et al. (2015) and Buettner-Schmidt et al. (2017), had an accepted internal validity as indicated by Cronbach's alpha scores that ranged from 0.71 - 0.81. After adaptation, no testing of validity occurred. Dr. Kelly Schmidt-Buettner, chair of this project, had previously obtained permission to use questionnaires from Cunnigham for the future study (Appendix T). Cunningham's seven questions for motivation and confidence in helping people quit tobacco and nicotine were all included in the questionnaire for this project, Cunningham referred to these questions as "Tobacco Cessation Motivation/Confidence" (p. 93). Cunningham's four questions related to comfort and confidence in providing information about cessation medications, programs, and services were all included in the questionnaire for this project. Cunningham referred to these questions as "Tobacco Cessation Comfort" (p. 93). Two of the seven Tobacco Cessation Motivation/Confidence questions related to secondhand smoke. The questions related to secondhand smoke were analyzed separately from the remaining questions that was related more specifically to tobacco and nicotine dependence treatment. The questionnaire was distributed pre- and two months post-education intervention. In addition, one Likert scale question adapted from Coovadia et al. (2020) was on the post-education questionnaire to assess the student's perception of increased ability to support patients who would like to quit. Optional open-ended questions to allow students to expand on their answer choices from the Likert scale questions was included in both pre- and post-questionnaire. The pre-education questionnaire is in Appendix U and the 2 months post-education questionnaire is in Appendix V.

The questionnaires were distributed via students' school associated email using a Qualtrics link. The Qualtrics panel was used to send out Qualtrics links, so that the participants

were not required to use a code while completing pre- and post-education questionnaires, thereby allowing questionnaires to be paired for evaluation purposes. The pairing of the pre-and post-education questionnaires was recommended by Doan (2023). A Qualtrics link for the pre-education questionnaire was emailed to the participants by the co-investigator immediately before attending the class. The co-investigator explained to the participants that NDQuits QuitLogix is mandatory, but the questionnaire is optional and anonymous. Qualtrics also had consent for the participant to choose not to participate, complete or withdraw at any time without any consequences. The participants were then required to complete NDQuits QuitLogix modules within two weeks as a part of mandatory coursework. Two weeks after the pre-questionnaire, the co-investigator attended the class to present on tobacco and nicotine dependence treatment. Two months after the in-class educational session, the co-investigator attended the class to recruit participants for the post-education questionnaire. An email with a Qualtrics link was sent to the participants immediately before the co-investigator attended the class. The co-investigator explained to the participants that the post-education questionnaire was optional and anonymous and, therefore would not affect the grade. Refer to Appendix U and V for the pre-education and post-education questionnaires respectively.

The long-term outcomes are that NDSU will continue to retain the tobacco and nicotine dependence treatment education into FNP/DNP coursework. A second long-term outcome was that patients of NDSU FNP/DNP graduates will have an increased rate of receiving evidence-based tobacco and nicotine dependence treatment, an increased rate of quitting attempts, and an increased rate of successful tobacco and nicotine cessation. Lastly, decreased mortality and morbidity from tobacco and nicotine use and exposure will be observed among patients taken

care of by DNP graduates. However, these long-term outcomes will not be measured in this project.

Data Management and Analysis

All the data were gathered using Qualtrics and downloaded onto the co-investigator's laptop and computer. The co-investigator's laptop and computer were password-protected. No identifying information from the participants was obtained. Raw data were shared with the committee members when needed. NDSU statistics department faculty, Dr. Megan Orr, and graduate research assistant, Nazia Riasat, had access to Qualtrics and data for analysis. Dr. Megan Orr stored data on her U drive and accessed it from password protected NDSU computer. Nazia Riasat saved the data to a password-protected computer as well. After data analysis was completed and the dissertation was approved, all the data was deleted from all research personnel U drives, computers, and laptops.

Per recommendation from Doan (2023), pre- and post-education data sets were paired to allow testing of statistical significance and, thereby, the effectiveness of the intervention. The analysis included descriptive statistics, including frequencies, and inferential statistics on each Likert question from the questionnaire. As the sample size was small and the data did not follow normal distribution, the Wilcoxon Signed-Rank test was a suitable alternative to a paired t-test per the statistician. A Wilcoxon Signed-Rank test is a non-parametric test used to determine whether there is a significance between paired observations. Level of significance was set as $\alpha = 0.05$. The questionnaire related to secondhand smoke was not analyzed separately from the remaining questions that relate more specifically to tobacco cessation treatment.

CHAPTER 4: RESULTS

Presentation of Results

This chapter presents data analysis results including descriptive statistics, frequencies, and paired test for the demographics and for pre-and post-education ion questionnaires. The intervention was implemented in NDSU's DNP program, specifically in the NURS 810 Health Promotion and Disease Prevention course, offered in the first year. There were 19 students in first-year DNP class. Among 19 students, 17 were enrolled in NURS 810 and eligible to participate in the project. However, during the post education questionnaire, only 16 students were enrolled and eligible to participate. The pre-education questionnaire was available to participants on September 11, 2023. Out of 17 students, 16 students completed it for 94.12% response rate. The co-investigator conducted in-class presentation on September 25, 2023. The post-education questionnaire was available to participants on November 27, 2023, two months after in-class education. Out of 16 students, 14 students completed it for 87.50% response rate.

Data analysis was completed on 11- Likert scale questionnaires pre-education and 13-Likert scale questionnaires post-education. Demographics were included in the pre-education questionnaire only. A total of 16 students completed the pre-questionnaire and 14 students completed the post-education questionnaire. Per the statistician, all 16 students were displayed in tables and figures to maintain consistency and transparency in the presentation of data. While the number of students differed between the pre-test and post-test, including all 16 students on the pre-test tables and figures tables and figures allowed for a clear depiction of the initial cohort size and provided context for the subsequent analysis. The non-parametric Wilcoxon Signed-Rank test, set at a level of significance $\alpha = 0.05$, was used to determine whether there was a significant difference between the paired pre- to post-education surveys. Thus, the analysis

appropriately focused on the matched pre-post observations to assess the significance of any changes within the sample. Descriptive analysis was conducted for optional open-ended questions that were included in both the pre- and post-education questionnaire.

Demographics

Demographics data was collected only on pre-education questionnaire (Table 3)

Table 3

Demographics of Questionnaire Responders (N = 16)

Demographics	n	%
Years of nursing experience		
1-2 years	4	25.00
3-4 years	4	25.00
5-6 years	5	31.20
7-8 years	1	6.25
9-10 years	1	6.25
11-15 years	1	6.25
15+ years	0	0.00
Have you used any forms of tobacco within the last year		
Yes	1	6.25
No	15	93.75
Have you had previous tobacco and nicotine treatment training		
Yes	0	0.00
No	16	100.00

Among the 16 participants, the majority (n = 13) had 1 - 6 years of nursing experience, while the remaining (n = 3) had 7 - 15 years of experience. The mean years of experience was 4.83 and the mode was 5.2. One participant had used any form of tobacco products within the last year. None of the participants had any previous tobacco and nicotine treatment training.

Objective One: Improve Knowledge on Tobacco and Nicotine Dependence Treatment Among FNP/DNP Students

Objective one was to improve knowledge on tobacco and nicotine dependence treatment among FNP/DNP students by implementing tobacco and nicotine dependence treatment education curriculum into NDSU's FNP/DNP curriculum. Objective one was measured through the successful completion of each module from NDQuits QuitLogix. Each module has an activity and/or knowledge check questionnaire to complete the module and participants receive a certificate of completion. In addition, one Likert scale question adapted from Coovadia et al. (2020) was on the post-education questionnaire to assess the participants' perception of increased knowledge to support patients who would like to quit.

Objective one was met. The course instructor informed the co-investigator that all students enrolled in NURS 810 Health Promotion course completed each module as evidenced by their submission of the certificate of completion to the instructor. In addition, nearly three-fourths of the students who completed the post-education questionnaire strongly agreed that the education increased their knowledge to support patients who would like to quit. The remaining approximately one-fourth of the students somewhat agreed that the education increased their knowledge to support patients who would like to quit. None of the participants responded somewhat disagreed or strongly disagreed. Thus, all of the students who completed the post-education questionnaire either somewhat or strongly agreed that the education increased their knowledge to support patients who would like to quit. The results are presented in Table 4.

Table 4

The smoking and nicotine cessation training has increased my knowledge to support patients who would like to quit (N=14).

	n	%
Strongly Agree	10	71.42
Somewhat Agree	4	28.52
Somewhat Disagree	0	0.00
Somewhat Disagree	0	0.00

Objective Two: Improve Students' Motivation, Confidence, and Comfort in Counseling Patient to Quit Tobacco and Nicotine

Objective two evaluated the effectiveness of the educational session by evaluating participants' (a) motivation and confidence in helping people quit tobacco and nicotine, and (b) comfort and confidence with providing information about cessation medications, programs and services, and referrals for evidence-based tobacco and nicotine dependence treatment as measured through a pre- and 2 months post-education questionnaire. The results of 2a and 2b will be presented separately.

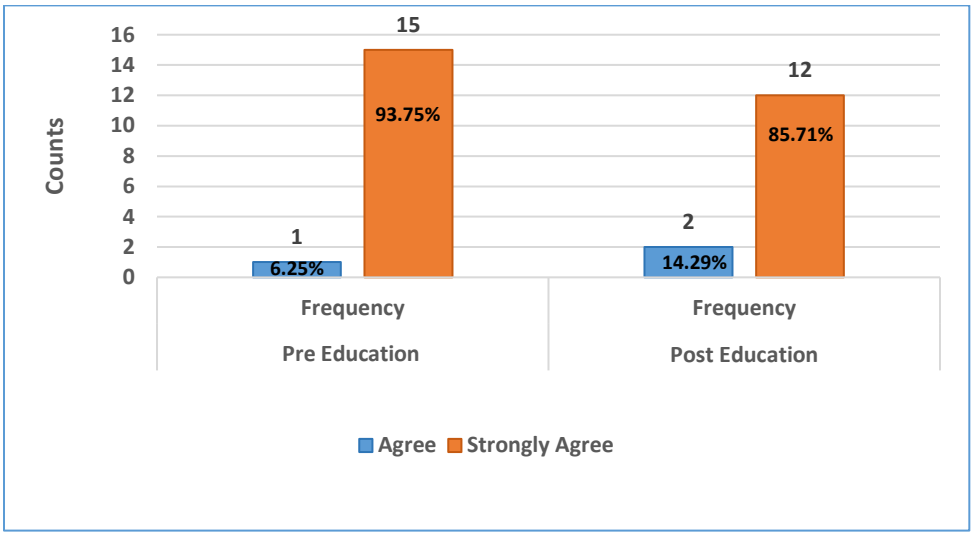
Objective 2a. Improve Students' Motivation and Confidence in Helping People Quit Tobacco and Nicotine

Seven questions were included in pre- and post-education questionnaire related to participant's motivation and confidence in helping people to quit tobacco and nicotine. The pre-post results of each question is shown in individual bar graphs. Appendix W has the results in the table format.

Question 1 asks if it is important, as a practitioner, to know whether a patient/client uses tobacco or nicotine. The results are presented in Figure 2.

Figure 2

Question 1: It is important, as a practitioner, to know whether a patient/client uses tobacco or nicotine

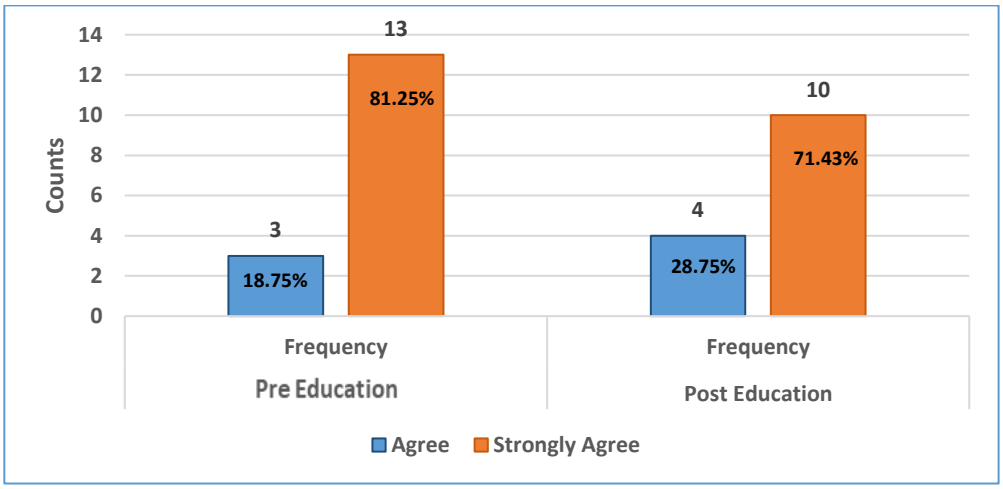


All participants either agreed or strongly agreed in both pre- and post-education that it is important, as a practitioner, to know whether the patient uses tobacco or nicotine. No participants either disagreed or strongly disagreed. Although the number of responding participants changed from pre- to post-education, and the percent who strongly agreed decreased from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations did not appear to be statistically significant because the P-value was greater than the level of significance α=0.05 (W = -1, p = 1).

Question 2 asks if it is important, as a practitioner, to know whether a patient/client has regular exposure to secondhand smoke. The results are presented in Figure 3.

Figure 3

Question 2: It is important, as a practitioner, to know whether a patient/client has regular exposure to secondhand smoke

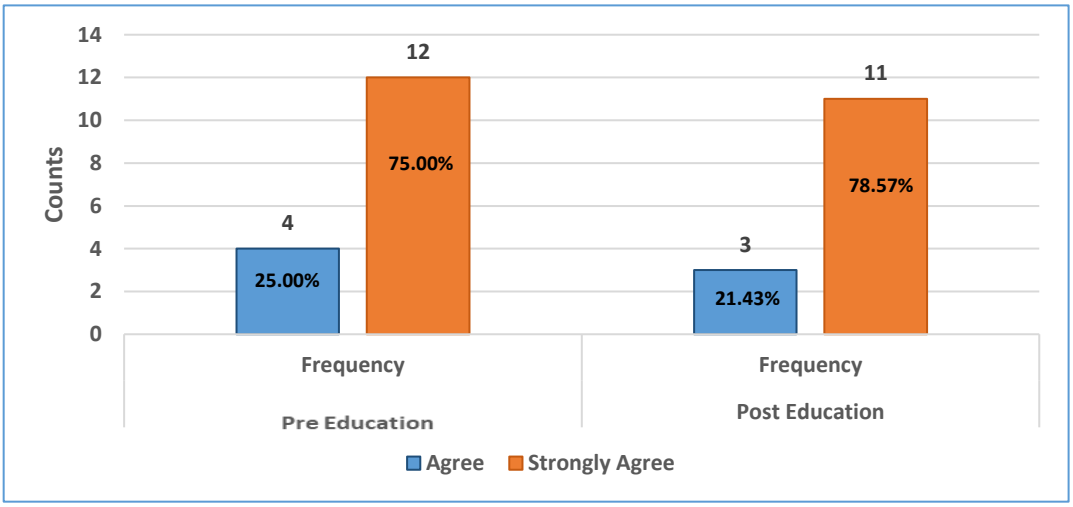


All participants either strongly agreed or agreed in both pre- and post-education that it is important, as a nurse practitioner, to know where a patient has regular exposure to secondhand smoke. No participants either disagreed or strongly disagreed. Although the number of responding participants changed from pre- to post-education and the percent who strongly agreed decreased slightly by one participant from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations did not appear to be statistically significant ($W = -1.5$, $p = 1$).

Question 3 asks if participants are motivated to help tobacco and nicotine users quit. The results are presented in Figure 4.

Figure 4

Question 3: I am motivated to help tobacco and nicotine users quit

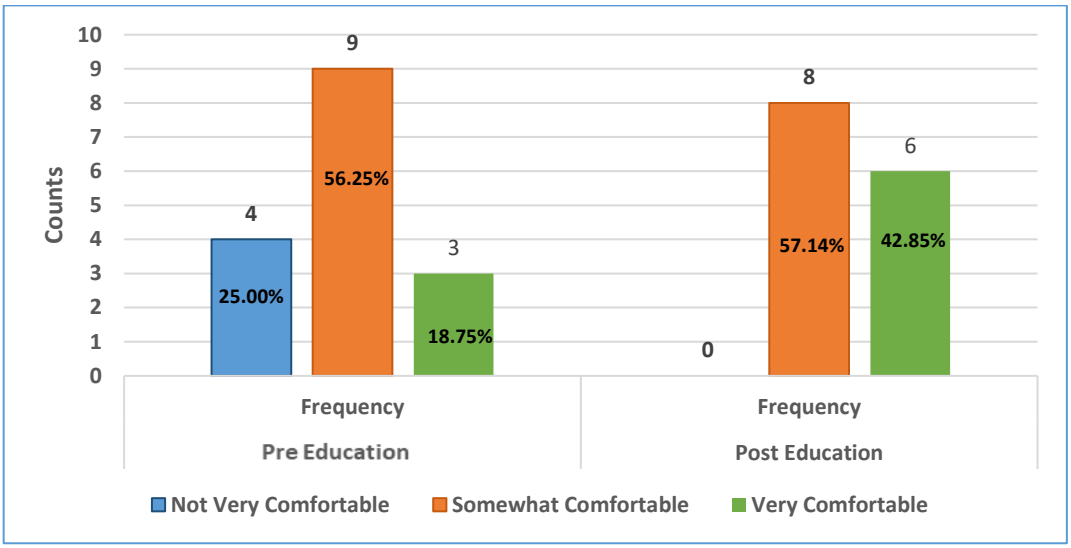


All participants either strongly agreed or agreed in both pre- and post-education that they are motivated to help tobacco and nicotine users quit. No participants either disagreed or strongly disagreed. Although the number of responding participants changed from pre- to post-education, and the percent who strongly agreed increased slightly from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations did not appear to be statistically significant ($W = 1.5$, $p = 1$).

Question 4 asks participants comfort level in talking with patients/clients about tobacco and nicotine use. The results are presented in Figure 5.

Figure 5

Question 4: How comfortable are you in talking with patients/clients about tobacco and nicotine use

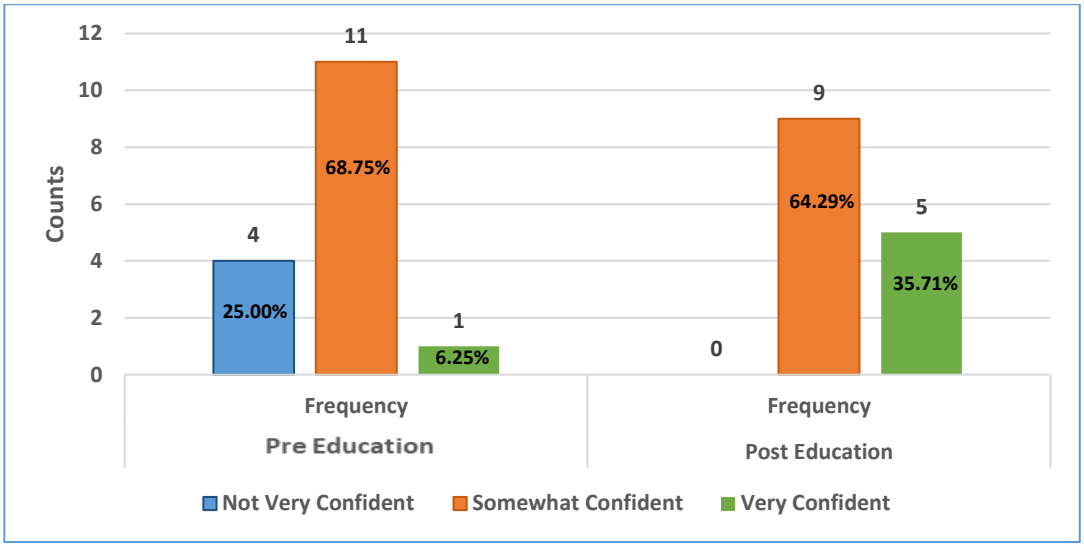


Regarding comfort in talking with patients about tobacco and nicotine use, before the educational intervention, one-fourth (25.00%, n = 4) of the participants reported not very comfortable while 56.25% (n = 9) and 18.75% (n = 3) reported somewhat comfortable and very comfortable respectively. None the participants reported being uncomfortable at all. At 2 months post-education, comfort levels increased from pre-education with about slightly more than half of the participants (57.14%, n = 8) reported being to somewhat comfortable, and almost half of the participants (42.85%, n = 6) reported being very confident. None of the participants were not very comfortable or not comfortable at all. Thus, post-education all participants were either somewhat or very comfortable with talking about patients about tobacco and nicotine use. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations appeared to be statistically significant ($W = 10.5$, $p = 0.031$).

Question 5 asks if participants are confident in exploring issues related to quitting smoking and the use of nicotine, even with someone not interested in quitting. The results are presented in Figure 6.

Figure 6

Question 5: I am confident that I can explore issues related to quitting smoking and the use of nicotine, even with someone not interested in quitting



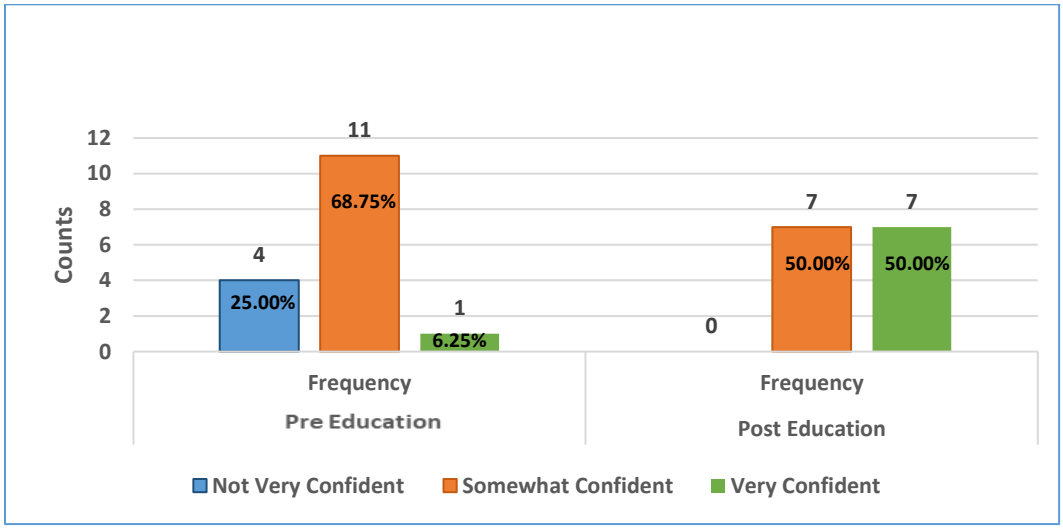
Regarding confidence in exploring issues related to quitting smoking and use of nicotine, even with someone not interested, before the educational intervention, one-fourth (25.00%, n = 4) of the participants were not very confident while about two-thirds of the participants (68.75%, n = 11) reported somewhat confident. One participant (6.25%) reported being very confident. None of the participants reported not being confident at all. At 2 months post-education, confidence levels increased from pre-education with the percent of participants reporting being somewhat confident decreased to 64.29% (n = 9) while participants reporting very confident increased to 35.71% (n = 5). None of the participants reported being not very confident or not confident at all. Thus, post-education all participants were either somewhat or very confident in exploring issues related to quitting smoking and use of nicotine, even with someone not

interested. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations appeared to be statistically significant (W = 10.5, p = 0.031).

Question 6 asks participants level of confidence in personalizing the benefits of quitting with each individual tobacco and nicotine user. The results are presented in Figure 7.

Figure 7

Question 6: I am confident that I can personalize the benefits of quitting with each individual tobacco and nicotine user



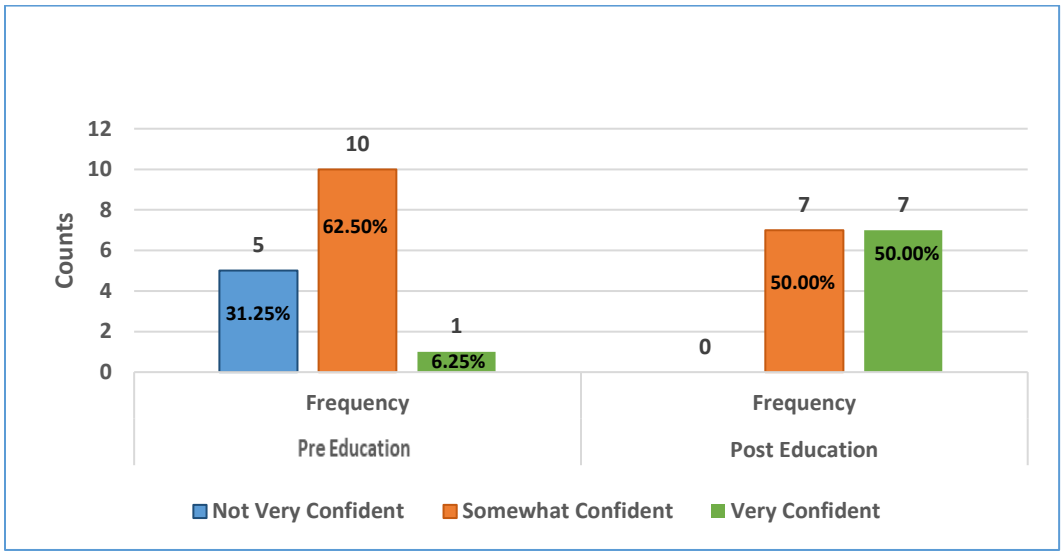
Regarding confidence to personalize the benefits of quitting with each individual tobacco and nicotine user, before the educational intervention, 25.00% (n = 4) of participants reported not very confident while more two-thirds of the participants (68.75%, n = 11) were somewhat confident. One participant (6.25%) reported being very confident. None of the participants reported not being confident at all. At 2 months post-education, confidence levels increased from pre-education, with half of the participants reported being somewhat confident (50.00%, n = 7) and half reported being very confident (50.00%, n = 7). None of the participants reported not very confident or not confident at all. Thus, post-education all participants were either somewhat or very confident to personalize the benefits of quitting with each individual tobacco and nicotine

user. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations appeared to be statistically significant (W = 22.5, p = 0.004).

Question 7 asks participants' level of confidence in knowing if a patient has regular exposure to secondhand smoke. The results are presented in Figure 8.

Figure 8

Question 7: I am confident that I know if a patient has regular exposure to secondhand smoke



Regarding the confidence in knowing if a patient has a regular exposure to a secondhand smoke, before the educational intervention, slightly more than one-third of the participants (31.25%, n = 5) were not very confident in contrast to about two-thirds of the participants (62.50%, n = 10) who were somewhat confident. One participant (6.25%) reported being very confident. None of the participants reported not confident at all. At 2 months post-education, confidence levels increased from pre-education. There was a decrease in the percent of participants reporting being somewhat confident to 50.00% (n = 7) while the percent of participants reporting very confident increased to 50.00% (n = 7). None of the participants reported being not very confident or not confident at all. Thus, post-education all participants

were either somewhat or very confident in knowing if a patient has a regular exposure to a secondhand smoke. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations appeared to be statistically significant ($W = 27.5$, $p = 0.002$).

Optional open-ended questions on motivation and confidence. One open-ended question was included in both pre-and post-education questionnaires to allow students to expand on their answer choices from the Likert scale questions. There were three responses on pre-test and two responses on post-test. On the pre-test, one participant reported as, "I have not had to counsel patient on tobacco cessation. Therefore, I am not very comfortable with what language to use to be most successful. I know of some resources but would like to learn more. Once I am more familiar with specific resources, I think I would be more confident to personalize benefits of quitting to an individual patient. I am not currently screening patient for secondhand smoke exposure in my current job but think, I would in different setting." The second participant responded as ," As a nurse, it is our job to promote health. Smoking and use of nicotine can be detrimental to an individual health. It is hard to educate patient who have been chronic smoker their entire life and show no interest in quitting smoking." Lastly, the third respondent reported, "I am aware how important tobacco cessation is for our patient as well as staying away from secondhand smoking, but I am not sure I would be super comfortable education and plan to be brought up to a patient as a practitioner."

After 2 months post-education, there were two responses where one participant responded, "I have increased confidence with different forms of smoking cessation." The other responded, "With resources in hand, I believe I would be able to have a conversation with a

patient about their use of tobacco products, their exposure to secondhand smoke and customize a plan to help patient limit use of tobacco or quit."

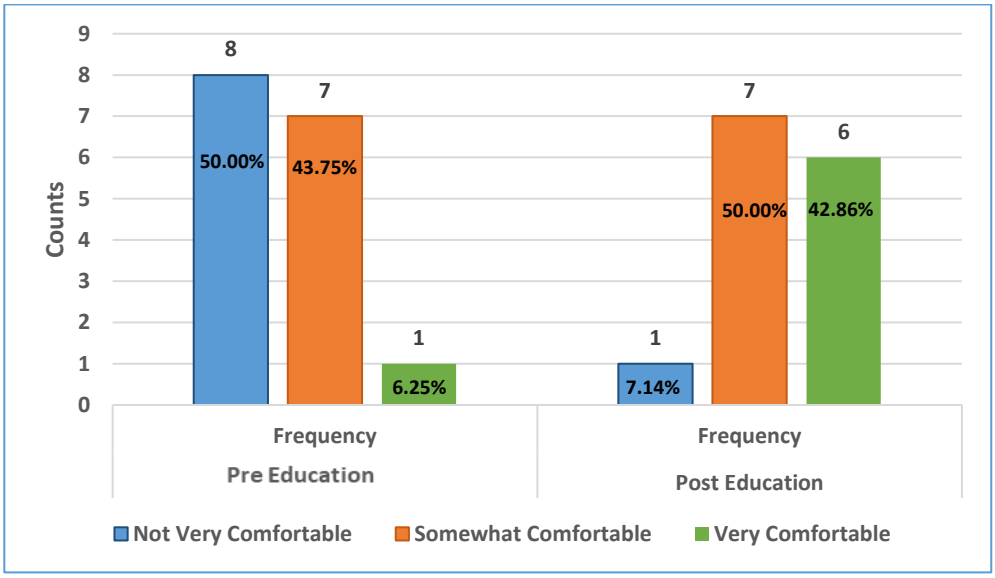
Objective 2b. Improve Students' Comfort in Providing Information about Cessation Medications, Programs and Services, and Referrals for Evidence-Based Tobacco and Nicotine Dependence Treatment

Four questions were included in pre- and post-education questionnaire related to participant's comfort in providing information and referrals for evidence-based tobacco and nicotine dependence treatment. Responses to all the questions in this section increased in comfort, or confidence, from pre-education to 2 months post-education. The results of each questionnaire are shown in the bar graph separately. Appendix W has the results in a table format.

Question 8 asks how comfortable participants are in providing information about medications that help in quitting tobacco and nicotine. The results are presented in Figure 9.

Figure 9

Question 8: How comfortable are you in providing information about medications that help in quitting tobacco and nicotine

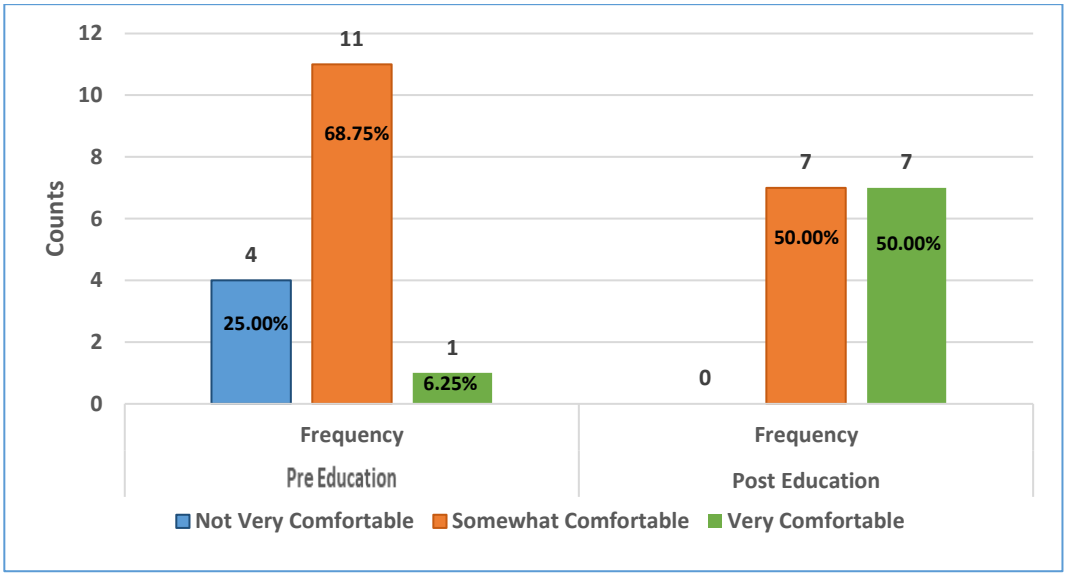


Regarding comfort in providing information about medications, before the educational intervention, half of the participants (50.00%, n = 8) reported as being not very comfortable and almost half of them (43.75%, n = 7) reported as being somewhat comfortable. One participant (6.25%) reported being very comfortable. None of the participants reported not being comfortable at all. After 2 months post-education, comfort levels increased with only one participant (7.14%) reported being not very comfortable while the percent of participants reporting being somewhat comfortable increased slightly to 50% (n = 7) and the percent of participants reporting being very comfortable increased to 42.86% (n = 6). None of the participants reported not being comfortable at all. Thus, post-education all but one participant were either somewhat comfortable or very comfortable in providing information about medications. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations appeared to be statistically significant (W = 18, p = 0.008).

Question 9 asks how comfortable participants are in providing information about programs and services that help aid in quitting (quit lines, counseling etc.). The results are presented in Figure 10.

Figure 10

Question 9: How comfortable are you in providing information about programs and services that help in quitting (quit lines, counseling etc.)



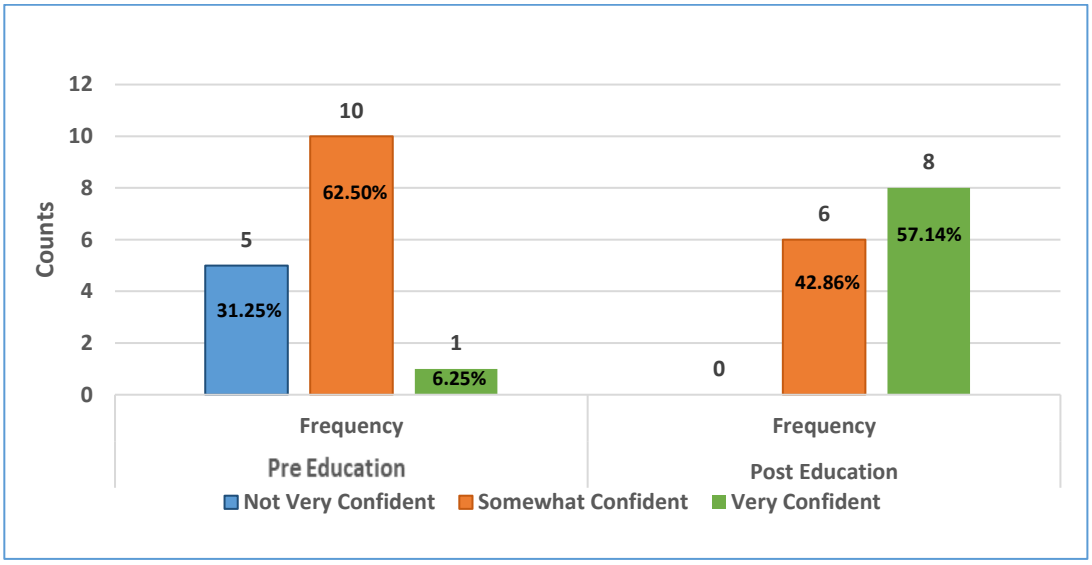
Regarding comfort providing information about programs and services, before the educational intervention, one-fourth of the participants (25.00%, n = 4) were not very comfortable while about two-thirds (68.75%, n = 11) were somewhat comfortable. One participant (6.25%) was very comfortable. None of the participants reported as not being comfortable at all. After 2 months post-education, comfort levels increased from pre-education, with all of the participants being either somewhat comfortable (50.00%, n = 7) or very comfortable (50.00%, n = 7) in providing information about programs and services. None of the participants reported not being very comfortable or not comfortable at all. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test

indicated that the differences between the paired observations appeared to be statistically significant (W = 14, p = 0.016).

Question 10 asks participants level of confidence on providing information about programs and services that help in quitting (quitlines, counseling, etc.).

Figure 11

Question 10: I am confident that I can provide information about programs and services that help in quitting (quitlines, counseling, etc.)



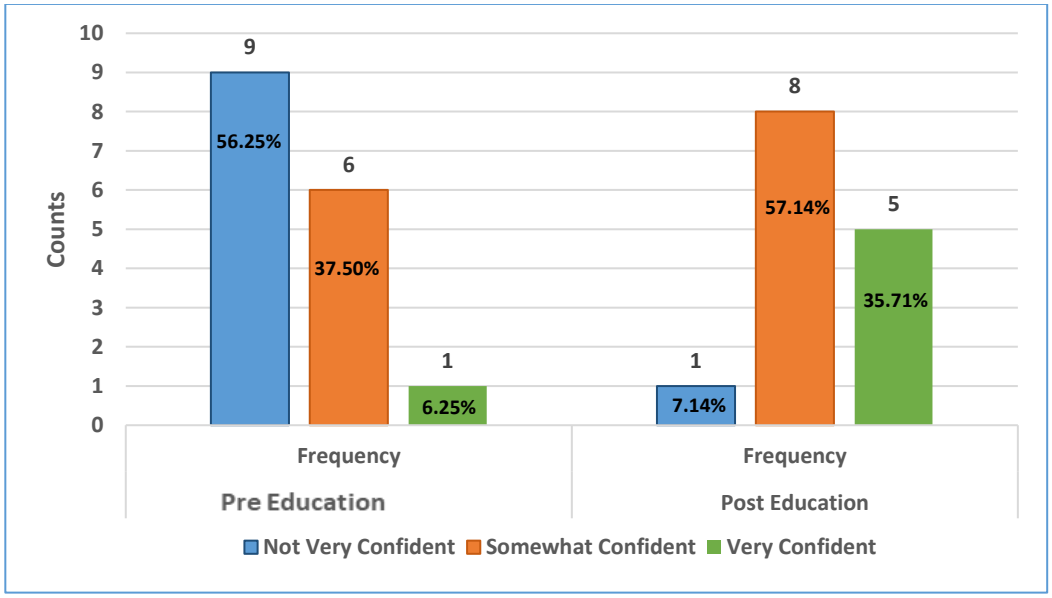
Regarding confidence in providing information about programs and services that help in quitting, before the educational intervention, almost one-third of the participants were not very confident (31.25%, n = 5) and about two-thirds of the participants (62.50%, n = 10) were somewhat confident. One participant (6.25%) reported to be very confident. None of the participant reported not confident at all. After 2 months of post-education, confidence levels increased from pre-education, while there was a decrease in the percent of participants reporting being somewhat confident (42.86%, n = 6), there was an increase in the percent of participants being very confident (57.14%, n = 8). None of the participants reported being not very confident or not confident at all. Thus, post-education, participants were either very confident or somewhat

confident in providing information about programs and services that help in quitting. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations appeared to be statistically significant (W = 18, p = 0.008).

Question 11 asks about participants' level of confidence in providing information about medications that can help in quitting tobacco and nicotine.

Figure 12

Question 11: I am confident that I can provide information about medications that can help in quitting tobacco and nicotine



Regarding confidence in providing information about medications that can help in quitting tobacco and nicotine, before the educational intervention, majority of the participants were not very confident (56.25%, n = 9) and about one-third (37.50%, n = 6) of the participants were somewhat confident. One participant (6.25%) was very confident. None of the participants were not confident at all. After 2 months of post education, confidence levels increased from pre-education, with only one participant (7.14%) being not very confident while all other participants reported either somewhat confident (57.14%, n = 8) or very confident (35.71%, n = 5). None of

the participants reported not confident at all. Although the number of responding participants changed from pre- to post-education, the Wilcoxon Signed-Rank Test indicated that the differences between the paired observations appeared to be statistically significant (W = 28.50, p = 0.009).

One additional question was asked during post-test to evaluate the program outcomes. The question asked about the participants' perception that the training increased their ability to support patients who would like to quit smoking. Post-intervention, all participants (100%, n = 14) either strongly agreed or somewhat agreed that the training increased their ability to support patients who would like to quit as shown in Table 5.

Table 5

The smoking and nicotine cessation training has increased my ability to support patients who would like to quit smoking

Question	n	%
Strongly Agree	11	78.60
Somewhat Agree	3	21.40
Somewhat Disagree	0	0.00
Strongly Disagree	0	0.00

Optional open-ended questions on Comfort. Two open-ended questions were asked before the educational intervention: (1) to expand on participants' answer choices and (2) to describe any barriers that the participants may anticipate in implementing tobacco and nicotine dependence treatment into practice. On the post-test, only one question to expand participants' answer choices was asked. There were three responses to each question on the pre-test while no participants responded to the post-test open-ended question.

In the pre-test, on expanding their answer choices, one student reported, "I do not have the education to know about specific resources other than a generalized idea." The second

student reported, “I am not aware or confident in medication available.” The third student reported, “Unfamiliar with available medications listed above.” Three students responded to the question on barriers to implementing tobacco and nicotine dependence treatment into practice. One responded, “None.” The second responded as, “Time”. The third student responded as, “Patient motivation/determination in regard to quit to quit.”

CHAPTER 5: DISCUSSION AND RECOMMENDATION

The purpose of this evidence-based practice improvement project was to determine if improving tobacco and nicotine dependence treatment education in a FNP/DNP program at NDSU would increase participants' (a) knowledge, (b) motivation and confidence in helping people quit tobacco and nicotine, and (c) comfort with providing information about cessation medications, program and services, and referrals for evidence-based tobacco and nicotine dependence treatment. In this project, per Doan (2023), a revised curriculum was implemented and evaluated. Doan previously incorporated the online education Rx for Change (University of California Regents, n.d.) course, along with other educational aspects. This project modified Doan's curriculum by incorporating the evidence-based tobacco and nicotine treatment education available through NDQuits QuitLogix (NDQUITS, 2023) along with an in-class presentation presented by the co-investigator. During the in-class presentation, a tool kit was provided, and patient case scenarios were discussed.

The participants completed an 11-item Likert scale questionnaire before educational intervention and a 13-item Likert scale questionnaire post-intervention. Optional open-ended questions were included in both pre-and post-intervention questionnaire. Seventeen students were enrolled in NURS 810 class and were eligible for the pre-test and 16 students were eligible for the post-test. The short-term outcome identified in the logic model was to have 100% of the cohort complete the education on tobacco and nicotine dependence treatment but this outcome was not met. However, both pre-and post-test questionnaire completion rates were high at 94.12% and 87.50% respectively.

Objective One

Objective one evaluated if improving tobacco and nicotine dependence treatment education increased students' knowledge on tobacco and nicotine dependence treatment through successful completion of each module from NDQuits QuitLogix and on the Likert scale question on the post-test. This objective was met. One medium outcome of this project from the logic model (Figure 1) was that the students would report perception of an increase in knowledge two months post-education. The outcome was achieved. All students completed the knowledge check questionnaire and/or activity from each module as evidenced by their submission of the certificate of completion. With each questionnaire, if students answer incorrectly, NDQuits QuitLogix provides the best answer. Some students may not have answered correctly and simply memorized the answers. Therefore, the questionnaire may not be a valid measure of increased knowledge. However, on the post-education questionnaire, all students either strongly agreed or somewhat agreed that the education increased their knowledge to support patients who would like to quit. Thus, it can be assumed that the educational intervention was effective in increasing students' knowledge. As inadequate knowledge and training were identified as barriers to using clinical practice guideline among providers (Manolios et al., 2021), it appears this educational intervention overcame the barrier of lack of knowledge or training to using clinical practice guidelines for tobacco and nicotine dependence treatment.

Objective Two

Objective two evaluated if improving tobacco and nicotine dependence treatment education improved students' (a) motivation and confidence in helping people quit tobacco and nicotine, and (b) comfort with providing information about cessation medications, program and services, and referrals for evidence-based tobacco and nicotine dependence treatment as

measured through pre-and 2 months post-education questionnaire and are discussed separately next.

Objective 2a. Improve Students' Motivation and Confidence in Helping People Quit Tobacco and Nicotine

Objective 2a was met, overall students' motivation and confidence improved in helping people quit tobacco and nicotine. Student motivation was strong before the intervention was initiated, with all students either agreeing or strongly agreeing with being motivated to help people quit tobacco both pre-and post-intervention. Improvement in students' motivation and confidence in tobacco and nicotine dependence treatment after 2 months post-education was second medium outcome in this project from logic model. The outcome was achieved. Seven questions were asked pre-and post-education to measure students' motivation and confidence in helping people quit tobacco and nicotine.

Of the seven questions, five showed significant increases in positive responses. Of the five questions (Questions 3 – 7), all students reported agreeing/strongly agreeing; being somewhat comfortable/very comfortable or being somewhat confident/very confident. The question on motivation had the highest level of students reporting strongly agreeing in being motivated to help nicotine and tobacco users quit. The remaining four questions while showing statistically significant improvement have room for more improvement to achieve the highest level of positive responses, that is, to being very comfortable in talking with patients about tobacco and nicotine use, to being very confident in exploring issues related to quitting smoking and the use of nicotine, to being very confident to personalizing the benefits of quitting, and to being very confident that a person has regular exposure to secondhand smoke.

Of the seven questions for Objective 2a, two had slight decreases in responses, due to one participant changing from strongly agree to agree in each of the two questions. The two questions were, "It is important, as a practitioner, to know whether a patient/client uses tobacco or nicotine" and "It is important, as a practitioner, to know whether a patient/client has regular exposures to secondhand smoke." It is difficult to analyze the rationale as to why this participants' motivation would have decreased from strongly agree to agree. One possibility is that the response was unintentional. Statistically, the difference between these two questions was not found to be significant.

Objective 2b. Improve Students' Comfort in Providing Information about Cessation Medications, Programs and Services, and Referrals for Evidence-Based Tobacco and Nicotine Dependence Treatment

Objective 2b was met. Overall, students' comfort improved in providing information about cessation medications, programs and services, and referrals for evidence-based tobacco and nicotine dependence treatment. Improvement in students' comfort in providing nicotine dependence treatment was also a medium outcome identified in the logic model of this project. The outcome was achieved. To evaluate this objective/outcome, Cunningham's four questions related to comfort and confidence in providing information about cessation medications, programs, and services were all included in the questionnaire for this project. Cunningham (2015) referred to these questions as "Tobacco Cessation Comfort" (p. 93).

All four questions showed significant increases in positive responses. On three questions (Questions 9 – 11), all students reported being somewhat comfortable/very comfortable: or being somewhat confident/very confident. The three questions showed statistically significant improvement but have room for more improvement to achieve the highest level of positive

responses to being very comfortable in providing information about programs and services that helps in quitting tobacco and nicotine, to being very confident in providing information about programs and services that help in quitting tobacco and nicotine, and to being very confident in providing information about medication that can help in quitting tobacco and nicotine.

On one question (Question 8), all but one student reported being somewhat comfortable/very comfortable. One student reported as being not very comfortable. The question was, "How comfortable are you in providing information about medications that help in quitting tobacco and nicotine?" Even though the question showed statistically significant improvement, there is more room for improvement to achieve all the responses as being very comfortable in providing information about tobacco and nicotine treatment medications. It is important to note that there were two questions in objective 2b in which the highest percentage of students reported being somewhat confident. Each question was related to providing information about medications to help quit tobacco and nicotine. The questions were, "How comfortable are you in providing information about medications that help in quitting tobacco and nicotine?" and "I am confident that I can provide information about medications that can help in quitting tobacco and nicotine." It may be assumed that as classroom learning does not provide enough hands-on experience with actual medications students may feel very confident when they have practical exposure, such as clinical rotation, where they can apply theoretical knowledge to real patient scenarios. Thus, a recommendation for future studies is to incorporate tobacco cessation medication.

One additional question was asked on the post-test regarding students' perception that the education increased their ability to support patients who would like to quit. All students reported strongly agree/somewhat agree with the highest percentage (78.60%) of students

reporting strongly agreeing that the education increased their abilities to support patients who want to quit tobacco products.

The results discussed above lead to the conclusion that there was a significant increase in knowledge, confidence, and comfort in tobacco and nicotine dependence treatment among FNP/DNP students 2 months after education. Motivation did not show a significant increase perhaps due to the already high level of motivation as indicated by the pre-survey questionnaire with all participants either agreeing or strongly agreeing to being motivated to help users quit. Coovadia et al. (2020) found an increase in healthcare professionals' confidence and knowledge after education and training of tobacco cessation. Therefore, this project supports the literature that tobacco cessation education increases healthcare providers' knowledge, confidence, and comfort. No current study was found on assessing tobacco cessation among DNP program. In addition, as healthcare professionals who received training on tobacco and nicotine dependence treatment are more likely to counsel and assist with tobacco cessation as compared to untrained providers (Carson et al., 2012), the results of this project provide evidence that tobacco and nicotine education is beneficial in the DNP student's ability to be successful in providing treatment for tobacco and nicotine dependence.

Recommendation for Education

This project findings support the effectiveness of educating current and future providers on evidence-based tobacco and nicotine dependence treatment. A practice gap among providers in using clinical practice guidelines for tobacco and nicotine dependence treatment has been associated with inadequate knowledge and training (Manolios et al., 2021). Moreover, healthcare professionals who received training on smoking cessation have been found to be more likely to counsel and assist with tobacco cessation as compared to untrained providers (Carson et al.,

2012). From this study, it appears that this educational intervention overcame the barrier of lack of knowledge and increased confidence and comfort to using clinical practice guidelines for tobacco and nicotine dependence treatment. Therefore, it is prudent to include formal tobacco and nicotine dependence treatment in the curriculum of all future primary care providers. Previously, former graduate student, Dr. Doan, implemented Rx for Change into the DNP program and observed an increase in motivation, confidence, and comfort among DNP students following educational intervention (Doan, 2023). Although the study likely demonstrated statistical significance, the absence of paired data prevented demonstration of significance. Considering that both NDQuits QuitLogix and Rx for Change are evidence-based programs for tobacco and nicotine dependence treatment, it is likely that either program will be effective for educational purposes.

While participants' responses to the questionnaire was significantly improved from pre-to post-education, there is still room for improvement, particularly in transitioning from "agree", "somewhat confident" and "somewhat comfortable" to "strongly agreed", "very comfortable" and "very confident". Therefore, a recommendation is to allow students to practice motivational interviewing techniques in class with their peers, facilitating constructive feedback. This will allow students to gain additional confidence and comfort in talking with the patients on counseling, resources, and medications available. A second recommendation is to briefly discuss coding and billing for tobacco and nicotine dependence treatment in primary care. Additionally, clear instructions on accessing all the courses in NDQuits QuitLogix should be provided to the students.

For the participating university, NDSU, continued use of tobacco and nicotine dependence treatment is recommended. As a higher number of students reported somewhat

comfortable and confident regarding medications, the recommendation is to integrate a review of the pharmacology of tobacco and nicotine dependence treatment into the second year of their academic program, especially when the students are engaged in the study of pharmacology.

The use of the Iowa Model is recommended for the ongoing evaluation and modification of tobacco and nicotine dependence treatment education. This approach is crucial as tobacco and nicotine dependence treatment is continually evolving, and implementing Iowa model allows continuous assessment ensuring education remains up-to-date and effective.

Recommendations for Future Research

This project did not measure long-term outcomes as identified in the logic model. The long-term outcomes include the rates of using evidence-based tobacco and nicotine dependence treatment, rate of quit attempts, successful quit rates among patients taken care of by NDSU DNP graduates. The other long-term outcome identified in this project was to decrease morbidity and mortality from tobacco and nicotine use.

Future additional studies could follow DNP students, and other primary care provider students educated on tobacco and nicotine treatment education after they graduate and move into practice to evaluate use of evidence-based tobacco and nicotine dependence treatment, rate of quit attempts, successful quit rates, and mortality and morbidity rates.

As recommended by Doan (2023), similar studies may consider removing questions related to secondhand smoke exposure or measure secondhand smoke questions independently from motivation and confidence in assisting individuals in quitting tobacco use.

The questionnaire evaluated confidence and comfort in providing information about treatment medication, but it did not specifically assess participants' confidence and comfort in prescribing them. As recommended by Doan (2023), future studies may measure how confident

and comfortable participants are in prescribing tobacco and nicotine dependence treatment. All recommendations are found in a table in Appendix X.

Dissemination

The results of this project were presented to the dissertation committee during final defense. After completion and approval, the dissertation will be published and available on ProQuest Dissertation & Thesis Global for review. Once available via Pro Quest, the published dissertation will be provided to Kara Backer, Nicotine Dependence Treatment Coordinator at North Dakota Tobacco Prevention and Control Program. Additional dissemination includes possible presentation at peer-reviewed nursing conferences or in peer-reviewed publications.

Strengths and Limitations

Strengths

The strengths of this project include the support from Kara Backer, Nicotine Dependence Treatment Coordinator at North Dakota Department of Health and Human Services' Tobacco Prevention and Control Program, Mayo Clinic, National Jewish Health, and Sanford Health. Kara Backer organized the Tobacco Treatment Specialist training and Certification presented by Mayo Clinic in Bismarck, ND. Funding for the co-investigator's travel to the training was from Buettner-Schmidt's, Dissertation Committee Chair, Collaborative Tobacco Prevention and Control Grant (NDDHHS Grant #G21.781). Mayo Clinic, National Jewish Health and Sanford Health assisted the co-investigator in gathering case studies. Another strength was the enthusiastic support of the course faculty, Dr. Mykell Barnacle, who was also on the dissertation committee.

Limitations

Some limitations were associated with this project. First, the time allocated for the in-class presentation. With 60 minutes, the time was limited to have participants practice motivational interviewing in class among their peers by creating groups. Practicing motivational interviewing among peers could have increased participants' motivation and confidence on helping people quit tobacco and nicotine and comfort with providing information about medications, programs and services, and referrals for evidence-based tobacco and nicotine dependence treatment even more.

Second, participants had few opportunities to practice with patient case scenarios. More interactive patient case scenarios during in class session addressing motivational interviewing techniques and pharmacology could increase students' knowledge, confidence, and motivation with providing information about medications, programs and services, and referrals for evidence-based tobacco and nicotine dependence treatment even more.

Third, there was slight decrease in number of participants responding to post-test questionnaire. It may be assumed that if all participants had responded to pre- and post-test, the results may have been different. However, the results are very positive and thus those not responding (1 less for pre-test and 2 less for the post-test) likely would not affect the findings overall.

Lastly, the generalizability of this study is limited because it was conducted in one university's DNP program and because the sample size of students available to participate in this project was small because of the small student cohorts of the NDSU FNP/DNP program. A recommendation is to replicate the study including multiple DNP programs or programs with more students per cohort.

Application to DNP Roles

The results of this project indicated significant improvement in the knowledge, confidence, and comfort of future nurse practitioners enrolled in the DNP program after an educational intervention on tobacco and nicotine dependence treatment. The students who are future family nurse practitioners exhibit increased knowledge, confidence, and comfort with counseling patients to quit tobacco and nicotine use by providing evidence-based tobacco and nicotine dependence treatment. Since about 70% of tobacco users visit primary care clinics annually and even brief advice from clinicians can improve cessation rates (USDHHS, 2020), educating family nurse practitioners in tobacco and nicotine dependence treatment is a key to increasing use of clinical practice guidelines for tobacco and nicotine dependence treatment and improving patient outcomes, ultimately contributing to reduction of mortality and morbidity from tobacco and nicotine related illness.

Conclusion

This project demonstrated that an evidence-based education curriculum in tobacco and nicotine dependence treatment can significantly increase knowledge, confidence, and comfort in counseling patients to quit tobacco and nicotine use among DNP students (future family nurse practitioners). Evidence suggests that few providers assess, refer, and provide evidence-based treatment options to the patient consistently and effectively (Rojewski et al., 2019). A metasynthesis of 22 studies found that primary providers identified the lack of skills and training and inadequate knowledge as barriers to providing regular counseling or pharmacologic intervention (Manolios et al., 2021). Therefore, incorporating formal tobacco and nicotine dependence treatment education into the curriculum of nurse practitioner programs is imperative

to strengthen their ability in providing evidence-based treatment and decrease morbidity and mortality related to tobacco and nicotine use.

EXECUTIVE SUMMARY

Tobacco is the leading cause of preventable mortality and morbidity in the United States (CDC, 2022h) with approximately 5.4 million people dying annually due to tobacco-related illnesses (CDC, 2021b). About 70% of tobacco users visit primary care clinics annually and even brief advice from clinicians can improve cessation rates (USDHHS, 2020). However, four out of nine adult smokers who visited healthcare providers did not receive any advice or counseling on quitting smoking. Lack of training and confidence were identified as a barrier among different groups of providers as to why they were not providing regular counseling or pharmacologic intervention (Meijer et al., 2019).

The purpose of this evidence-based practice improvement project was to determine if improving tobacco and nicotine dependence treatment educational curriculum in a FNP/DNP program at NDSU increased participants' (a) knowledge, (b) motivation and confidence in helping people quit tobacco and nicotine, and c) comfort with providing information about cessation medications, program and services, and referrals for evidence-based tobacco and nicotine dependence treatment.

The co-investigator improved the tobacco and nicotine dependence treatment education based on the recommendation provided by former FNP/DNP student, Dr. Doan. Dr. Doan first incorporated tobacco and nicotine dependence treatment education into the FNP/DNP curriculum in 2022. This project was implemented in NURS 810 class among FNP/DNP students. The education consisted of an online program (NDQuits QuitLogix) and an in-class presentation with interactive patient scenarios. Students were also provided with toolkits.

NDSU FNP/DNP students' knowledge, motivation, confidence in helping people quit tobacco and nicotine, and comfort with providing information about cessation medications,

programs and services, and referrals for evidence-based tobacco and nicotine dependence treatment were assessed through pre- and 2-month post-education questionnaires. Student motivation was strong before the intervention was initiated with all students either agreeing or strongly agreeing with being motivated to help people quit tobacco both pre-and post-intervention. Significant increases in knowledge, confidence, and comfort were observed in helping patients quit and providing information about cessation medications, programs and services, and referrals for tobacco and nicotine dependence treatment. The results of this practice improvement support the effectiveness of formal tobacco and nicotine dependence treatment curriculum for FNP/DNP and other primary care professional programs. In addition, the project serves as a guide for FNP/DNP and other primary care professional programs for adding or improving tobacco and nicotine dependence education curriculum into FNP/DNP and other primary care professional programs.

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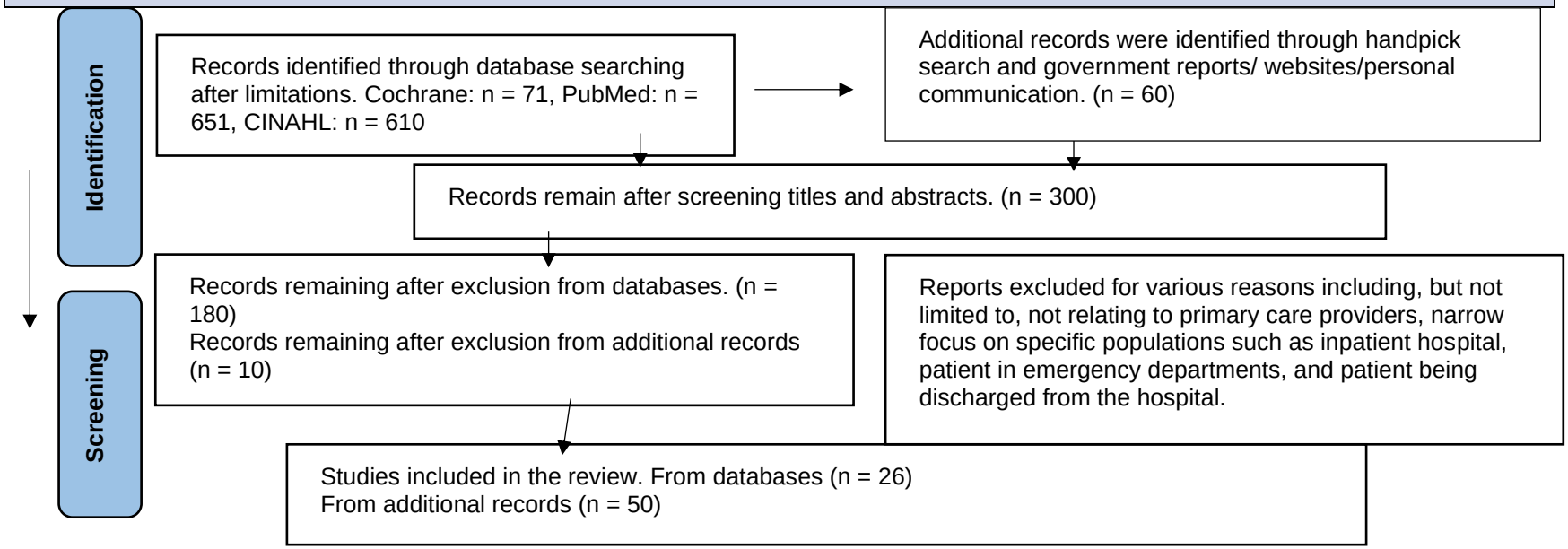
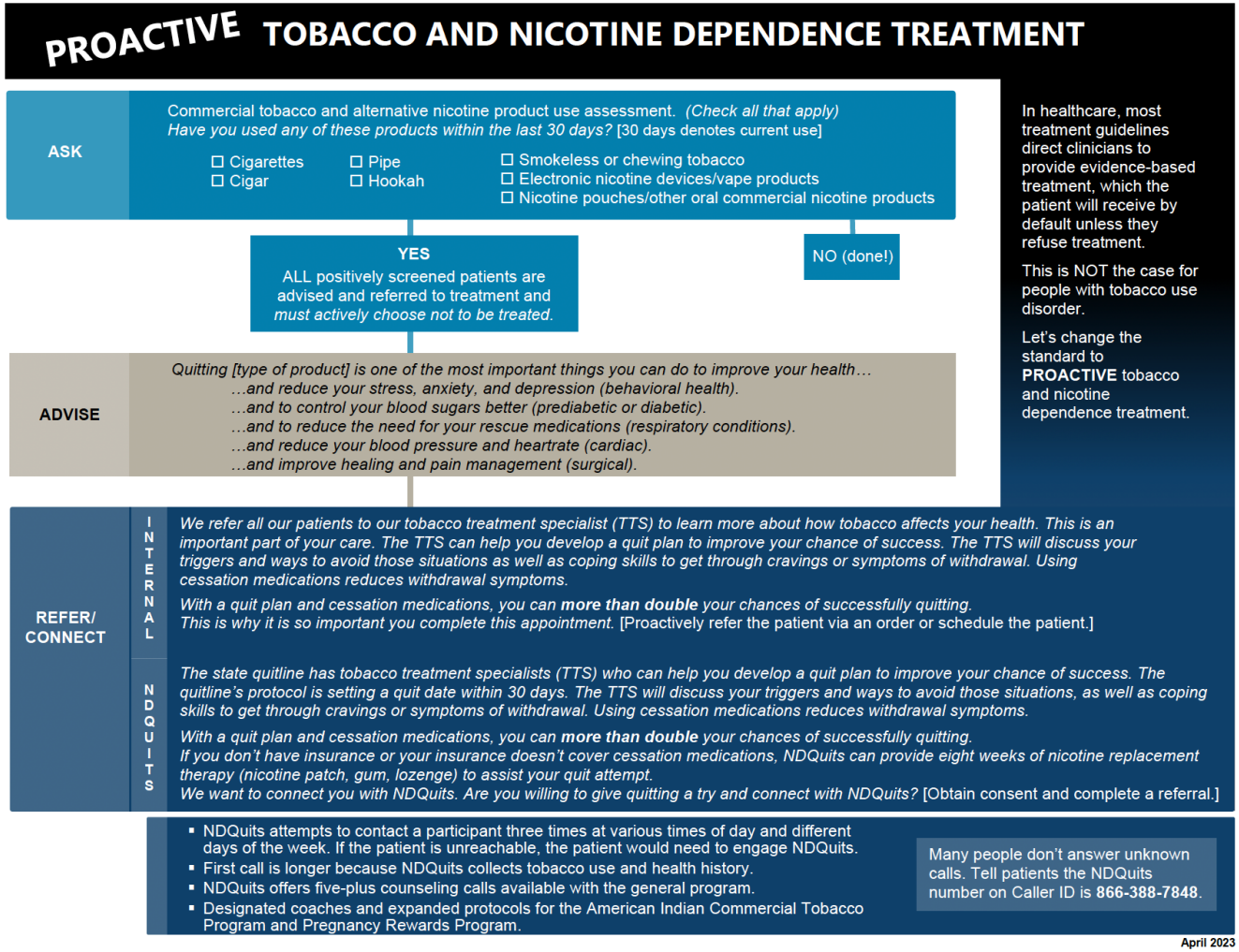
APPENDIX A. PRISMA FLOW DIAGRAM

Identification of studies via databases					
	"Tobacco cessation" AND "healthcare"	"Smoking cessation" AND "counseling"	"Tobacco cessation" AND "healthcare" AND "counseling"	"E-cigarette" AND "nicotine"	Totals
Cochrane Reviews	n = 9	n = 25	n = 32	n = 5	71
PubMed	n = 247	n = 25	n = 94	n =285	651
CINAHL	n = 127	n =276	n =70	n =137	610
Total	n =383	n =326	n =196	n =427	1332
Limits: 2017- 2023, English language, Adults, Systematic Reviews, Randomized Control Trials, Meta-Analysis, study within US Exclusions applied: non-English, ages other than adults, editorials, commentaries, clinical trials. Number of duplicates were not identified- but there were many across databases and searches.					



APPENDIX B. NDDHHS AAR/C ALGORITHM



Note: NDQuits Ask, Advise, Refer/Connect (AAR/C). Used/reprinted from NDQuits with permission from Kara Backer, MBA, RRT, NCTTP, Nicotine Dependence Treatment Coordinator, Tobacco Prevention and Control Program, North Dakota Department of Health and Human Services, kbacker@nd.gov

APPENDIX C. PERMISSION TO USE AAR/C ALGORITHM FROM KARA A. BACKER

KB

Backer, Kara A.

April 6, 2023, 4:04 PM

RE: Permission to Use AAR/C model

To: Bhattarai, Kanchan

Hi, Kanchan,

Of course, you can use the AAR/C algorithm. I've recently tweaked it to make it a strong opt-out. The previous version allowed patients to exit when healthcare staff should provide treatment for tobacco use disorder. Please see the attached 2023 AAR/C!

Also, would you be interested in changing the terminology a bit? This is the information I include in my grant documents: Terminology describing treatment is preferred because cessation refers to a one-event-stopping behavior. Tobacco and nicotine dependence is a chronic, relapsing condition often requiring repeated treatment interventions and long-term support.

I only use 'cessation' when talking about cessation medications. Otherwise, whatever was cessation is now 'tobacco and nicotine dependence treatment.'

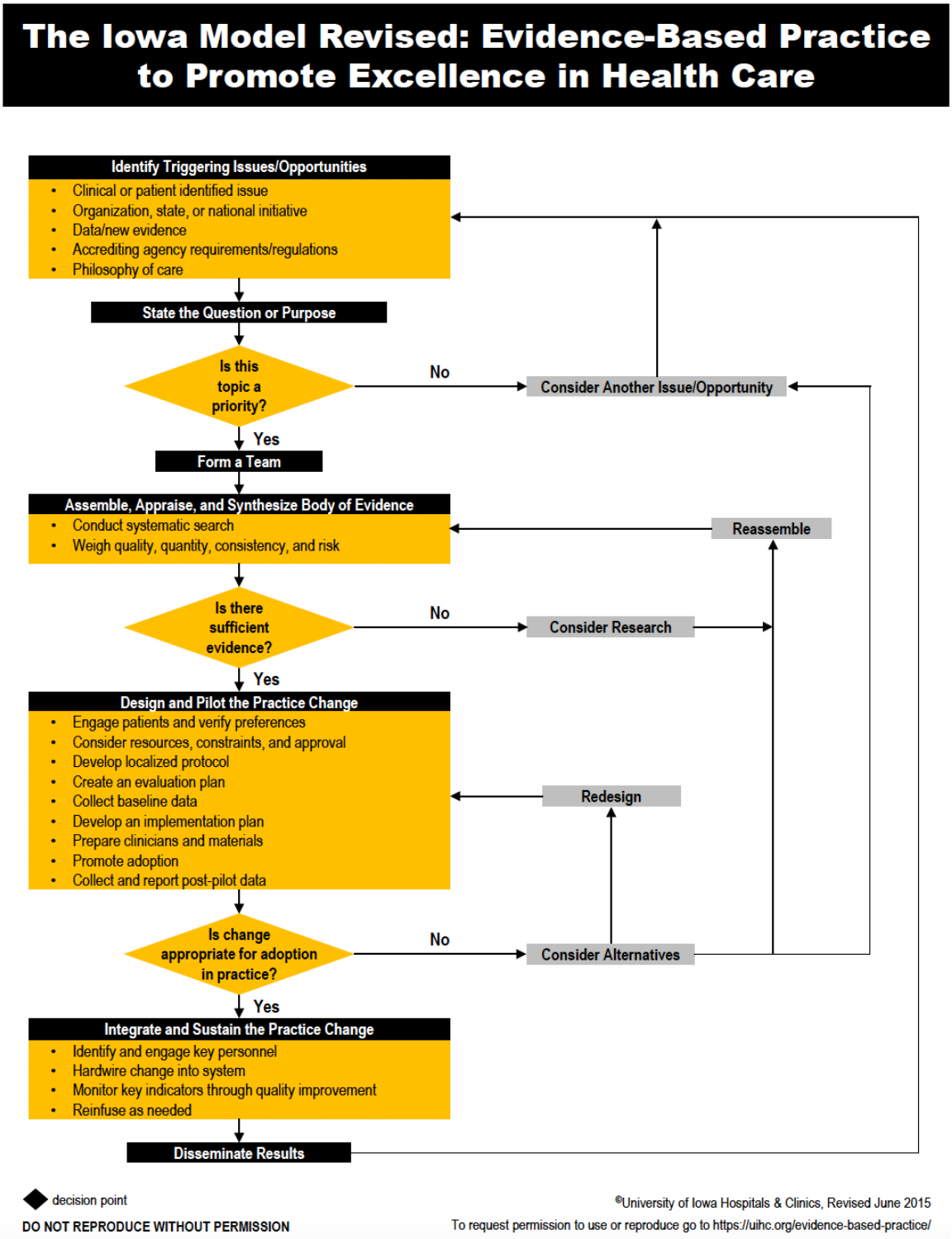
Our program focuses this year is to be more proactive versus passive, and offering treatment is proactive.

I hope that is helpful. Let me know if you have questions. I'll be back Tuesday. 😊

Kara A. Backer, MBA, RRT, NCTTP
Nicotine Dependence Treatment Coordinator
Tobacco Prevention and Control Program

701-328-4517 • kbacker@nd.gov • hhs.nd.gov

APPENDIX D. IOWA MODEL REVISED



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APPENDIX E. PERMISSION TO USE IOWA MODEL

Kimberly Jordan - University of Iowa Hospitals and Clinics
Permission to use Iowa Implementation for Sustainability Framework©
To: Budi,
Reply-To: Kimberly Jordan - University of Iowa Hospitals and Clinics

Inbox - Kanchan NDSU February 4, 2023, 10:47 AM

You have permission, as requested today, to review and/or use the Iowa Implementation for Sustainability Framework©. Click the link below to open.

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Reference: Cullen, L., Hanrahan, K., Edmonds, S. W., Reisinger, H., & Wagner, M. (2022). Iowa implementation and sustainability framework. *Implementation Science, 17,* 1-20. https://doi.org/10.1186/s13012-021-01157-5

Please contact UIHCNursingResearchandEBP@uiowa.edu or 319-384-9098 with questions.

APPENDIX F. ORAL SCRIPT FOR RECRUITMENT IN CLASS

Hi everyone,

My name is Kanchan Bhattarai. I am a graduate student in the School of Nursing at North Dakota State University, and I am conducting a research project to determine if modifying tobacco and nicotine dependence treatment education into the coursework of the DNP program at NDSU will increase student's knowledge and improve motivation, comfort, and confidence in counseling patients in tobacco and nicotine dependence treatment.

Because you are enrolled in the graduate course, NURS 810 Health Promotion, you are invited to take part in this research project. Your participation is entirely your choice, and you may change your mind and withdraw or quit participating at any time, with no penalty to you. Since tobacco and nicotine dependence treatment education is mandatory in NURS 810 class, you will receive points upon completion of the NDQuits QuitLogix modules. The required coursework of tobacco and nicotine dependence treatment will not include completion of the pre- and post-education questionnaire. My project includes asking you to complete pre- and post-education questionnaires. The pre- and post-education questionnaire is optional and is not associated with your grade.

The pre-education questionnaire should take about 5 - 8 minutes to complete 11 Likert scale questions about your comfort, confidence, and motivation to provide tobacco and nicotine dependence treatment counseling to patients and some open-ended questions. You will also see three demographic data questions. You will be asked to complete this questionnaire twice: once pre- education, in a few minutes, and then again about 2 months post-education. The post-education questionnaire will contain 13 Likert scale questions and some open-ended questions.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks. These known risks include privacy/confidentiality. The participant's choice to complete or not complete the questionnaire will not be made known to myself, the other project investigators, or the course faculty. Data will be gathered using Qualtrics and downloaded onto my password protected laptop. NDSU Stats Department faculty and research assistant will have access to the data for analysis. No identifying information will be gathered.

By taking part in this research, you may benefit by increasing your knowledge, confidence, motivation, and comfort in treating tobacco and nicotine dependence treatment.

However, you may not get any benefit from being in this study. This could in turn benefit society by increasing the participating future nurse practitioner's ability to counsel patients through tobacco and nicotine dependence treatment. Additionally, this information may be used to determine if this tobacco and nicotine dependence treatment education will be included in future NDSU DNP coursework.

Again, this study is completely anonymous. That means that no one, not even members of the research team, will know that the information you give comes from you. Even if you choose to not participate in this survey, please remain seated in the classroom for 5-8 minutes. During survey time, you may choose to work on your other coursework. I have sent an email to your school email address provided with the Qualtrics link. Once you click the Qualtrics link, you will proceed with this survey. By proceeding with this survey, your consent to participate is implied.

APPENDIX G. EMAIL FOR RECRUITMENT

Dear Students,

My name is Kanchan Bhattarai. I am a third year DNP student at NDSU. I am conducting my dissertation project to determine if modifying tobacco and nicotine dependence treatment education into the coursework of the DNP program at NDSU will increase the participating students' knowledge and improve motivation, comfort, and confidence in counseling patients in tobacco and nicotine dependence treatment.

I will be coming to your classroom soon to invite you to participate in my dissertation project. If you choose to participate, you will be asked to complete a questionnaire twice once pre-education and then again about 2 months post-education by using a Qualtrics link. Once you click on the Qualtrics link, you will proceed with the survey. By proceeding with the survey, your consent to participation is implied. Your choice to complete or not complete the questionnaires will not be made known to myself, the other project investigators, or the course faculty and is not associated with your grade. You may choose to withdraw from this project and the questionnaire any time without any penalty. All the entries and communications will be anonymous and confidential. NDSU Stats Department faculty and research assistant will have access to the data for analysis. Your anonymous responses will be saved in my secure password protected laptop until the dissertation is complete, at which time responses will be deleted from my laptop.

After I attend your class in a few minutes and explain the study more, you are free to click on the Qualtrics link. Visit Qualtrics link here : Link

You may contact me directly with any questions for more information. My email address is Kanchan.bhattarai@ndsu.edu and contact info: ###-###-####

Thank you!

APPENDIX H. NDSU IRB APPROVAL

NDSU NORTH DAKOTA STATE UNIVERSITY

08/28/2023

Dr. Kelly Patricia Buettner-Schmidt
Nursing

IRB Approval of Amendment to Protocol #IRB0004788 , "A PRACTICE IMPROVEMENT PROJECT IMPROVING TOBACCO AND NICOTINE DEPENDENCE TREATMENT EDUCATION IN A DOCTOR OF NURSING PRACTICE PROGRAM"

Co-investigator(s) and research team:

- Kelly Patricia Buettner-Schmidt
- Kanchan Bhattarai
- Megan C Orr
- Nazia Riasat

Funding Agency:
Changes approved: Changed wording

Research site(s): This practice improvement project will be conducted in NDSU DNP program. NDSU offers the DNP program in two locations i.e., Fargo and Bismarck, N.D. The NDSU DNP program prepares students for eligibility for certification as a family nurse practitioner. The NDSU DNP program is accredited by the Commission on Collegiate Nursing Education (North Dakota State University, n.d.). The NDSU's DNP program accepts 18-20 students annually after the completion of the application and interview process. The NDSU's DNP program provides on-campus learning opportunities with direct interaction with faculty. This education module will be implemented in the NURS 810 Health Promotion course during the Fall semester of 2023.

The protocol amendment request and all included documentation for the above-referenced project have been reviewed and approved via the procedures of the North Dakota State University Institutional Review Board. Current protocol approval expires - 07/23/2026.

Thank you for cooperating with NDSU IRB procedures, and best wishes for a successful study.

NDSU has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

APPENDIX I. CONSENT

Title of Research Study: A Practice Improvement Project Improving Tobacco and Nicotine Dependence Treatment Education in a Doctor of Nursing Practice Program

Dear Graduate Student,

My name is Kanchan Bhattarai. I am a graduate student in the School of Nursing at North Dakota State University, and I am conducting a research project to determine if modifying tobacco and nicotine dependence treatment education into the coursework of the DNP program at NDSU will increase student's knowledge, motivation, comfort, and confidence in counseling patients in tobacco and nicotine dependence treatment.

Because you are enrolled in the graduate course, NURS 810 Health Promotion, you are invited to take part in this research project. Your participation is entirely your choice, and you may change your mind and withdraw or quit participating at any time, with no penalty to you.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks. These known risks include privacy/confidentiality. The participant's choice to complete or not complete the questionnaire will not be made known to the project investigators or the NURS 810 course faculty. Data will be gathered using Qualtrics and downloaded onto the coinvestigator's password protected laptop. NDSU Stats Department faculty and research assistant will have access to the data for analysis. No identifying information will be gathered.

By taking part in this research, you may benefit by increasing your knowledge, confidence, motivation, and comfort in treating tobacco and nicotine use. However, you may not get any benefit from being in this study. This could in turn benefit society by increasing the participating future nurse practitioner's ability to counsel patients through tobacco and nicotine dependence treatment. Additionally, this information may be used to determine if this tobacco and nicotine dependence treatment education will be included in future NDSU DNP coursework. It should take about five to eight minutes to complete Likert scale and open-ended questions about your comfort, confidence, and motivation to provide tobacco and nicotine dependence treatment counseling to patients. Additionally, there are three demographic data questions. You will be asked to complete this questionnaire twice: pre- education and 2 months post-education.

The post-education questionnaire will contain 13 Likert scale questions. There will be two open ended questions. This study is completely anonymous. That means that no one, not even members of the research team, will know that the information you give comes from you. By proceeding with this survey, your consent to participate is implied.

If you have any questions about this project, please contact me at ###-###-#### or kanchan.bhattarai@ndsu.edu, or contact my advisor, Kelly Buettner-Schmidt PhD, RN, FAAN, at ###-###-#### or Kelly.buettnerschmi@ndsu.edu. You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8995, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu , or by mail at: NDSU HRPP Office, NDSU Dept. 4000, PO Box 6050, Fargo, ND 58108-6050

Thank you for taking part in this research.

APPENDIX J. PERMISSION TO USE NDQUITS QUITLOGIX

KP **Kanchan Bhattarai Poudel** May 26, 2023, 7:40 AM

Permission to use NDQUITS QuitLogix modules

To: Backer, Kara A.

Hi Kara,

For my dissertation project to improve tobacco cessation education in the graduate family nurse practitioner program at NDSU, I am planning to modify previously adapted course to all the modules of NDQUIT Quitlogix. With your permission, I would like to implement this change of adding NDQUIT QuitLogix to the coursework.

Please let me know if you have any questions.

Thank you for your consideration.

Kanchan Bhattarai
North Dakota State University
DNP student
Kanchan.bhattarai@ndsu.edu

KB **Backer, Kara A.** June 2, 2023, 11:04 AM

RE: Permission to use NDQUITS QuitLogix modules

To: Bhattarai, Kanchan, Cc: Charvat, Neil J. Details

Hi, Kanchan,

The Tobacco Prevention and Control Program and National Jewish Health approve using QuitLogix modules for your coursework.

Thank you,

Kara A. Backer, MBA, RRT, NCTTP
Nicotine Dependence Treatment Coordinator
Tobacco Prevention and Control Program

701-328-4517 • kbacker@nd.gov • hhs.nd.gov

APPENDIX K. TOBACCO CESSATION AND NICOTINE DEPENDENCE TOOLKIT

Tobacco and Nicotine Dependence Treatment Toolkit

STEP One: ASK about Tobacco Use

➲ Suggested Dialogue

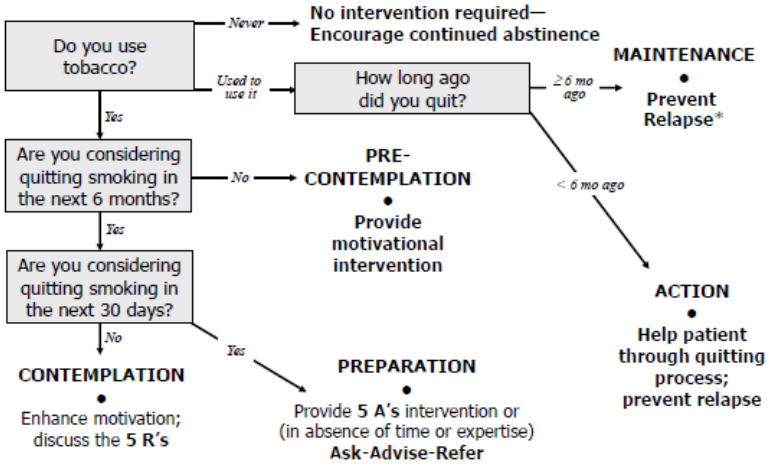
- ✓ Do you ever smoke or use other types of tobacco or nicotine, such as e-cigarettes?
  - – I take time to talk with all of my patients about tobacco use—because it's important.
- ✓ Condition X often is caused or worsened by exposure to tobacco smoke. Do you, or does someone in your household smoke?
- ✓ Medication X often is used for conditions linked with or caused by smoking. Do you, or does someone in your household smoke?

STEP Two: Strongly ADVISE to Quit

➲ Suggested Dialogue

- – Quitting is the most important thing you can do to protect your health now and in the future. I have training to help my patients quit, and when you are ready I would be more than happy to work with you to design a treatment plan.
- – Prior to imparting advice, consider asking the patient for permission to do so – e.g., "May I tell you why this concerns me?" [then elaborate on patient-specific concerns]

STEP Three: ASSESS Readiness to Quit



* Relapse prevention interventions are not necessary if patient has not used tobacco for many years and is not at risk for re-initiation.

Fiore MC, Jaén CR, Baker TB, et al. *Treating Tobacco Use and Dependence: 2008 Update.* Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service. May 2008.

STEP Four: ASSIST with Quitting

RX for CHANGE

- ✓ **Assess Tobacco Use History**
  - Current use: type(s) of tobacco used, amount
  - Past use:
    - – Duration of tobacco use
    - – Changes in levels of use recently
  - Past quit attempts:
    - – Number of attempts, date of most recent attempt, duration
    - – Methods used previously—What did or didn't work? Why or why not?
    - – Prior medication administration, dose, adherence, duration of treatment
    - – Reasons for relapse
- ✓ **Discuss Key Issues** (for the upcoming or current quit attempt)
  - Reasons/motivation for wanting to quit (or avoid relapse)
  - Confidence in ability to quit (or avoid relapse)
  - Triggers for tobacco use
  - Routines and situations associated with tobacco use
  - Stress-related tobacco use
  - Concerns about weight gain
  - Concerns about withdrawal symptoms
- ✓ **Facilitate Quitting Process**
  - Discuss methods for quitting: pros and cons of the different methods
  - Set a quit date: more than 2–3 days away but less than 2 weeks away
  - Recommend Tobacco Use Log
  - Discuss coping strategies (cognitive, behavioral)
  - Discuss withdrawal symptoms
  - Discuss concept of "slip" versus relapse
  - Provide medication counseling: adherence, proper use, with demonstration
  - Offer to assist throughout the quit attempt
- ✓ **Evaluate the Quit Attempt** (at follow-up)
  - Status of attempt
  - Address "slips" and relapse
  - Medication compliance, extent to which nicotine withdrawal is being alleviated with current regimen, and plans for discontinuation of medication(s)

STEP Five: ARRANGE Follow-up Counseling

- ✓ Monitor patients' progress throughout the quit attempt. Follow-up contact should occur during the first week after quitting. A second follow-up contact is recommended in the first month. Additional contacts should be scheduled as needed. Counseling contacts can occur face-to-face, by telephone, or by e-mail. Keep patient progress notes.
- ✓ Address temptations and triggers; discuss relapse prevention strategies.
- ✓ Congratulate patients for continued success.

TOBACCO CESSATION COUNSELING GUIDESHEET – Transtheoretical Model

COPING WITH QUITTING:
COGNITIVE AND BEHAVIORAL STRATEGIES

COGNITIVE STRATEGIES focus on retraining the way a patient thinks. Often, patients will deliberate on the fact that they are thinking about a cigarette, and this leads to relapse. Patients must recognize that thinking about a cigarette doesn't mean they need to have one.	
REVIEW COMMITMENT TO QUIT	Each morning, say, "I am proud that I made it through another day without tobacco!" Remind oneself that cravings and temptations are temporary and will pass. Announce, either silently or aloud, "I am a nonsmoker, and the temptation will pass."
DISTRACTIVE THINKING	Use deliberate, immediate refocusing of thinking toward other thoughts when cued by thoughts about tobacco use.
POSITIVE SELF-TALKS, PEP TALKS	Say, "I can do this," and remind oneself of previous difficult situations in which tobacco use was avoided.
RELAXATION THROUGH IMAGERY	Center mind toward positive, relaxing thoughts.
MENTAL REHEARSAL, VISUALIZATION	Prepare for situations that might arise by envisioning how best to handle them. For example, envision what would happen if offered a cigarette by a friend—mentally craft and rehearse a response, and perhaps even practice it by saying it aloud.
BEHAVIORAL STRATEGIES involve specific actions to reduce risk for relapse. These strategies should be considered prior to quitting, after determining patient-specific triggers and routines or situations associated with tobacco use. Below are strategies for several of the more common cues or causes for relapse.	
STRESS	Anticipate upcoming challenges at work, at school, or in personal life. Develop a substitute plan for tobacco use during times of stress (e.g., use deep breathing, take a break or leave the situation, call a supportive friend or family member, use nicotine replacement therapy).
ALCOHOL	*Drinking alcohol can lead to relapse.* Consider limiting or abstaining from alcohol during the early stages of quitting.
OTHER TOBACCO USERS	*Quitting is more difficult if the patient is around other tobacco users. This is especially difficult if another tobacco user is in the household.* During the early stages of quitting, limit prolonged contact with individuals who are using tobacco. Ask co-workers, friends, and housemates not to smoke or use tobacco in your presence.
ORAL GRATIFICATION NEEDS	Have nontobacco oral substitutes (e.g., gum, sugarless candy, straws, toothpicks, lip balm, toothbrush, nicotine replacement therapy, bottled water) readily available.

AUTOMATIC SMOKING ROUTINES	Anticipate routines associated with tobacco use and develop an alternative plan. Examples: MORNING COFFEE: change morning routine, take shower before drinking coffee, drink tea instead of coffee, take a brisk walk shortly after awakening. WHILE DRIVING: remove all tobacco from car, have car interior detailed, listen to an audio book or talk radio, use oral substitutes. WHILE ON THE PHONE: stand while talking, limit call duration, change phone location, keep hands occupied by doodling or sketching. WHILE WATCHING TV: sit in a different chair, rearrange furniture, consider watching in a different room, keep hands busy by squeezing a stress ball. AFTER MEALS: get up and immediately do dishes or take a brisk walk after eating, brush teeth, call supportive friend.
POST-CESSATION WEIGHT GAIN	Do not attempt to modify multiple behaviors at one time. If weight gain is a barrier to quitting, engage in regular physical activity and adhere to a healthful diet (as opposed to strict dieting). Carefully plan and prepare meals, increase fruit and water intake to create a feeling of fullness, and chew sugarless gum or eat sugarless candies. Consider use of pharmacotherapy shown to delay weight gain.
CRAVINGS FOR TOBACCO	Cravings for tobacco are temporary and usually pass within 5–10 minutes. Handle cravings through distractive thinking, take a break, do something else, take deep breaths.

WITHDRAWAL SYMPTOMS INFORMATION SHEET

Quitting tobacco use brings about a variety of physical and psychological withdrawal symptoms. For some people, coping with withdrawal symptoms is like riding a roller coaster—there can be sharp turns, slow climbs, and unexpected plunges. **Most symptoms begin within the first 1 to 2 days, peak within the first week, and subside within 2 to 4 weeks.** Report new symptoms to your health-care provider, especially if severe. Consider the impact of recent medication changes and your caffeine intake.

SYMPTOM	CAUSE	DURATION	RELIEF
Chest tightness	Tightness is likely due to tension created by the body's need for nicotine or may be caused by sore muscles from coughing.	A few days	▪ Use relaxation techniques ▪ Try deep breathing ▪ Use of a nicotine medication might help
Constipation, stomach pain, gas	Intestinal movement decreases for a brief period.	1–2 weeks	▪ Drink plenty of fluids ▪ Add fruits, vegetables, and whole-grain cereals to diet
Cough, dry throat, nasal drip	The body is getting rid of mucus, which has blocked airways and restricted breathing.	A few days	▪ Drink plenty of fluids ▪ Avoid additional stress during first few weeks
Craving for a cigarette	Nicotine is a strongly addictive drug, and withdrawal causes cravings.	Frequent for 2–3 days; can happen for months or years	▪ Wait out the urge, which lasts only a few minutes ▪ Distract yourself ▪ Exercise (take walks) ▪ Use of a nicotine medication might help
Depressed mood	It is normal to feel sad for a period of time after you first quit smoking. Many people have a strong urge to smoke when they feel depressed.	1–2 weeks	▪ Increase pleasurable activities ▪ Talk with your clinician about changes in your mood when quitting ▪ Get extra support from friends and family

Difficulty concentrating	The body needs time to adjust to not having constant stimulation from nicotine.	A few weeks	▪ Plan workload accordingly ▪ Avoid additional stress during first few weeks
Dizziness	The body is getting extra oxygen.	1–2 days	▪ Use extra caution ▪ Change positions slowly
Fatigue	Nicotine is a stimulant.	2–4 weeks	▪ Take naps ▪ Do not push yourself ▪ Use of a nicotine medication might help
Hunger	Cravings for a cigarette can be confused with hunger pangs; sensation may result from oral cravings or the desire for something in the mouth.	Up to several weeks	▪ Drink water or low-calorie liquids ▪ Be prepared with low-calorie snacks
Insomnia	Nicotine affects brain wave function and influences sleep patterns; coughing and dreams about smoking are common.	1 week	▪ Reduce caffeine intake by about half (and none after lunchtime, to improve sleep), because its effects will increase with quitting smoking ▪ Use relaxation techniques
Irritability	The body's craving for nicotine can produce irritability.	2–4 weeks	▪ Take walks ▪ Try hot baths ▪ Use relaxation techniques

Adapted from materials from the National Cancer Institute.

FAGERSTRÖM TEST FOR NICOTINE DEPENDENCE (ADULTS)

1. How soon after you wake up do you smoke your first cigarette? **Score**

- ❑ Within 5 minutes 3
- ❑ 6–30 minutes 2
- ❑ 31–60 minutes 1
- ❑ After 60 minutes 0

2. Do you find it difficult to refrain from smoking in the places where it is forbidden (e.g., in church, at the library, in cinema)?

- ❑ Yes 1
- ❑ No 0

3. Which cigarette would you hate most to give up?

- ❑ The first one in the morning 1
- ❑ Any other 0

4. How many cigarettes/day do you smoke?

- ❑ 10 or less 0
- ❑ 11–20 1
- ❑ 21–30 2
- ❑ 31 or more 3

5. Do you smoke more frequently during the first hours after waking than during the rest of the day?

- ❑ Yes 1
- ❑ No 0

6. **Do you smoke if you are so ill that you are in bed most of the day?**

- ❑ Yes 1
- ❑ No 0

Total Score: ☐

Heatherton TF, Kozlowski LT, Frecker RC, Fagerström K-O. The Fagerström Test for Nicotine Dependence: a revision of the Fagerström Tolerance Questionnaire. *Br J Addict* 1991;86:1119–1127.

Score of:	1-2=low dependence	5-7= moderate dependence
	3-4= low to moderate dependence	8 + = high dependence

PROACTIVE TOBACCO AND NICOTINE DEPENDENCE TREATMENT

ASK

Commercial tobacco and alternative nicotine product use assessment. *(Check all that apply)*
Have you used any of these products within the last 30 days? [30 days denotes current use]

- ☐ Cigarettes
- ☐ Cigar
- ☐ Pipe
- ☐ Hookah
- ☐ Smokeless or chewing tobacco
- ☐ Electronic nicotine devices/vape products
- ☐ Nicotine pouches/other oral commercial nicotine products

YES
ALL positively screened patients are advised and referred to treatment and *must actively choose not to be treated.*

NO (done!)

ADVISE

Quitting [type of product] is one of the most important things you can do to improve your health…
…and reduce your stress, anxiety, and depression (behavioral health).
…and to control your blood sugars better (prediabetic or diabetic).
…and to reduce the need for your rescue medications (respiratory conditions).
…and reduce your blood pressure and heartrate (cardiac).
…and improve healing and pain management (surgical).

REFER/ CONNECT

INTERNAL

We refer all our patients to our tobacco treatment specialist (TTS) to learn more about how tobacco affects your health. This is an important part of your care. The TTS can help you develop a quit plan to improve your chance of success. The TTS will discuss your triggers and ways to avoid those situations as well as coping skills to get through cravings or symptoms of withdrawal. Using cessation medications reduces withdrawal symptoms.

*With a quit plan and cessation medications, you can **more than double** your chances of successfully quitting.*
This is why it is so important you complete this appointment. [Proactively refer the patient via an order or schedule the patient.]

NDQUITS

The state quitline has tobacco treatment specialists (TTS) who can help you develop a quit plan to improve your chance of success. The quitline's protocol is setting a quit date within 30 days. The TTS will discuss your triggers and ways to avoid those situations, as well as coping skills to get through cravings or symptoms of withdrawal. Using cessation medications reduces withdrawal symptoms.

*With a quit plan and cessation medications, you can **more than double** your chances of successfully quitting.*
If you don't have insurance or your insurance doesn't cover cessation medications, NDQuits can provide eight weeks of nicotine replacement therapy (nicotine patch, gum, lozenge) to assist your quit attempt.
We want to connect you with NDQuits. Are you willing to give quitting a try and connect with NDQuits? [Obtain consent and complete a referral.]

- NDQuits attempts to contact a participant three times at various times of day and different days of the week. If the patient is unreachable, the patient would need to engage NDQuits.
- First call is longer because NDQuits collects tobacco use and health history.
- NDQuits offers five-plus counseling calls available with the general program.
- Designated coaches and expanded protocols for the American Indian Commercial Tobacco Program and Pregnancy Rewards Program.

Many people don't answer unknown calls. Tell patients the NDQuits number on Caller ID is **866-388-7848**.

In healthcare, most treatment guidelines direct clinicians to provide evidence-based treatment, which the patient will receive by default unless they refuse treatment.

This is NOT the case for people with tobacco use disorder.

Let's change the standard to **PROACTIVE** tobacco and nicotine dependence treatment.

April 2023

Billing and Coding for Tobacco Cessation in Primary Care

Code	Description
99406	Smoking and tobacco use cessation counseling visit; intermediate, **greater than 3 minutes up to 10 minutes**
99407	Smoking and tobacco use cessation counseling visit; intermediate, **greater than 10 minutes**

Diagnosis Codes allowed for 99406/99407:

When billing for these services providers must use an ICD-10 F17 code or a Z code. The F codes are used if the patient is dependent on tobacco. The Z codes are used if there is not dependence on tobacco. The Z codes cannot be combined with an F17 code.

F CODES

ICD-10 Diagnosis Code	Description: All with Nicotine Dependence
F17.200*	Product unspecified, uncomplicated
F17.201*	Product unspecified, in remission
F17.203	Product unspecified, with withdrawal
F17.208	Product unspecified, with other nicotine-induced disorders
F17.209	Product unspecified, with unspecified nicotine-induced disorders
F17.210*	Cigarettes, uncomplicated
F17.211*	Cigarettes, in remission
F17.213	Cigarettes, with withdrawal
F17.218	Cigarettes, with other nicotine-induced disorders
F17.219	Cigarettes, with unspecified nicotine-induced disorders
F17.220*	Chewing tobacco, uncomplicated
F17.221*	Chewing tobacco, in remission
F17.223	Chewing tobacco, with withdrawal
F17.228	Chewing tobacco, with other nicotine-induced disorders
F17.229	Chewing tobacco, with unspecified nicotine-induced disorders

F17.290*	Other tobacco product, uncomplicated
F17.291*	Other tobacco product, in remission
F17.293	Other tobacco product, with withdrawal
F17.298	Other tobacco product, with other nicotine-induced disorders
F17.299	Other tobacco product, with unspecified nicotine-induced disorders

Z CODES

ICD-10 Diagnosis Code	Description: All with Nicotine Dependence
Z57.31	Occupational exposure to environmental tobacco smoke • May not be used with Z77.22 exposure to environmental smoke
Z77.22	Contact with and suspected exposure to environmental smoke • May not be used with a F17.2 tobacco dependence or Z72 tobacco use code.
Z71.6	Counseling and Medicaid Advice – tobacco abuse counseling
Z72.0	Problems Related to Lifestyle and tobacco use not otherwise specified
Z87.891	Personal history of nicotine dependence • May not be used with F17.2 current nicotine dependence code.
Z13.89	Encounter for screening for other disorder. Use for tobacco use screening.

The preventative counseling codes, 99406 and 99407, can be billed along with an evaluation and management (E/M) code such as 99213 and 99214.

Pharmacologic Product Guide: FDA-Approved Medications for Smoking Cessation

	Nicotine Replacement Therapy (NRT) Formulations				Bupropion SR	Varenicline
	Gum	**Lozenge**	**Transdermal Patch**	**Nasal Spray**		
Product	**Nicorette[1], Generic** OTC 2 mg, 4 mg original, cinnamon, fruit, mint (various)	**Nicorette[1], Generic; Nicorette[1] Mini** OTC 2 mg, 4 mg; cinnamon, cherry, mint	**Habitrol[2], NicoDerm CQ[1], Generic** OTC 7 mg, 14 mg, 21 mg (24-hr release)	**Nicotrol NS[3]** Rx Metered spray 10 mg/mL nicotine solution	**Generic** (formerly Zyban) Rx 150 mg sustained-release tablet	**Generic** (formerly Chantix[3]) Rx 0.5 mg, 1 mg tablet
Precautions	▪ Recent (≤ 2 weeks) myocardial infarction ▪ Serious underlying arrhythmias ▪ Serious or worsening angina pectoris ▪ Temporomandibular joint disease ▪ Pregnancy[4] and breastfeeding ▪ Adolescents (<18 years)	▪ Recent (≤ 2 weeks) myocardial infarction ▪ Serious underlying arrhythmias ▪ Serious or worsening angina pectoris ▪ Pregnancy[4] and breastfeeding ▪ Adolescents (<18 years)	▪ Recent (≤ 2 weeks) myocardial infarction ▪ Serious underlying arrhythmias ▪ Serious or worsening angina pectoris ▪ Pregnancy[4] and breastfeeding ▪ Adolescents (<18 years)	▪ Recent (≤ 2 weeks) myocardial infarction ▪ Serious underlying arrhythmias ▪ Serious or worsening angina pectoris ▪ Underlying chronic nasal disorders (rhinitis, nasal polyps, sinusitis) ▪ Severe reactive airway disease ▪ Pregnancy[4] and breastfeeding ▪ Adolescents (<18 years)	▪ Concomitant therapy with medications/conditions known to lower the seizure threshold ▪ Hepatic impairment ▪ Pregnancy[4] and breastfeeding ▪ Adolescents (<18 years) ▪ Treatment-emergent neuropsychiatric symptoms[5] **Contraindications:** ▪ Seizure disorder ▪ Concomitant bupropion (e.g., Wellbutrin) therapy ▪ Current or prior diagnosis of bulimia or anorexia nervosa ▪ Simultaneous abrupt discontinuation of alcohol or sedatives/benzodiazepines ▪ MAO inhibitors in preceding 14 days; concurrent use of reversible MAO inhibitors	▪ Severe renal impairment (dosage adjustment is necessary) ▪ Pregnancy[4] and breastfeeding ▪ Adolescents (<18 years) ▪ Treatment-emergent neuropsychiatric symptoms[5]
Dosing	*1st cigarette ≤30 minutes after waking:* 4 mg *1st cigarette >30 minutes after waking:* 2 mg Weeks 1–6: 1 piece q 1–2 hours* Weeks 7–9: 1 piece q 2–4 hours* Weeks 10–12: 1 piece q 4–8 hours* *while awake ▪ Maximum, 24 pieces/day ▪ During initial 6 weeks of treatment, use at least 9 pieces/day ▪ Chew each piece slowly ▪ Park between cheek and gum when peppery or tingling sensation appears (~15–30 chews) ▪ Resume chewing when tingle fades ▪ Repeat chew/park steps until most of the nicotine is gone (tingle does not return; generally 30 min) ▪ Park in different areas of mouth ▪ No food or beverages 15 minutes before or during use ▪ Duration: up to 12 weeks	*1st cigarette ≤30 minutes after waking:* 4 mg *1st cigarette >30 minutes after waking:* 2 mg Weeks 1–6: 1 lozenge q 1–2 hours* Weeks 7–9: 1 lozenge q 2–4 hours* Weeks 10–12: 1 lozenge q 4–8 hours* *while awake ▪ Maximum, 20 lozenges/day ▪ During initial 6 weeks of treatment, use at least 9 lozenges/day ▪ Allow to dissolve slowly (20–30 minutes) ▪ Nicotine release may cause a warm, tingling sensation ▪ Do not chew or swallow ▪ Occasionally rotate to different areas of the mouth ▪ No food or beverages 15 minutes before or during use ▪ Duration: up to 12 weeks	*>10 cigarettes/day:* 21 mg/day x 4–6 weeks 14 mg/day x 2 weeks 7 mg/day x 2 weeks *≤10 cigarettes/day:* 14 mg/day x 6 weeks 7 mg/day x 2 weeks ▪ Rotate patch application site daily; do not apply a new patch to the same skin site for at least one week ▪ May wear patch for 16 hours if patient experiences sleep disturbances (remove at bedtime); before recommending, rule out other factors that might be contributing (e.g., drug interaction between caffeine and tobacco smoke, other medications, and lifestyle factors) ▪ Duration: 8–10 weeks	1–2 doses/hour* (8–40 doses/day) One dose = 2 sprays (one in **each** nostril); each spray delivers 0.5 mg of nicotine to the nasal mucosa *while awake ▪ Maximum – 5 doses/hour or – 40 doses/day ▪ During intial 6-8 weeks of treatment, use at least 8 doses/day ▪ Gradually reduce daily dosage over an additional 4-6 weeks ▪ Do not sniff, swallow, or inhale through the nose as the spray is being administered ▪ Duration: 12 weeks	150 mg po q AM x 3 days, then 150 mg po bid ▪ Do not exceed 300 mg/day ▪ Begin therapy 1–2 weeks **prior** to quit date ▪ Allow at least 8 hours between doses ▪ Avoid bedtime dosing to minimize insomnia ▪ Duration: 7–12 weeks, with maintenance up to 6 months in selected patients ▪ Dose tapering is not necessary	Days 1–3: 0.5 mg po q AM Days 4–7: 0.5 mg po bid Weeks 2–12: 1 mg po bid ▪ Begin therapy 1 week **prior** to quit date ▪ Take each dose after eating and with a full glass of water ▪ Dosing adjustment is necessary for patients with severe renal impairment ▪ Duration: 12 weeks; an additional 12-week course may be used in selected patients ▪ May initiate up to 35 days before target quit date OR may reduce smoking over a 12-week period of treatment prior to quitting and continue treatment for an additional 12 weeks

	Nicotine Replacement Therapy (NRT) Formulations				Bupropion SR	Varenicline
	Gum	Lozenge	Transdermal Patch	Nasal Spray		
Adverse Effects	▪ Mouth and throat irritation ▪ Jaw muscle soreness ▪ Hiccups ▪ GI complaints (dyspepsia, nausea) ▪ May stick to dental work ▪ Adverse effects more commonly experienced when chewing the lozenge or using incorrect gum chewing technique (due to rapid nicotine release): – Lightheadedness/dizziness – Nausea/vomiting – Hiccups – Mouth and throat irritation	▪ Mouth and throat irritation ▪ Hiccups ▪ GI complaints (dyspepsia, nausea)	▪ Local skin reactions (erythema, pruritus, burning) ▪ Sleep disturbances (abnormal or vivid dreams, insomnia); associated with nocturnal nicotine absorption	▪ Nasal and/or throat irritation (hot, peppery, or burning sensation) ▪ Ocular irritation/tearing ▪ Sneezing ▪ Cough	▪ Insomnia ▪ Dry mouth ▪ Nausea ▪ Anxiety/difficulty concentrating ▪ Constipation ▪ Tremor ▪ Rash ▪ Seizures (risk is 0.15%) ▪ Neuropsychiatric symptoms (rare; see Precautions)	▪ Nausea ▪ Sleep disturbances (insomnia, abnormal/vivid dreams) ▪ Headache ▪ Flatulence ▪ Constipation ▪ Taste alteration ▪ Neuropsychiatric symptoms (rare; see Precautions)
Advantages	▪ Might serve as an oral substitute for tobacco ▪ Might delay weight gain ▪ Can be titrated to manage withdrawal symptoms ▪ Can be used in combination with other agents to manage situational urges ▪ Relatively inexpensive	▪ Might serve as an oral substitute for tobacco ▪ Might delay weight gain ▪ Can be titrated to manage withdrawal symptoms ▪ Can be used in combination with other agents to manage situational urges ▪ Relatively inexpensive	▪ Once-daily dosing associated with fewer adherence problems ▪ Of all NRT products, its use is least obvious to others ▪ Can be used in combination with other agents; delivers consistent nicotine levels over 24 hours ▪ Relatively inexpensive	▪ Can be titrated to rapidly manage withdrawal symptoms ▪ Can be used in combination with other agents to manage situational urges	▪ Twice-daily oral dosing is simple and associated with fewer adherence problems ▪ Might delay weight gain ▪ Might be beneficial in patients with depression ▪ Can be used in combination with NRT agents ▪ Relatively inexpensive (generic formulations)	▪ Twice-daily oral dosing is simple and associated with fewer adherence problems ▪ Offers a different mechanism of action for patients who have failed other agents ▪ Most effective cessation agent when used as monotherapy
Disadvantages	▪ Need for frequent dosing can compromise adherence ▪ Might be problematic for patients with significant dental work ▪ Proper chewing technique is necessary for effectiveness and to minimize adverse effects ▪ Gum chewing might not be acceptable or desirable for some patients	▪ Need for frequent dosing can compromise adherence ▪ Gastrointestinal side effects (nausea, hiccups, heartburn) might be bothersome	▪ When used as monotherapy, cannot be titrated to acutely manage withdrawal symptoms ▪ Not recommended for use by patients with dermatologic conditions (e.g., psoriasis, eczema, atopic dermatitis)	▪ Need for frequent dosing can compromise adherence ▪ Nasal administration might not be acceptable or desirable for some patients; nasal irritation often problematic ▪ Not recommended for use by patients with chronic nasal disorders or severe reactive airway disease ▪ Cost of treatment	▪ Seizure risk is increased ▪ Several contraindications and precautions preclude use in some patients (see Precautions) ▪ Patients should be monitored for potential neuropsychiatric symptoms[5] (see Precautions)	▪ Patients should be monitored for potential neuropsychiatric symptoms[5] (see Precautions) ▪ Cost of treatment
Cost/day[6]	2 mg or 4 mg: $2.52–$3.42 (9 pieces)	2 mg or 4 mg: $3.42–$3.87 (9 pieces)	$1.82–$2.61 (1 patch)	$10.63 (8 doses)	$0.54 (2 tablets)	$11.18 (2 tablets)

[1] Marketed by GlaxoSmithKline.
[2] Marketed by Dr. Reddy's.
[3] Marketed by Pfizer. Chantix (0.5 mg and 1 mg tablets), formerly marketed by Pfizer, were voluntarily recalled (unavailable since 9/16/2021) due to the presence of N-nitroso-varenicline at or above the FDA acceptable intake limit. Alternative suppliers have been approved for generic formulations in the US.
[4] The U.S. Clinical Practice Guideline states that pregnant smokers should be encouraged to quit without medication based on insufficient evidence of effectiveness and theoretical concerns with safety. Pregnant tobacco users should be offered behavioral counseling interventions that exceed minimal advice to quit.
[5] In July 2009, the FDA mandated that the prescribing information for all bupropion- and varenicline-containing products include a boxed warning highlighting the risk of serious neuropsychiatric symptoms, including changes in behavior, hostility, agitation, depressed mood, suicidal thoughts and behavior, and attempted suicide. Clinicians should advise patients to stop taking varenicline or bupropion SR and contact a health care provider immediately if they experience agitation, depressed mood, or any changes in behavior that are not typical of nicotine withdrawal, or if they experience suicidal thoughts or behavior. If treatment is stopped due to neuropsychiatric symptoms, patients should be monitored until the symptoms resolve. Based on results of a mandated clinical trial, the FDA removed this boxed warning in December 2016.
[6] Approximate cost based on the recommended initial dosing for each agent and average wholesale acquisition prices for generic and brand formulations from Red Book Online. Thomson Reuters, January 2024.

Abbreviations: MAO, monoamine oxidase; NRT, nicotine replacement therapy; OTC, over-the-counter (nonprescription product); Rx, prescription product.

For complete prescribing information and a comprehensive listing of warnings and precautions, please refer to the manufacturers' package inserts.

DRUG INTERACTIONS WITH TOBACCO SMOKE

Many interactions between tobacco smoke and medications have been identified. Note that in most cases it is the tobacco smoke—not the nicotine—that causes these drug interactions. Tobacco smoke interacts with medications through pharmacokinetic (PK) and pharmacodynamic (PD) mechanisms. PK interactions affect the absorption, distribution, metabolism, or elimination of other drugs, potentially causing an altered pharmacologic response. The majority of PK interactions with smoking are the result of induction of hepatic cytochrome P450 enzymes (primarily CYP1A2). Smokers may require higher doses of medications that are CYP1A2 substrates. Upon cessation, dose reductions might be needed. PD interactions alter the expected response or actions of other drugs. The amount of tobacco smoking needed to have an effect has not been established, and the assumption is that any smoker is susceptible to the same degree of interaction. **The most clinically significant interactions are depicted in the shaded rows.**

DRUG/CLASS	MECHANISM OF INTERACTION AND EFFECTS
Pharmacokinetic Interactions	
Alprazolam (Xanax®)	▪ Conflicting data on significance, but possible ↓ plasma concentrations (up to 50%); ↓ half-life (35%).
Bendamustine (Treanda®)	▪ Metabolized by CYP1A2. Manufacturer recommends using with caution in smokers due to likely ↓ bendamustine concentrations, with ↑ concentrations of its two active metabolites.
Caffeine	▪ ↑ Metabolism (induction of CYP1A2); ↑ clearance (56%). Caffeine levels likely ↑ after cessation.
Chlorpromazine (Thorazine®)	▪ ↓ Area under the curve (AUC) (36%) and serum concentrations (24%). ▪ ↓ Sedation and hypotension possible in smokers; smokers may require ↑ dosages.
Clopidogrel (Plavix®)	▪ ↑ Metabolism (induction of CYP1A2) of clopidogrel to its active metabolite. ▪ Enhanced response to clopidogrel in smokers (≥10 cigarettes/day): ↑ platelet inhibition, ↓ platelet aggregation; improved clinical outcomes have been shown (smokers' paradox; may be dependent on CYP1A2 genotype); tobacco cessation should still be recommended in at-risk populations needing clopidogrel.
Clozapine (Clozaril®)	▪ ↑ Metabolism (induction of CYP1A2); ↓ plasma concentrations (by 18%). ▪ ↑ Levels upon cessation may occur; closely monitor drug levels and reduce dose as required to avoid toxicity.
Erlotinib (Tarceva®)	▪ ↑ Clearance (24%); ↓ trough serum concentrations (2-fold).
Flecainide (Tambocor®)	▪ ↑ Clearance (61%); ↓ trough serum concentrations (25%). ▪ Smokers may need ↑ dosages.
Fluvoxamine (Luvox®)	▪ ↑ Metabolism (induction of CYP1A2); ↑ clearance (24%); ↓ AUC (31%); ↓ Cmax (32%) and Css (39%). ▪ Dosage modifications not routinely recommended but smokers may need ↑ dosages.
Haloperidol (Haldol®)	▪ ↑ Clearance (44%); ↓ serum concentrations (70%); data are inconsistent therefore clinical significance is unclear.
Heparin	▪ Mechanism unknown: ↑ clearance; ↓ half-life. Smoking has prothrombotic effects. ▪ Smokers may need ↑ dosages due to PK and PD interactions.
Insulin, subcutaneous	▪ Possible ↓ insulin absorption secondary to peripheral vasoconstriction. ▪ Smoking may cause release of endogenous substances that cause insulin resistance. ▪ PK & PD interactions likely not clinically significant, but smokers may need ↑ dosages.
Irinotecan (Camptosar®)	▪ ↑ Clearance (18%); ↓ serum concentrations of active metabolite, SN-38 (~40%; via induction of glucuronidation); ↓ systemic exposure resulting in lower hematologic toxicity and may reduce efficacy. ▪ Smokers may need ↑ dosages.
Methadone	▪ Possible ↑ metabolism (induction of CYP1A2, a minor pathway for methadone). ▪ Carefully monitor response upon cessation.
Mexiletine (Mexitil®)	▪ ↑ Clearance (25%; via oxidation and glucuronidation); ↓ half-life (36%).
Nintedanib (OFEV®)	▪ Decreased exposure (21%) in smokers. ▪ No dose adjustment recommended, however, patients should not smoke during use.

Pharmacokinetic Interactions (continued)	
Drug/Class	**Mechanism of Interaction and Effects**
Olanzapine (Zyprexa®)	• ↑ Metabolism (induction of CYP1A2); ↑ clearance (98%); ↓ serum concentrations (12%). • Dosage modifications not routinely recommended but smokers may need ↑ dosages.
Pirfenidone (Esbriet®)	• ↑ Metabolism (induction of CYP1A2); ↓ AUC (46%) and ↓ Cmax (68%). • Decreased exposure in smokers might alter efficacy profile.
Propranolol (Inderal®)	• ↑ Clearance (77%, via side-chain oxidation and glucuronidation)
Riociguat (Adempas®)	• ↓ Plasma concentrations (by 50–60%). • Smokers may require dosages higher than 2.5 mg three times a day; consider dose reduction upon cessation.
Ropinirole (Requip®)	• ↓ Cmax (30%) and ↓ AUC (38%) in study with patients with restless legs syndrome. • Smokers may need ↑ dosages.
Tasimelteon (Hetlioz®)	• ↑ Metabolism (induction of CYP1A2); ↓ drug exposure (40%). • Smokers may need ↑ dosages.
Theophylline (Theo-Dur®, etc.)	• ↑ Metabolism (induction of CYP1A2); ↑ clearance (58–100%); ↓ half-life (63%). • Levels should be monitored if smoking is initiated, discontinued, or changed. Maintenance doses are considerably higher in smokers; ↑ clearance also with second-hand smoke exposure.
Tizanidine (Zanaflex®)	• ↓ AUC (30–40%) and ↓ half-life (10%) observed in male smokers.
Tricyclic antidepressants (e.g., imipramine, nortriptyline)	• Possible interaction with tricyclic antidepressants in the direction of ↓ blood levels, but the clinical significance is not established.
Warfarin	• ↑ Metabolism (induction of CYP1A2) of R-enantiomer; however, S-enantiomer is more potent and effect on INR is inconclusive. Consider monitoring INR upon smoking cessation.
Pharmacodynamic Interactions	
Benzodiazepines (diazepam, chlordiazepoxide)	• ↓ Sedation and drowsiness, possibly caused by nicotine stimulation of central nervous system.
Beta-blockers	• Less effective BP and heart rate control effects, possibly caused by nicotine-mediated sympathetic activation. • Smokers may need ↑ dosages.
Corticosteroids, inhaled	• Smokers with asthma may have less of a response to inhaled corticosteroids.
Hormonal contraceptives (combined)	• ↑ Risk of cardiovascular adverse effects (e.g., stroke, myocardial infarction, thromboembolism) in women who smoke and use combined hormonal contraceptives. Ortho Evra patch users shown to have 2-fold ↑risk of venous thromboembolism compared with oral contraceptive users, likely due to ↑ estrogen exposure (60% higher levels). • ↑ Risk with age and with heavy smoking (≥15 cigarettes per day) and is quite marked in women ≥35 years old.
Serotonin 5-HT_1 receptor agonists (triptans)	• This class of drugs may cause coronary vasospasm, caution for use in smokers due to possible unrecognized CAD.
Adapted and updated, from Zevin S, Benowitz NL. Drug interactions with tobacco smoking. An update. *Clin Pharmacokinet* 1999;36:425–38 and Kroon LA. Drug interactions with smoking. *Am J Health-Syst Pharm* 2007;64:1917–21.	

PLANNING FOR CHANGE: THINKING ABOUT QUITTING

Understanding the reasons why you smoke, in addition to considering your smoking patterns and routines, are important to the design of a successful quitting plan. Consider the following before you quit:

WHY DO I STILL SMOKE?

My top 3 reasons for continuing to smoke are:

(1)

(2)

(3)

WHY IS QUITTING IMPORTANT?

My top 3 reasons for wanting to quit smoking are:

(1)

(2)

(3)

WHAT WERE YOUR MAIN DIFFICULTIES WITH QUITTING IN THE PAST?

My top 3 difficulties with quitting in the past were:

(1)

(2)

(3)

WHAT ARE YOUR BARRIERS TO QUITTING NOW?

My top 3 barriers to quitting now are:

(1)

(2)

(3)

WHAT IS THE WORST THING THAT COULD HAPPEN IF YOU QUIT SMOKING FOR GOOD?

ARE YOU READY TO QUIT NOW? (WITHIN THE NEXT MONTH)

If YES, what will be your official quit date? ____ / ____ / ____ (ENTER DATE)

If NO, how might it benefit you to quit sooner (instead of later)?

PLANNING FOR CHANGE: GETTING READY TO QUIT

Rx for CHANGE

Smokers don't plan to fail. Most *fail* to plan. To plan for quitting, you should:
(1) identify triggers for smoking and how to cope with them, (2) identify persons to help you throughout your quit attempt, and (3) choose the best methods—for you—for quitting.

WHAT ARE YOUR THREE MAIN TRIGGERS OR SITUATIONS FOR SMOKING?

To deal with situations when you feel the urge to smoke, you should (1) identify the trigger situation, (2) change what you do or how you do it, and (3) change the thoughts that trigger the desire to smoke.

Trigger #1:	▪ I will change *what I do* in this situation by: ▪ I will change *how I think* in this situation by:
Trigger #2:	▪ I will change *what I do* in this situation by: ▪ I will change *how I think* in this situation by:
Trigger #3:	▪ I will change *what I do* in this situation by: ▪ I will change *how I think* in this situation by:

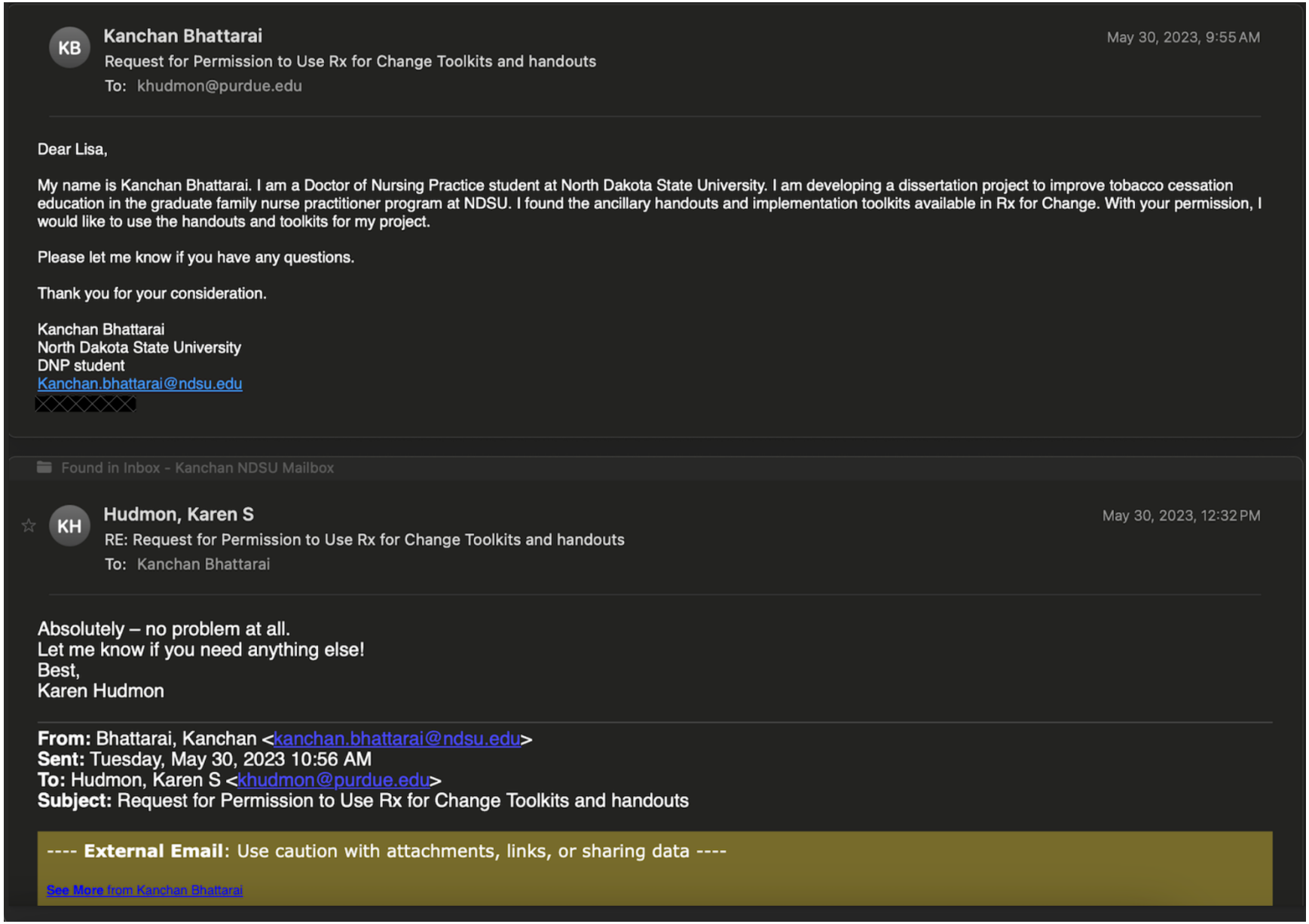
WHO WILL HELP YOU WITH QUITTING?

My top 3 persons who will have a positive influence on my ability to quit for good:	**(1)** **(2)** **(3)**

WHAT FORM OF COUNSELING ASSISTANCE WILL YOU RECEIVE WHILE QUITTING?

WHAT MEDICATION(S) WILL YOU USE FOR QUITTING, AND HOW WILL YOU USE THEM?

APPENDIX L. PERMISSION TO USE TOOLKIT AND HANDOUTS FROM RX FOR CHANGE



Kanchan Bhattarai — May 30, 2023, 9:55 AM
Request for Permission to Use Rx for Change Toolkits and handouts
To: khudmon@purdue.edu

Dear Lisa,

My name is Kanchan Bhattarai. I am a Doctor of Nursing Practice student at North Dakota State University. I am developing a dissertation project to improve tobacco cessation education in the graduate family nurse practitioner program at NDSU. I found the ancillary handouts and implementation toolkits available in Rx for Change. With your permission, I would like to use the handouts and toolkits for my project.

Please let me know if you have any questions.

Thank you for your consideration.

Kanchan Bhattarai
North Dakota State University
DNP student
Kanchan.bhattarai@ndsu.edu
[redacted]

Found in Inbox - Kanchan NDSU Mailbox

Hudmon, Karen S — May 30, 2023, 12:32 PM
RE: Request for Permission to Use Rx for Change Toolkits and handouts
To: Kanchan Bhattarai

Absolutely – no problem at all.
Let me know if you need anything else!
Best,
Karen Hudmon

From: Bhattarai, Kanchan <kanchan.bhattarai@ndsu.edu>
Sent: Tuesday, May 30, 2023 10:56 AM
To: Hudmon, Karen S <khudmon@purdue.edu>
Subject: Request for Permission to Use Rx for Change Toolkits and handouts

---- **External Email**: Use caution with attachments, links, or sharing data ----

See More from Kanchan Bhattarai

APPENDIX M. PERMISSION TO USE TOOLKIT/HANDOUTS AND RECOMMENDATION FROM DOAN (2023)

Re: Request for Permission

DJ **Doan, Jillian <jillian.b.glass@ndsu.edu>**
5/30/2023 2:17 PM

To: Bhattarai, Kanchan

Kanchan,

Yes, you have my permission to use and reproduce the Tobacco Cessation Toolkit for Providers as well as any recommendations that were made from my practice improvement project: A Practice Improvement Project Incorporating Tobacco Cessation Education Into a Doctor of Nursing Practice Program.

Best of luck with your studies and project,

Jillian Doan

From: Bhattarai, Kanchan <kanchan.bhattarai@ndsu.edu>
Sent: Tuesday, May 30, 2023 10:02 AM
To: Doan, Jillian <jillian.b.glass@ndsu.edu>
Subject: Request for Permission

Hi Jillian,

For my dissertation project to improve tobacco cessation education in the graduate family nurse practitioner program at NDSU, with your permission I would like to use and reproduce the Toolkits and Recommendations from your study, " A practice improvement incorporting tobacco cessation education into a doctor of nursing practice program."

Please let me know if you have any questions.

Thanks for your consideration.

Kanchan Bhattarai
North Dakota State University

With written permission obtained from Dr. Doan to use and reproduce Tool kit/handouts in this study. Adapted from Doan, J. (2023). *A Practice Improvement Project Incorporating Tobacco Cessation Education Into Doctor of Nursing Practice Program*. [Doctoral Dissertation, North Dakota State University]

APPENDIX N. IN CLASS PRESENTATION SLIDES

Photo source: *Quitting is an option: nicotine facts & the great American smoke out* . (2019). LRADAC

Tobacco and Nicotine Dependence Treatment

Kanchan Bhattarai, BSN, RN
3rd Year DNP student
North Dakota State University
School of Nursing

Objectives

1. Review prevalence of tobacco and nicotine use
2. Describe the health effects of tobacco and nicotine use
3. Discuss FDA-approved pharmacotherapy
4. Discuss techniques of motivational interview
5. Practice case studies

What is the Problem?

Leading cause of mortality and morbidity

Any tobacco products used in 2021

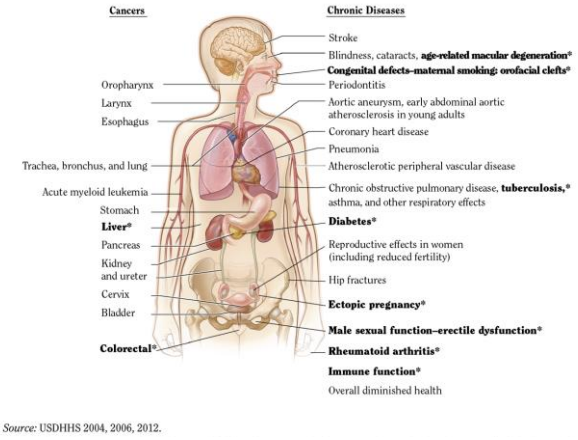
U.S. adults = 18.7% of current users (Cornelius et al., 2023)

ND adults = 22.7% used at least one day in past 30 days (North Dakota Department of Health and Human Services (NDDHHS, 2023a)

ND Youth (grade 9-12) = 23% used at least one day in past 30 days

- 21.2% used e-cigarettes at least one day of the past 30 days (NDDHHS, 2023a)

Speakers note: Tobacco and nicotine use is the leading cause of mortality and morbidity in US and North Dakota. Approximately 5.4 million people die annually in US and about 1000 people die each year in ND with tobacco-related illnesses. Tobacco use remains one of the major public health problems. In 2021, approximately 18.7 % of US adults were currently using any form of tobacco products while ND reported 22.7% which is sadly higher than the national use. Among Youth (grade 9 – 12) in North Dakota; 23% of them reported using any form of tobacco at least one day in the past 30 days. E-cigarettes were the most frequently reported tobacco product with 21.2%. E-cigarettes is becoming popular among youths in ND as well.



Source: USDHHS 2004, 2006, 2012.

Speaker's note: This slide shows the overall health effects of tobacco and nicotine use. As shown in the diagram, tobacco and nicotine use causes many diseases rather than just cancer. Most people are aware that tobacco and nicotine use has harmful effects on the cardiovascular and respiratory systems. However, studies have proven that it is linked to a multitude of diseases involving almost every system of our body. It has also been linked with 12 different cancers (USSGR, 2014)

In this figure, the bold text shows health problems related to tobacco use that were recently discovered and added to the surgeon general report.

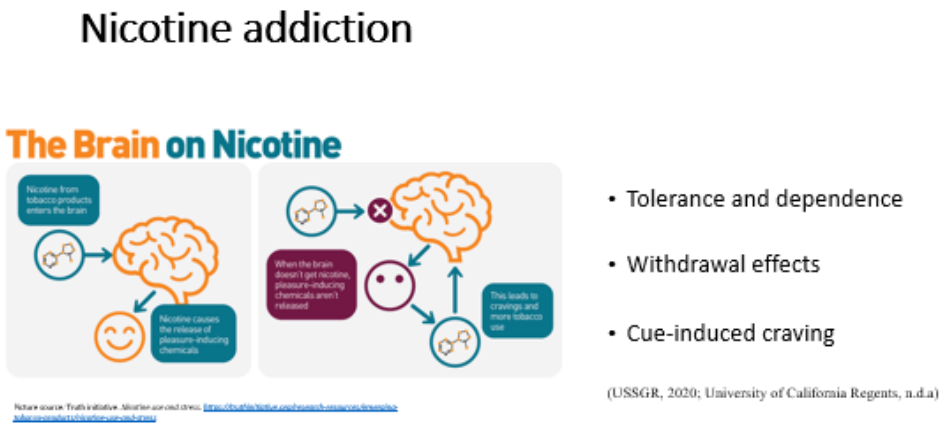
Moreover, youth and young adults' brains are more vulnerable to nicotine exposure leading to addiction, chances for substance use disorder, reduced impulse control, attention

deficit, poor cognition, anxiety, and mood disorder. Nicotine use is also toxic to the fetus during pregnancy and causes sudden infant death.

(US Surgeon General Report on E-Cigarette Use Among Youth and Young Adults, 2016).

Speaker's note: Even though we have FDA–approved pharmacotherapy and behavioral therapy, treatment has been underutilized. In 2018, 55.1% of adult smokers attempted quitting in the past 12 months, however, only 7.5% were successful. In addition, two-thirds of adult cigarette smokers who wanted to quit did not use any pharmacotherapy or behavioral therapy.

According to U.S. Surgeon General Report, 4 out of 9 adult smokers who visited healthcare providers did not receive any advice or counseling on quitting smoking. A study conducted by Manolios in 2021 showed that a practice gap among providers was associated with a lack of time, skills, training, and inadequate knowledge. A practice gap among providers in using clinical practice guidelines was associated with a lack of time, skills, training, and inadequate knowledge. Education and training among healthcare professionals has shown to increase providers' confidence, knowledge, and comfort in assisting patients with quitting (Coovadia et al., 2020).



Speaker's note: As a healthcare provider, it is first important to review the nicotine addiction cycle to understand how to treat nicotine dependence.

When a person uses tobacco or any form of nicotine products, nicotine goes to the brain and binds with nicotinic receptors. Those receptors then release three key neurotransmitters: dopamine, serotonin, and norepinephrine. Dopamine is the hormone that induces feelings of euphoria, happiness, and pleasure.

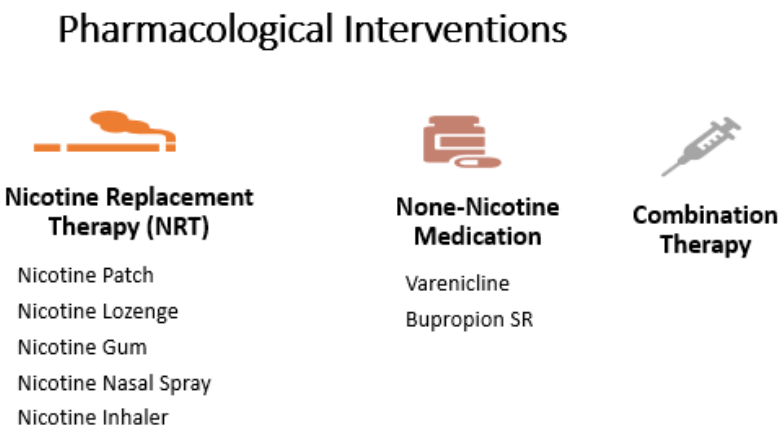
Once those receptors are repeatedly exposed to nicotine, those receptors become desensitized and upregulated, which means that a person no longer gets the same response from the same dose of nicotine which is called tolerance. The nicotine user will then need a large amount of nicotine to produce those 3 neurotransmitters which leads to dependence. That is why, when serum nicotine levels drop, a person will experience withdrawal symptoms that are primarily related to low levels of the neurotransmitters.

In the toolkit- there is a withdrawal symptom information sheet that is helpful for providers and helpful to give to patients (University of California Regents, n.d.a). It shows the withdrawal symptom, the cause of that symptom, how long it will likely last, and how to relieve it. All this information will help a patient to prepare what to expect and plan on coping strategies.

Another reason is Cue-induced cravings. Cues can be anything including environmental cues such as sights, sounds, or smell of a cigarette. These cues can trigger a tobacco craving due to a relative decline in dopamine release.

In your toolkit there is a section titled Coping with Quitting: Cognitive and Behavioral strategies. This is a great handout for patients. The handout explores different strategies to use such as distractive thinking, positive self-talk, tips on dealing with stress, alcohol, and being around other tobacco users (University of California Regents, n.d.a).

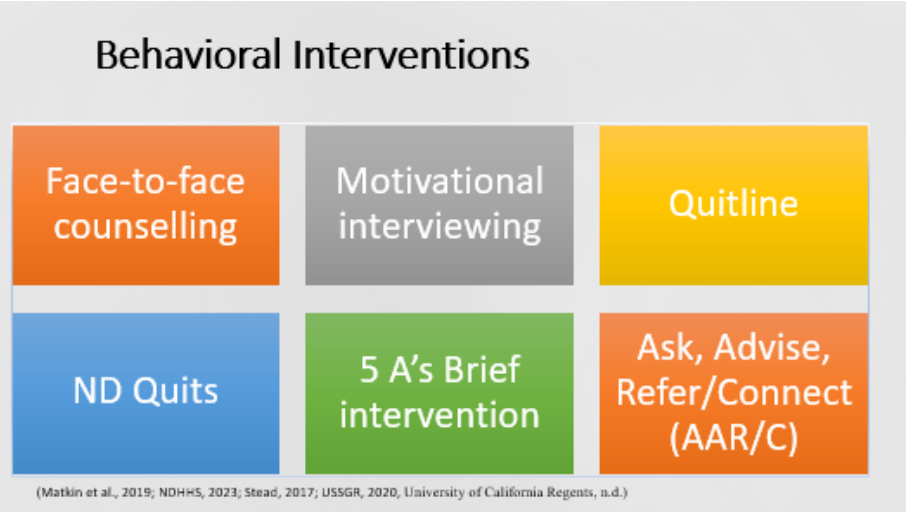
The Fagerstrom Test for Nicotine Dependence is a reliable tool that can assess the intensity of physical dependence on nicotine. It is provided to you in the toolkit.



Speaker's note: Now that you have completed NDQUIT QuitLogix, you know the pharmacotherapy for quitting. As described in NDQUIT QuitLogix, the choice of pharmacotherapy depends on patient choices and preferences. In addition, a combination of therapies has been shown to be more efficient than alone while assisting patients to quit.

- First talking about NRT, NRT delivers nicotine, thereby, reducing the urge to smoke and withdrawal symptoms in the process of quitting smoking. A nicotine patch is long- acting vs all others are short-acting (quickly reaches the brain). Studies have shown that combining fast/short-acting and long-acting NRT (patch) increases the chance of quitting (Lindson et al., 2019).

- I have provided a Pharmacotherapy guide from Rx for change in the tool kit (University of California Regents, n.d.). As you can see on the guide nicotine Patch dosing depends on the amount of cig/day If patients smokes < 10 cpd: 14 mg/day for 6 weeks and 7 mg/day for 2 weeks ; >10 cpd: 21 mg/ day x 4-6 weeks 14 mg/day for 2 weeks and 7 for 2 weeks
- Nicotine Lozenges depend on the time to the first cigarette of the day and the amount of cpd. If smokes <30 min of waking up = 4 mg and >30 min of waking up = 2 mg and based on cpd= >20 cpd:4 mg and <20 cpd: 2 mg
- Nicotine gum: similar to Nicotine lozenges
- Nasal spray= 1 spray in each nostril (1-2 times/ hr.) (up to 40 doses/day)
- Nicotine Inhaler: Minimum 6 cartridges/day. Up to 16/day. New update that Pfizer stopped the production of its nicotine inhaler (Nicotrol) earlier this year so, there might be shortage of inhaler and thus, the availability varies across the state.
- Varenicline: non-nicotine therapy. blocks nicotinic receptors in the brain and diminishes the dopamine reward system associated with nicotine addiction (Singh & Saadabadi, 2022). Thus, varenicline makes smoking less rewarding and decreases cravings and withdrawal that occurs during tobacco cessation attempts. Start 1 week prior to quit date (0.5 mg OD X 3 days than 0.5 mg twice daily for 4 days then on quit date (STOP Smoking) take 1 mg twice daily x 11 weeks (may initiate up to 30 days before target quit date). Large study called, (EAGLE) study, showed that varenicline is more effective than placebo, nicotine patch, and bupropion in assisting smokers with quitting (Anthenelli et al., 2016)
- Bupropion : bupropion aids in smoking cessation by blocking the effects of nicotine and alleviating withdrawal symptoms. Similar to Varenicline- start 1 week prior to Quit date – 150 mg once daily for 3 days , then 150 mg twice daily for 4 days, then on quit date STOP SMOKING .Continue 150 mg twice daily for 12 weeks.



Speaker's note: adults about tobacco use, advise them to stop using tobacco, and provide both behavioral counseling interventions and pharmacotherapy for cessation.

There are different techniques of behavioral interventions including face-to-face counseling, motivational interviewing, quitline, ND Quits, 5 A, and AAR/C.

Face-to-face counselling (either group or individual) have been found to be effective as stand-alone therapy for tobacco cessation but are more effective when used in combination with medications. (Stead et al., 2017). MI is great technique to utilize in counseling patient which we will further discuss in this presentation later.

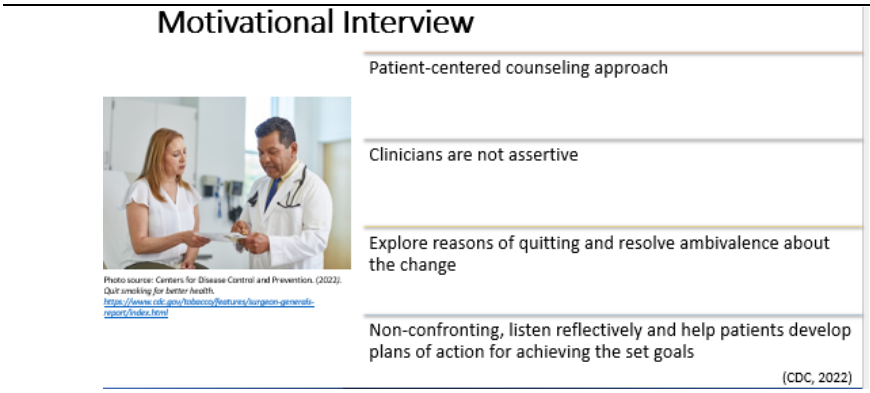
Quitlines are free, proactive counseling via the phone/web. A Cochrane review showed those who utilized quitlines were 1.38 time more likely to quit than if they were just given self-help materials to review (Matkin et al., 2019). Every state provides free quitline services. As you have learnt in detail about ND Quits services and benefit in detail from NDQuit QuitLogix modules, we will briefly discuss ND Quit in the following slide.

Utilizing the 5 A's is used to ask about tobacco use, advise to quit, assess readiness to quit, assist with quitting, and arrange follow up (USPSTF, 2021). ND Quit adopted the AAR/C algorithm as an alternative to 5A which is quick in implementation. After the first two steps of AAR/C, clinicians can *Refer/Connect* interested patients to the cessation resources such as Quitline. In the toolkit, you will see the 5 A's brief intervention and AAR/C (Ask, Advise, Refer/Connect) interventions.

NDQuits

- ND Quits vendor is National Jewish Health from Colorado.
- ND Quits provides up to **eight weeks of NRT** twice a year.
- NRT is available to North Dakota residents who are uninsured or underinsured.
- In 2021, 32.8% of the participants quit tobacco use, which is above the national quitline goal of 30% ((NDDHHS, 2023b).

Speaker's note: In ND Quits modules, you learnt different benefits and programs provided by ND Quits. ND quits is a free program that provides tobacco cessation counseling via the phone or online to north Dakota residents. ND quitline vendor is National Jewish Health from Colorado. National Jewish Health conducts the first (intake) call, and then the participant is scheduled with an ND Quits quit coach. ND Quits provides up to 8 weeks of NRT twice a year. NRT includes nicotine patches, nicotine gum, and nicotine lozenges. The participant must stay engaged in the quitline - complete counseling calls and/or log into the online program. NRT is available to North Dakota residents who are uninsured or underinsured (they have insurance, but insurance does not cover cessation medications).



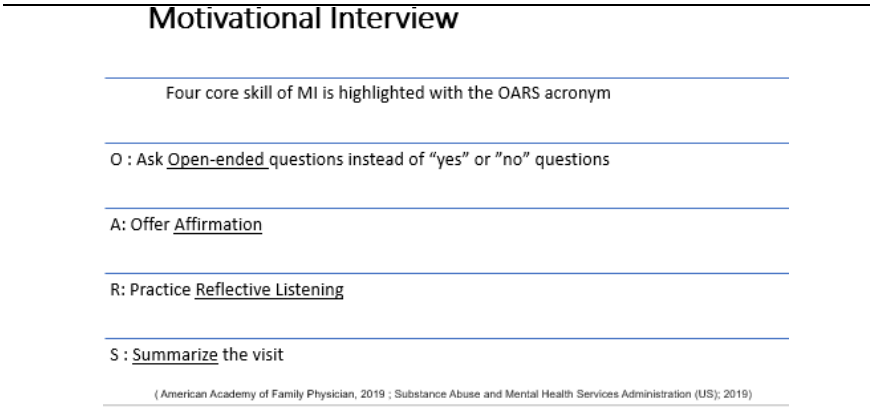
Speaker's note: Patient-centered counseling approach designed to enhance patient's motivation and commitment to change

Clinicians are not assertive and do not advise patients on why and how they should change their behaviors

Clinicians explore reasons why they want to quit and resolve ambivalence about the change

Clinicians are non-confronting, listen reflectively, and help patients develop plans of action for achieving the set goals

Ambivalence means having mixed feelings. Exploring ambivalence helps clinicians understand what keeps the person doing what they do (sustain talk) and what might move them towards wanting to make a change (change talk).



Speaker's note: The first essential aspect of MI is asking open-ended questions. We should ask patients Open-ended questions rather than "yes" or no questions as the goal is to elicit patient thoughts. For example: What are your thoughts about quitting? What would it mean to you if you were to quit smoking? When are you thinking of quitting? What support will you need?

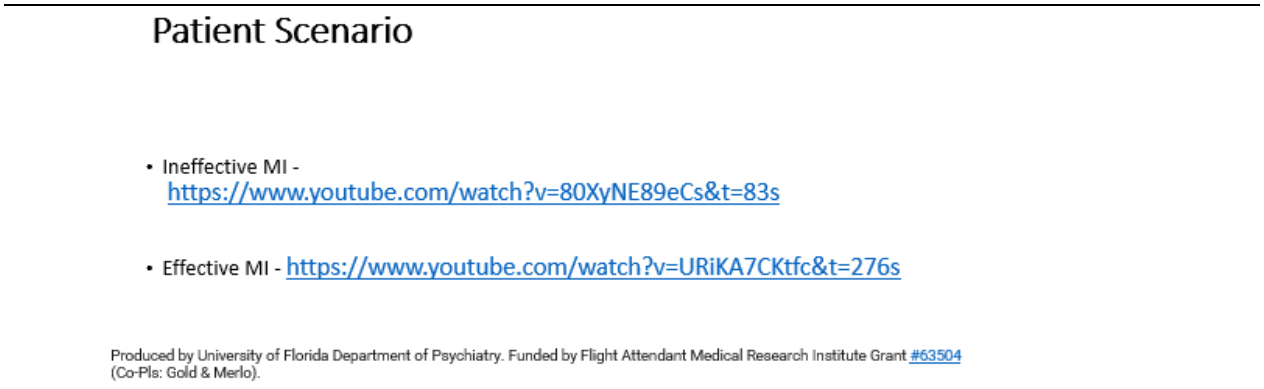
Stands for Affirmation: Affirming is a way to express your genuine appreciation and positive regard for the patients. Affirmation helps to support the patient's self-efficacy. It is important that affirming statements should be used with "you" instead of "I." For example,

instead of saying “I am proud of you,” which focuses more on the provider than on the client, instead use “You have worked really hard to get to where you are now in your life”, as it shows appreciation to the patient.

R stands for Reflective listening. Patients often have answers so, our role as a provider is to help guide them rather than tell them what to do. Simple reflection means you will repeat, rephrase, and paraphrase what the patient says so that the patient feels like you are genuinely listening to them and their perspectives while Complex reflection allows patients to deepen their self-exploration. In complex reflection, you will hypothesize in your mind what client is trying to say. For example: If the client says, “I drink because I am lonely,” you would then think about the possible meanings of “lonely” in your mind. Patient might be saying, “ I lost my wife” or “ I can’t make friends”. You will have to make a guess offer reflection and listen carefully to the patient.

Some people find it helpful to use some standard phrases during reflection such as: So, You feel…It sounds like you…You’re wondering if…

Summarize the visit : Summarizing is the form of reflective listening where provider takes the essence of patient’s several statements and reflect to them. During summarizing, patient gets an opportunity to hear change talk again from provider. At the end, a provider should ask if they left anything to talk about so that patient gets an opportunity to correct or add to the summary.



Speaker’s note: What went wrong int this video: The provider started a conversation with the accusatory question “Are you smoking” . The Provider immediately puts patient on the defense and minimizes the likelihood of a productive discussion. She then started lecturing the patient while ignoring the patient’s remarks.

Provider missed the opportunity where mother was expressing a real desire to quit but has a lack of confidence in her ability to quit. By listening, the provider could have developed a plan for the patient to help her quit smoking.

Motivational interviewing skills in brief intervention setting

Elicit – Provide – Elicit

- **Elicit**: Asking patients what they already know or would like to know
  "What do you know about the effects of second-hand smoke on children?"
- **Provide**: Give information in a neutral, non-judgmental fashion:
  " Research suggests that … " vs " Every time you smoke around your child, you put them at risk."
- **Elicit**: Ask patient for their interpretation: "What does this mean to you " vs "It's obvious from this information that you need to quit."

(National Library of Medicine, 2019)

Practice Example

CASE 1 – Patient with asthma who smokes

Speaker's note: ELICIT: "What do you know about how smoking can affect asthma ?" Vs. "If you continue to smoke, I'd be afraid your asthma will get worse".

PROVIDE: "What we know is that smoking can irritate the airways, making them narrow, and filled with mucus causing asthma to flare up".

ELICIT: "Tell me what your thoughts are about that." vs. "It's obvious from this information that you need to quit."

TIPS : " Use conditional words rather than concrete words. "might", "perhaps", "consider" vs. "should", "must"

Pharmacotherapy Case Scenario 1

61 years old male with a past medical history of hypertension, Hx of NSTEMI, CAD, hx of non-small cell carcinoma of right lung, tobacco use disorder, COPD, and shortness of breath, has smoked since he was 16 years old. At most, he had smoked 1.5-2 packs per day. In more recent years, he was smoking about ¾ pack of cigarettes per day. No history of smokeless tobacco or vape use. Has tried quitting many times in the past. His most successful quit attempt was for 50 days. He used Chantix during that attempt and felt it worked well while he was taking it. He said friends got in his head about side effects and he stopped taking the Chantix. He relapsed after 50 days when he tried smoking one cigarette with a family member at a social event. He has used nicotine patches in the past and thought they helped. He also has tried nicotine lozenges but did not care for them. Felt they were too chalky in his mouth. He also realizes now that his insurance plan doesn't cover Chantix.

"Used with permission from Sanford Health"

1) Cold turkey
2) Nicotine patch plus nicotine gum as needed
3) Varenicline (Chantix)
4) Nicotine patches with Nicotrol inhaler

Answer: 2

Pharmacotherapy Case Scenario 2

A 74 F with a past medical history of hypertension, obesity, diabetes, rheumatoid arthritis, depression (well-controlled on SSRI), and newly diagnosed atrial fibrillation is motivated to quit smoking. She has been motivated to quit since the diagnosis of atrial fibrillation. She smoked for 60 years, half a pack per day. She smokes within 30 minutes of waking up in the morning. She has four children and quit each time she was pregnant. She had also attempted to quit 6-8 months ago with cold turkey without success. She describes smoking as a coping strategy for stress. She describes being a closet smoker so, she doesn't want any of her family/friends to know that she is in the process of quitting. Which of the following would likely be the most effective medication choice?

"Used with permission from National Jewish Health"

1) Nicotine patch 14 mg/day plus 4 mg nicotine gum as needed
2) Varenicline 1 mg twice daily for 12 weeks
3) Bupropion SR 150 mg twice daily
4) Nicotine patch 14 mg/day

Answer: 1

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APPENDIX O. PERMISSION TO USE CASE STUDY FROM NATIONAL JEWISH HEALTH

Permission to Use Case study

Bhattarai, Kanchan
To: yliojat@njhealth.org <YLIOJAT@NJHealth.org>
Mon 9/18/2023 10:21 AM

Hi Thomas,

Thank you so much for your time in discussing a case study with me. I have attached the case that you have provided to me. With your permission, I would like to use this case study for my dissertation project.

Let me know if you have any questions.

Case Study

Pharmacotherapy Case Study :

A 74-year-old female with a past medical history of hypertension, obesity, diabetes, rheumatoid arthritis, depression, and newly diagnosed Atrial fibrillation is motivated to quit smoking. She has been motivated to quit since the diagnosis of A.fib. She smoked for 60 years, half a pack per day. She smokes within 30 minutes of waking up in the morning. She has four children and had quit each time she was pregnant. She had also attempted to quit 6-8 months ago with cold turkey but wasn't successful. She describes smoking as a coping strategy for stress. She describes being a closet smoker so, she doesn't want any of her family/friends to know that she is in the process of quitting. Which of the following would likely be the most effective medication choice:

1. Nicotine patch 14 mg/day plus 4 mg nicotine gum as needed
2. Varenicline 1 mg twice daily for 12 weeks
3. Bupropion SR 150 mg twice daily
4. Nicotine patch 14 mg/day

Y
Ylioja,Thomas <YLIOJAT@NJHealth.org>
To: Bhattarai, Kanchan
Mon 9/18/2023 10:22 AM

Yes. Good luck with your project.

Thanks,

Thomas

APPENDIX P. PERMISSION TO USE CASE STUDY FROM SANFORD HEALTH

Case study

Bhattarai, Kanchan
To: Stephanie.Rieniets@sanfordhealth.org <Stephanie.Rieniets@SanfordHealth.org>

Thu 8/24/2023 12:49 PM

Hi Stephanie,

Kara forwarded me the case study that you had sent for me. Thank you so much for providing me that Case study on tobacco and nicotine dependence treatment. With your permission, I would like to use it for my dissertation project.

Let me know if you have any questions. Thank you for the consideration.

Kanchan Bhattarai
DNP student, Third year
NDSU

Sent from my iPhone

Flag for follow up.

This sender Stephanie.Rieniets@SanfordHealth.org is from outside your organization. Block sender

R

Rieniets,Stephanie <Stephanie.Rieniets@SanfordHealth.org>
To: Bhattarai, Kanchan

Thu 8/24/2023 1:38 PM

Hi,
Yes, you can use it! Best of luck with your dissertation project!
Steph

APPENDIX Q. PERMISSION TO USE CASE STUDY FROM MAYO CLINIC

Permission to Use

Bhattarai, Kanchan
To: Milbrandt.Timothy@mayo.edu
Cc: Kara A. Backer <kbacker@nd.gov>

Wed 8/16/2023 3:08 PM

Hi Timothy,

I just wanted to follow up on this email in case you have missed it. Please let me know if you have any questions.

Thank you.

Kanchan.

Sent from my iPhone

> On Jul 17, 2023, at 11:42 AM, Bhattarai, Kanchan <kanchan.bhattarai@ndsu.edu> wrote:
>
> Hi Timothy,
>
> I hope you are having a great summer. My name is Kanchan Bhattarai. I am a Doctor of Nursing Practice student at North Dakota State University. I am developing a dissertation project to improve tobacco treatment education in the graduate family nurse practitioner program at NDSU. I am planning to present patient case scenarios during the implementation of my dissertation. I had an opportunity to take Mayo Clinic Nicotine Dependence Center-Tobacco Treatment Specialist (TTS) training on October 18-20, 2022 in Bismarck. I found that the patient case scenarios that were presented to use in the training were very helpful and all those resources were provided to us. With your permission, I would like to use those patient case scenarios in my project.
>
> Please let me know if you have any questions.
>
> Thank you for your consideration.

M

Milbrandt, Timothy J., M.S. <Milbrandt.Timothy@mayo.edu>
To: Bhattarai, Kanchan
Cc: Backer, Kara A. <kbacker@nd.gov>

Wed 8/23/2023 3:50 PM

Hello Bhattarai,

We are okay with you using our training case examples in your dissertation.
If you were to decide to publish, we would like you to remove our materials.

Thank you,

Tim

APPENDIX R. RECOMMENDATION FROM DOAN (2023)

Recommendations for Educational Institutions	
1.	Include formal tobacco cessation counseling education into the coursework of all future primary care providers • Pharmacological interventions • Behavioral interventions • Interactive patient scenarios • Local tobacco cessation resources • Coding and billing for tobacco treatment
2.	Tobacco cessation treatment knowledge questions should be included in the course's final exam
Recommendations for Future Research	
1.	Examine the effect that tobacco cessation education for primary care providers has on patient's tobacco cessation success
2.	Pair pre- and post-education data sets to enable determination of statistical significance and, thereby, effectiveness of the intervention
3.	Evaluate participants confidence and comfort in prescribing tobacco cessation medications
4.	Potentially delete questions related to secondhand smoke exposure Alternatively, the secondhand smoke questions could be measured separately from motivation and confidence in helping people quit tobacco use
5.	Include a comprehensive and stronger emphasis on ENDS use in regard to cessation and harm reduction
6.	Include information about new and emerging tobacco products

With written permission obtained from Dr. Doan to use Toolkit/handouts in this study. Adapted from Doan, J. (2023). *A Practice Improvement Project Incorporating Tobacco Cessation Education Into Doctor of Nursing Practice Program*. [Doctoral Dissertation, North Dakota State University]

APPENDIX S. PERMISSION TO USE COOVADIA ET AL. (2020) POST-TEST QUESTIONNAIRE

RE: Request for Permission to Use Survey Questionnaire

DL Di Prospero, Lisa <lisa.diprospero@sunnybrook.ca>
5/17/2023 1:12 PM

To: Bhattarai, Kanchan

Yes of course you can – sorry I thought you wanted the original document – which I can't find
Lisa ☺

From: Bhattarai, Kanchan [mailto:kanchan.bhattarai@ndsu.edu]
Sent: Wednesday, May 17, 2023 2:03 PM
To: Di Prospero, Lisa <lisa.diprospero@sunnybrook.ca>
Subject: Re: Request for Permission to Use Survey Questionnaire

CAUTION: External mail. Do not click on links or open attachments you do not trust.

Hi Lisa,

I have attached the original article hoping this is what we are both talking about. The survey questionnaire with likert scale explanations I want permission to use and reproduce is on figure 1: effectiveness of training on role and clinical practice fo health care provider. Please let me know if you agree with me using this survey or if there is any other information that you would need from me.

Thank you in advance,
Kanchan Bhattarai.

.

> On May 17, 2023, at 5:54 AM, Di Prospero, Lisa <lisa.diprospero@sunnybrook.ca> wrote:
>
> Hi Kanchan - I am still looking for it as I do not have an electronic version - apologies - let me give it one more look
> Lisa

On Apr 14, 2023, at 6:24 AM, Di Prospero, Lisa <lisa.diprospero@sunnybrook.ca> wrote:

Hi Kanchan
Apologies my response is late coming
I will check my files ot see if I can find the survey The survey was a
while back Lisa

-----Original Message-----
From: Bhattarai, Kanchan [mailto:kanchan.bhattarai@ndsu.edu]
Sent: Saturday, April 8, 2023 1:49 PM
To: Di Prospero, Lisa <lisa.diprospero@sunnybrook.ca>
Subject: Permission to Use Survey Questionnaire

CAUTION: External mail. Do not click on links or open attachments you do not trust.

Dear Lisa,

My name is Kanchan Bhattarai. I am a Doctor of Nursing Practice student at North Dakota State University. I am developing a dissertation project to improve tobacco cessation education in the graduate family nurse ctitioner program at NDSU. I found your article," Catalyst for Change: Measuring the Effectiveness of Training of All Health Care Professionals to Provide Brief Intervention for Smoking Cessation to Cancer Patients" remely beneficial in my research. With your permission, I would like to use and reproduce the Survey Questionnaire from this study in my project.

Please let me know if you have any questions.

Thanks for your consideration.

Kanchan Bhattarai
North Dakota State University
DNP student

APPENDIX T. PERMISSION TO USE CUNNINGHAM ET AL. (2015) READINESS FOR TRAINING IN TOBACCO INTERVENTION (RTTI) QUESTIONNAIRE IN THE PRE- AND POST-TEST QUESTIONNAIRE

From: Cunningham, James K - (jkcunnin)
To: Buettner-Schmidt, Kelly
Cc: Rykal, Katie; Niewojna, Elizabeth
Subject: Re: CAM RTTI Questionnaire - requesting permission to use
Date: Friday, April 17, 2020 10:28:58 AM

Hi Dr. Buetnner-Schmidt,

Glad the RTTI questionnaire has been helpful. Yes, you have our permission to use it in the current and future studies.

Best,

Jim

James K. Cunningham, PhD
Director, Program Evaluation & Policy Research
Dept. of Family and Community Medicine, College of Medicine
Health Promotion Sciences, College of Public Health
The University of Arizona

From: Buettner-Schmidt, Kelly <kelly.buettnerschmi@ndsu.edu>
Sent: Friday, April 17, 2020 8:23 AM
To: Cunningham, James K - (jkcunnin) <jkcunnin@arizona.edu>
Cc: Rykal, Katie <katelyn.mills@ndsu.edu>; Niewojna, Elizabeth <elizabeth.niewojna@ndsu.edu>
Subject: [EXT]RE: CAM RTTI Questionnaire - requesting permission to use

External Email

Dear Dr. Cunningham: Thank you for your past permission to use the RTTI questionnaire. We are now working on a study in which we would like to use the questionnaire again, may we have your approval for this purpose and for future studies and work. We will always acknowledge your work. Thank you! Kelly

Kelly Buettner-Schmidt, PhD, RN, FAAN
Associate Professor
RWJF Nursing & Health Policy Fellow
School of Nursing, North Dakota State University

NDSU Dept 2670, PO Box 6050, Fargo, ND 58108-6050
Kelly.buettner-schmidt@ndsu.edu
Office: Aldevron Tower; 701-231-8232 (o)

From: Buettner-Schmidt, Kelly <kelly.buettnerschmi@ndsu.edu>
Sent: Sunday, December 10, 2017 1:24 PM
To: Cunningham, James K - (jkcunnin) <jkcunnin@email.arizona.edu>
Subject: Re: CAM RTTI Questionnaire - requesting permission to use

APPENDIX U. PRE-EDUCATION TOBACCO AND NICOTINE DEPENDENCE TREATMENT QUESTIONNAIRE

Motivation and Confidence in Helping People Quit Tobacco and Nicotine				
	Strongly Agree	Agree	Disagree	Strongly Disagree
1. It is important, as a practitioner, to know whether a patient/client uses tobacco or nicotine				
2. It is important, as a practitioner, to know whether a patient/client has regular exposure to secondhand smoke				
3. I am motivated to help tobacco and nicotine users quit.				
	Very Comfortable	Somewhat Comfortable	Not Very Comfortable	Not Comfortable at all
4. How comfortable are you in talking with patients/clients about tobacco and nicotine use.				
	Very confident	Somewhat Confident	Not Very Confident	Not Confident at all
5. I am confident that I can explore issues related to quitting smoking and use of tobacco, even with someone not interested in quitting.				
6. I am confident that I can personalize the benefits of quitting with each individual tobacco and nicotine user.				
7. I am confident that I know if a patient has regular exposure to secondhand smoke.				

Please expand on your above answer choices (optional):				
Comfort and Confidence in Providing Information about Cessation Medications, Programs and Services, and Referrals for Evidence-Based Tobacco and Nicotine Dependence Treatment				
	Very Comfortable	Somewhat Comfortable	Not Very Comfortable	Not Comfortable at all
8. How comfortable are you in providing information about medications that help in quitting tobacco and nicotine?				
9. How comfortable are you in providing information about programs and services that help aid in quitting (quit lines, counseling etc.)?				
	Very Confident	Somewhat Confident	Not Very Confident	Not Confident at all
10. I am confident that I can provide information about programs and services that help in quitting (quitlines, counseling, etc).				
11. I am confident that I can provide information about medications that can help in quitting tobacco and nicotine.				
Please expand on your above answer choices (optional):				
Please describe any barriers you may anticipate in implementing tobacco and nicotine dependence treatment into your practice (optional) :				
Demographic data				
12. How many years of nursing experience do you currently have?				

13. Have you used any form of tobacco or nicotine in the last year?	
	Yes
	No
14. Have you had any previous tobacco and nicotine treatment training?	
	Yes
	No

Note: With written permission obtained from Cunningham to use RTTI in this study. Adapted from Cunningham, J. K., Floden, L. L., Howerter, A. L., Matthews, E., Gordon, J. S., & Muramoto, M. L. (2015). Complementary and Alternative Medicine (CAM) practitioners' readiness for tobacco intervention training: Development and psychometric properties of a new measure. Advances in Integrative Medicine, 2(2), 90-95. https://doi.org/10.1016/j.aimed.2014.10.012

APPENDIX V. POST-EDUCATION TOBACCO AND NICOTINE DEPENDENCE TREATMENT QUESTIONNAIRE

Motivation and Confidence in Helping People Quit Tobacco and Nicotine				
	Strongly Agree	Agree	Disagree	Strongly Disagree
1. It is important, as a practitioner, to know whether a patient/client uses tobacco or nicotine.				
2. It is important, as a practitioner, to know whether a patient/client has regular exposure to secondhand smoke				
3. I am motivated to help tobacco and nicotine users quit.				
	Very Comfortable	Somewhat Comfortable	Not Very Comfortable	Not Comfortable at all
4. How comfortable are you in talking with patients/clients about tobacco and nicotine use.				
	Very confident	Somewhat Confident	Not Very Confident	Not Confident at all
5. I am confident that I can explore issues related to quitting smoking, even with someone not interested in quitting.				
6. I am confident that I can personalize the benefits of quitting with each individual tobacco and nicotine user.				
7. I am confident that I know if a patient has regular exposure to secondhand smoke.				
Please expand on your above answer choices (optional):				

Comfort and Confidence in Providing Information about Cessation Medications, Programs and Services, and Referrals for Evidence-Based Tobacco and Nicotine Dependence Treatment				
	Very Comfortable	Somewhat Comfortable	Not Very Comfortable	Not Comfortable at all
8. How comfortable are you in providing information about medications that help in quitting tobacco and nicotine?				
9. How comfortable are you in providing information about programs and services that help aid in quitting (quit lines, counseling etc.)?				
	Very Confident	Somewhat Confident	Not Very Confident	Not Confident at all
10. I am confident that I can provide information about programs and services that help in quitting (quitlines, counseling, etc).				
11. I am confident that I can provide information about medications that can help in quitting tobacco and nicotine.				
	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
12. The smoking and nicotine cessation training has increased my knowledge to support patients who would like to quit				
13. The smoking and nicotine cessation training increased my ability to support patients who would like to quit smoking				

Please expand on your above answer choices (optional):

With written permission obtained from Cunningham to use RTTI in this study. Adapted from Cunningham, J. K., Floden, L. L., Howerter, A. L., Matthews, E., Gordon, J. S., & Muramoto, M. L. (2015). Complementary and Alternative Medicine (CAM) practitioners' readiness for tobacco intervention training: Development and psychometric properties of a new measure. Advances in Integrative Medicine, 2(2), 90-95. https://doi.org/10.1016/j.aimed.2014.10.012

With written permission obtained from Lisa Di Prospero, correspondence writer. Adapted from Coovadia, S., D'Alimonte, L., Bristow, B., Curle, E., Gibson, L., & Di Prospero, L. (2020). Catalyst for Change: Measuring the Effectiveness of Training of All Health Care Professionals to Provide Brief Intervention for Smoking Cessation to Cancer Patients. *Journal of Medical Imaging and Radiation Sciences, 51*(1), 7–11. https://doi.org/10.1016/j.jmir.2019.10.002

APPENDIX W. RESULTS

Q.1 It is important, as a practitioner, to know whether a patient/client uses tobacco or nicotine.

Pre Education					Post Education			
Q2_1	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Agree	1	6.25	1	6.52%	2	14.29	2	14.29%
Strongly Agree	15	93.75	16	100.00%	12	85.71	14	100.00%

Q.2. It is important, as a practitioner, to know whether a patient/client has regular exposure to secondhand smoke

Pre Education					Post Education			
Q2_2	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Agree	3	18.75	3	18.75	4	28.75	4	28.75
Strongly Agree	13	81.25	16	100	10	71.43	14	100

Q.3. I am motivated to help tobacco and nicotine users quit.

Pre Education					Post Education			
Q2_3	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Agree	4	25	4	25	3	21.43	3	21.43
Strongly Agree	12	75	16	100	11	78.57	14	100

Q.4 How comfortable are you in talking with patients/clients about tobacco and nicotine use

Pre Education					Post Education			
Q2_4	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Comfortable	4	25	4	25	0	0	0	0
Somewhat Comfortable	9	56.25	13	81.25	8	57.14	8	57.14
Very Comfortable	3	18.75	16	100	6	42.86	14	100

Q.5 I am confident that I can explore issues related to quitting smoking and use of tobacco, even with someone not interested in quitting

Pre Education					Post Education			
Q2_5	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Confident	4	25	4	25	0	0	0	0
Somewhat Confident	11	68.75	15	93.75	9	64.29	9	64.29
Very Confident	1	6.25	16	100	5	35.71	14	100

Q.6 I am confident that I can personalize the benefits of quitting with each individual tobacco and nicotine user

Pre Education					Post Education			
Q2_6	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Confident	4	25	4	25	0	0	0	0
Somewhat Confident	11	68.75	15	93.75	7	50	7	50
Very Confident	1	6.25	16	100	7	50	14	100

Q.7 I am confident that I know if a patient has regular exposure to secondhand smoke

Pre Education					Post Education			
Q2_7	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Confident	5	31.25	5	31.25	0	0	0	0
Somewhat Confident	10	62.5	15	93.75	7	50	7	50
Very Confident	1	6.25	16	100	7	50	14	100

Q.8 How comfortable are you in providing information about medications that help in quitting tobacco and nicotine?

Pre Education					Post Education			
Q4_1	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Comfortable	8	50	8	50	1	7.14	1	7.14
Somewhat Comfortable	7	43.75	15	93.75	7	50	8	57.14
Very Comfortable	1	6.25	16	100	6	42.86	14	100

Q.9 How comfortable are you in providing information about programs and services that help aid in quitting (quit lines, counseling etc.)?

Pre Education					Post Education			
Q4_2	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Comfortable	4	25	4	25	0	0	0	0
Somewhat Comfortable	11	68.75	15	93.75	7	50	7	50
Very Comfortable	1	6.25	16	100	7	50	14	100

Q.10 I am confident that I can provide information about programs and services that help in quitting (quitlines, counseling, etc).

Pre Education					Post Education			
Q4_3	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Confident	5	31.25	5	31.25	0	0	0	0
Somewhat Confident	10	62.5	15	93.75	6	42.86	6	42.86
Very Confident	1	6.25	16	100	8	57.14	14	100

Q.11 I am confident that I can provide information about medications that can help in quitting tobacco and nicotine

Pre Education					Post Education			
Q4_4	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Very Confident	9	56.25	9	56.25	1	7.14	1	7.14
Somewhat Confident	6	37.5	15	93.75	8	57.14	9	64.29
Very Confident	1	6.25	16	100	5	35.71	14	100

Results of Wilcoxin Sgned Rank Test:

H0: MU1 - MU2 = 0
H1: MU1-MU2 ≠0
α=0.05 (Level of significance)

Q	Test Statistics	P-Values	Comments
1.	-1	1	The P-value is greater than the level of significance α=0.05. A Wilcoxon signed-rank test indicated insufficient evidence to reject the null hypothesis. The differences between the paired observations do not appear to be statistically significant
2.	-1.5	1	There's insufficient evidence to reject the null hypothesis. The differences between the paired observations do not appear to be statistically significant
3	1.5	1	There's insufficient evidence to reject the null hypothesis. The differences between the paired observations do not appear to be statistically significant
4	10.5	0.0313	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant
5	10.5	0.0313	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant
6	22.5	0.0039	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant
7	27.5	0.002	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant
8	18	0.0078	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant
9	14	0.0156	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant
10	18	0.0078	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant
11	28.5	0.0088	There's sufficient evidence to reject the null hypothesis. The differences between the paired observations appear to be statistically significant

APPENDIX X. RECOMMENDATIONS

Recommendations for Educational Institutions	
1.	Include formal tobacco cessation counseling education into the curriculum of all future primary care providers that focuses on: • Pharmacological interventions • Behavioral interventions • Motivational interviewing techniques • Interactive patient scenarios • Local tobacco cessation resources • Coding and billing for tobacco treatment
2.	Integrate review of pharmacology of tobacco and nicotine dependence treatment when students are engaged in the study of pharmacology course
3.	Continuously assess tobacco and nicotine dependence treatment curriculum to ensure education remains up to date with evidence based practices.
Recommendations for Future Research	
1.	Examine the rate of using evidence-based practices, rate of quit attempts, successful quit rates, morbidity, and mortality rates among patients taken care by primary care providers educated on tobacco and nicotine dependence treatment.
2.	Potentially delete questions related to secondhand smoke exposure Alternatively, the secondhand smoke questions could be measured separately from motivation and confidence in helping people quit tobacco use
3.	Evaluate participants' confidence and comfort in prescribing tobacco cessation medications