Facilitators and Barriers of Physician-Ordered Consultations and Medication Orders

of a Tobacco Treatment Service

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The current inquiry investigates the practices of tobacco treatment physician-ordered consultation and nicotine pharmacotherapy medication orders from physicians at a tobacco treatment service. Smoking increases the chance of hospitalization and interferes with patients' health. Smoking impacts pulmonary function and wound healing. It interferes with hospital treatments and medications. Tobacco treatment services (TTS) in hospitals decrease hospital readmission rates among patients at 30, 90, and 180 days, with statistical significance for patient readmission rates at 30 days. Despite evidence supporting the benefits of tobacco treatment service protocols set by hospitals and the Joint Commission, program utilization for high-priority patients (i.e., everyday smokers, serious medical conditions) is an issue. Key to TTS improvement are the tobacco treatment physician–ordered consultation and nicotine pharmacotherapy medication orders. The inquiry focuses on the barriers and facilitators to implementation of physician-ordered consultation and nicotine pharmacotherapy medication orders from physicians. TTS program improvement strategies are recommended to increase the number of physician order consultations, expand the age groups of the patients that receive physician-ordered consultations, and increase tobacco pharmacotherapy medication orders and utilization of all available medications when appropriate.

Table of Contents

List of Tables

List of Figures

Preface

I am extremely thankful for the support and encouragement I have received throughout this journey. First and foremost, would like to thank my wonderful wife, Erin, for all her support and tolerance throughout this process. I would also like to thank my other family members, such as my mom, sister, brother, mother-in-law, stepfather-in-law, and father-in-law, for their support in this journey. To my mentor, committee member Dr. Harris, thank you for your guidance, support, and feedback. The influence you have had on my life in such a short amount of time is unmeasurable, and words cannot express my gratitude. In addition, I would like to thank my other committee member, Dr. Gibbs, for her guidance during this process. Your help in creating a solid study, especially with the data analysis, was tremendous. I would like to thank Dr. Ross, who played an instrumental part in this journey as well. Lastly, and certainly not least, thank you, Dr. Fertman, for your guidance and time spent with me, both in person and on the phone. Your energy, passion, and how much you care for all of us is evident every time we meet. I would not have chosen a different advisor and am so very fortunate you were mine. Without these people in my life, I would not have been able to finish this journey.

1.0 Introduction

Tobacco is the most preventable cause of disease and death in the United States. Since the Surgeon General's first report on smoking and health in 1964, smoking prevalence in the U.S. has dropped from around 43% to 15.5% of the adult population (Centers for Disease Control and Prevention, 2017a). Nevertheless, close to 38 million Americans continue to smoke, and the health impact and costs are significant—480,000 die from smoking-related illnesses annually, or 20% of all deaths, and there are more than $200 billion in added healthcare costs and productivity losses (Goldberg, Krantz, Semal, Zhang, & Trick, 2016). Smoking also impacts individuals exposed to secondhand smoke. Secondhand smoke has contributed to 2.5 million deaths since 1964 and causes heart disease, lung cancer, stroke, and health issues in children (Centers for Disease Control and Prevention, 2017b).

One of the Healthy People 2020 objectives is to reduce tobacco use among Americans. Effective strategies to end tobacco use include increasing the price of tobacco products, enacting comprehensive smoke-free policies, expanding cessation treatment in clinical care settings, providing evidence-based cessation treatment to all smokers, implementing hard-hitting anti-tobacco media campaigns, regulating access to all tobacco and nicotine delivery devices, and reducing targeted advertising campaigns directed at children (CDC, 2017a).

The CDC has three targeted objectives: (1) addressing tobacco prevalence by implementing policies such as age restrictions to reduce tobacco use and initiation among youth and adults; (2) health system changes, such as policies and strategies to increase the accessibility and affordability of tobacco cessation methods; and (3) social-environmental changes that result in new policies to

reduce secondhand smoke, illegal sales to minors, and tobacco advertising and increase the cost of tobacco (CDC, 2017).

With increased awareness of the negative impact of smoking on health, regulatory bodies in the healthcare industry have long pushed to prohibit smoking and offer tobacco cessation services in healthcare facilities. Hospital-based smoking cessation programs provide a teachable moment for patients and allow them to become open to quitting (Jones and Hamilton, 2011). In addition, inpatient hospital programs that use counseling and post-discharge support increase the chances of quitting by 65% (Rigotti, Clair, Munafò, & Stead, 2012). Since the late 2000s, U.S. hospitals, such as the University of Pittsburgh Medical Center (UPMC), have moved to a tobacco-free campus model, including the prohibition of electronic cigarettes. Since 2012, hospitals have been required by the Joint Commission to identify tobacco users upon admission and offer hospital cessation services (Flore, Goplerud, & Schroeder, 2012).

The hospital cessation services' purpose is to treat patients during their stay at the hospital. The services, commonly known as tobacco treatment services (TTS), are built on the following evidence-based guidelines (Public Health Service, 2008):

- Tobacco dependence is a chronic disease that requires multiple attempts to quit and numerous intervention attempts.
- It is imperative that clinicians and healthcare delivery systems consistently identify and document tobacco status for all inpatients
- Tobacco dependence treatments are effective across a wide range of populations. Clinicians should encourage all patients willing to try to quit tobacco products to use counseling and treatments.

- Brief intervention treatment does work and should be offered to every patient that uses tobacco products.

- Counseling methods such as individual, group, and telephonic are effective. The effectiveness of these treatments increases with the treatment intensity.

- There are effective medications available for tobacco dependence, and clinicians should recommend their use for all patients except for those who are medically contraindicated, or when there is not enough evidence to justify their use.

- The following medications should be recommended: bupropion SR, varenicline, nicotine patch, nicotine gum, nicotine lozenge, nicotine inhaler, and nicotine nasal spray.

- Counseling and medication can be effective when used individually but are more effective when used in combination.

- Telephonic quit lines are effective with diverse tobacco users and have a wide reach; thus, patients should be offered access to the tobacco quit lines.

- Tobacco treatments are clinically effective and cost-effective in relation to other intervention methods for clinical disorders. Insurers and purchasers should determine that insurance plans cover tobacco treatment.

A performance measure to guide hospital cessation program development and implementation was developed by a voluntary external technical advisory panel (TAP) appointed by the Joint Commission in 2009, which was composed of experts in science and tobacco dependence. TAP's chief goal was to ensure delivery of evidence-based tobacco-cessation counseling and medication for all admitted patients who use tobacco during hospitalization and on discharge (Flore et al., 2012). Hospital cessation programs are built around five A's to treat patients when attempting to address their tobacco use: ask, advise, assess, assist, and arrange. The five A's

are widely used in outpatient settings, with health care providers trained to (1) ask—identify and document tobacco use status for every patient at every visit; (2) advise—in a clear, strong, and personalized manner, urge every tobacco user to quit at every visit; (3) assess the patient's willingness to quit at every visit; (4) assist a patient who is willing to make a quit attempt, using counseling and pharmacotherapy to help him or her quit; (5) arrange follow-up contact in person or by telephone, preferably within the first week after the quit date (Agency for Healthcare Research and Quality, 2012).

Rooted in the five A's, hospitals identify and document the tobacco-use status of all admitted patients. Hospitals provide both evidence-based cessation counseling and medication during hospitalization for all identified tobacco users (absent contraindications or patient refusal), a referral upon discharge for evidence-based cessation counseling and a prescription for cessation medication (absent contraindications or patient refusal), and documentation of tobacco-use status approximately 30 days after discharge (Figure 1). To support hospital cessation programs, Jones and Hamilton (2011) recommended staff training on how to advise patients to quit smoking based on their individual health, supporting each individual through the quitting process, and group counseling and nicotine pharmacotherapy for assistance with cessation.
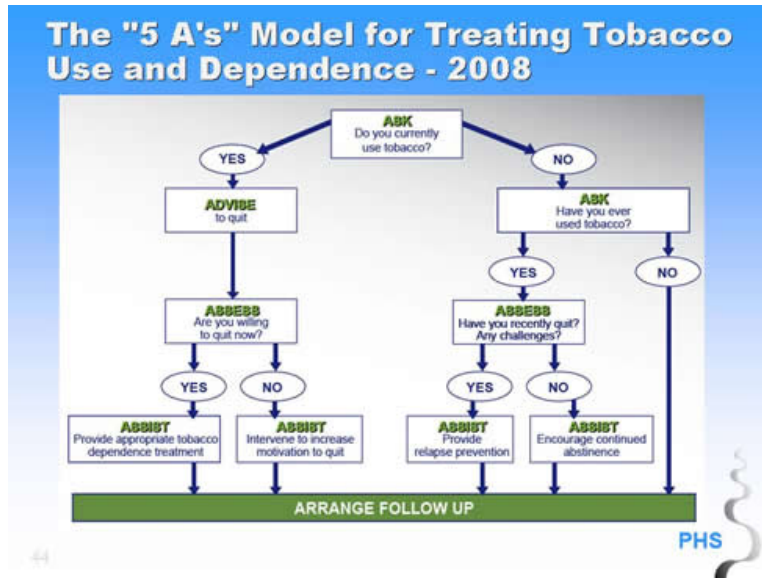
Figure 1 The "5 A's" Model for Treating Tobacco Use and Dependence—2008 (AHRQ, 2012)

1.1 Inquiry Context

The inquiry context is the UPMC Presbyterian Hospital TTS. The UPMC Presbyterian Hospital is a large teaching hospital founded in 1893. The hospital is a Level I regional resource trauma center and one of 41 nationally certified comprehensive stroke centers. The hospital consists of 43 services and over 750 medical/surgical beds and 150 critical care beds and employs 4,800 physicians. Hospital staff consist of nurses, physicians, advanced practice providers (APPs), and allied health professionals such as physician therapists, occupational therapists, tobacco treatment specialists, and speech therapists.

The UPMC TTS is available to all UPMC Presbyterian Hospital services (Table 1). Each hospital service has physicians, residents, and medical students and works with the hospital floor nurses. Ideally, these staffs work together to provide patient-centered care, but due to patients with multi-morbid health issues, staff sometimes use disease-centered care (Stokes, Tumilty, Doolan-

Noble, & Gauld, 2017). Physicians often make decisions based on time limitations and thus must neglect other non-pressing health issues (Stokes et al., 2017).

Table 1 UPMC Presbyterian Hospital Services Served by the TTS

Anesthesiology	Thoracic Surgery	Pulmonary Medicine
Dermatology	Plastic Surgery	Orthopedic Surgery
Hematology/Oncology	Oral Surgery	Nephrology
Ophthalmology	Internal Medicine	Gastroenterology
Pediatric Surgery	Emergency Medicine	Cardiothoracic Surgery
Surgical Oncology	Cardiology	Colon/Rectal Surgery
Unspecified	Vascular Surgery	General Medicine
Urology	Toxicology	Neurology
Otorhinolaryngology	Radiology	Transplant
Critical Care Medicine	General Surgery	Neurosurgery
Pathology	Rheumatology	Trauma

1.2 Problem of Practice

Clinical smoking cessation programs are successful and strongly suggested; however, implementation varies (Goldberg et al., 2016). Hoekstra et al. (2017) argued that there is an expected amount of program adaptation necessary for services to work. Adapting programs is essential, since each hospital service has a unique set of needs for adaptation for the program to be successful (Hoekstra et al., 2017). Hospital services categorized as stable high-fidelity by hospital professional staff were of high interest to the staff, who had a vision and strategy for program implementation. The same professionals were more creative in adapting such programs to fit their specific environment (Hoekstra et al., 2017).

1.2.1 Lack of Referrals

Physician-ordered consultations allow patients to be prioritized to receive counseling as soon as possible and are a critical element of the tobacco treatment service (TTS) (Public Health Service, 2008). Consultations expedite the process. Patients run the risk of not getting medication without a physician-ordered consultation. Healthcare professionals have high credibility and play an important role in educating tobacco users about their behaviors (Kruger, O'Halloran, Rosenthal, Babb, & Fiore, 2016). Physician-ordered consultations allow patients to receive intensive counseling about their tobacco use from a healthcare professional such as a tobacco treatment counselor (Kruger et al., 2016). These consultations are important, as it is difficult to provide in-depth tobacco counseling to every tobacco user. In particular, there are safety nets to prioritize and intervene with high-priority patients (i.e., everyday smokers, those serious medical conditions). Intensive counseling increases patients' motivation to quit tobacco products. When physicians do not refer patients, an opportunity is missed to counsel tobacco users.

1.2.2 Lack of Medication Orders

Tobacco pharmacotherapy medications are an essential element of the TTS (Public Health Service, 2008). Medications include nicotine patches, nicotine gum, nicotine lozenges, nicotine inhalers, nicotine nasal spray, varenicline (Chantix), and bupropion (Wellbutrin). Not all hospital services order the tobacco pharmacotherapy recommended by the TTS staff. Most tobacco replacement pharmacotherapy doubles the chances of quitting smoking (Public Health Service, 2008). As with the physician-ordered consultations, when nicotine pharmacotherapy medications

are not ordered, an opportunity and an essential element in the tobacco cessation process are missed.

UPMC Presbyterian has approximately 32,000 inpatient admissions a year. In 2017, approximately 9,500 patients who were admitted to the hospital were "someday" or "everyday" tobacco users. Approximately 50% of tobacco users admitted to the hospital have contact with a certified tobacco treatment specialist. This amounts to slightly more than 400 patients per month. While this might be viewed as a positive, the TTS performance could be improved by focusing their efforts on high-priority patients (i.e., everyday smokers, those with serious medical conditions). Too often, the patients who are most in need of services do not get access to the TTS.

The current inquiry investigates the practice of physician-ordered consultations and nicotine pharmacotherapy medication orders for the hospital's TTS. The inquiry focuses on the barriers to and facilitators of implementation of physician-ordered consultation and nicotine pharmacotherapy medication orders. The intention is to improve hospital TTS participation and create a better patient-centered environment.

1.2.3 UPMC Tobacco Treatment Service

The TTS's goal is to see at least 50% of the tobacco users admitted to the hospital service. In 2017, the TTS counseled approximately 48% of tobacco users admitted to the hospital, which amounts to slightly more than 4,500 patients. Each hospital service is staffed by physicians, residents, and medical students and works with advanced practice providers (i.e., nurse CRNPs or physician assistants) that staff hospital floors. These individuals can put in physician-ordered consultation for a patient. The TTS counselor meets with the patient to discuss his or her tobacco use and interest in using nicotine pharmacotherapy. If the patient would like to use medication, the

counselor sends a text page to the paging physician for a medication recommendation. The service uses seven first-line effective treatments for patients: varenicline, bupropion SR, nicotine patches, nicotine lozenges, nicotine gum, nicotine inhalers, and nicotine nasal sprays. TTS counselors do not have medication-prescribing rights and thus must make the recommendation to the paging physician or advanced practice providers. Patients who accept are also electronically referred to the national tobacco quit line for further assistance with cessation after discharge.

The TTS identifies patients through two methods: The first is through the nursing admission assessment, and the second is through physician-ordered consultations. Once patients are identified, their medical records are reviewed through the Electronic Health Record (EHR), and then they are visited by a TTS counselor. Figure 2 provides a workflow model of how the UPMC TTS operates.
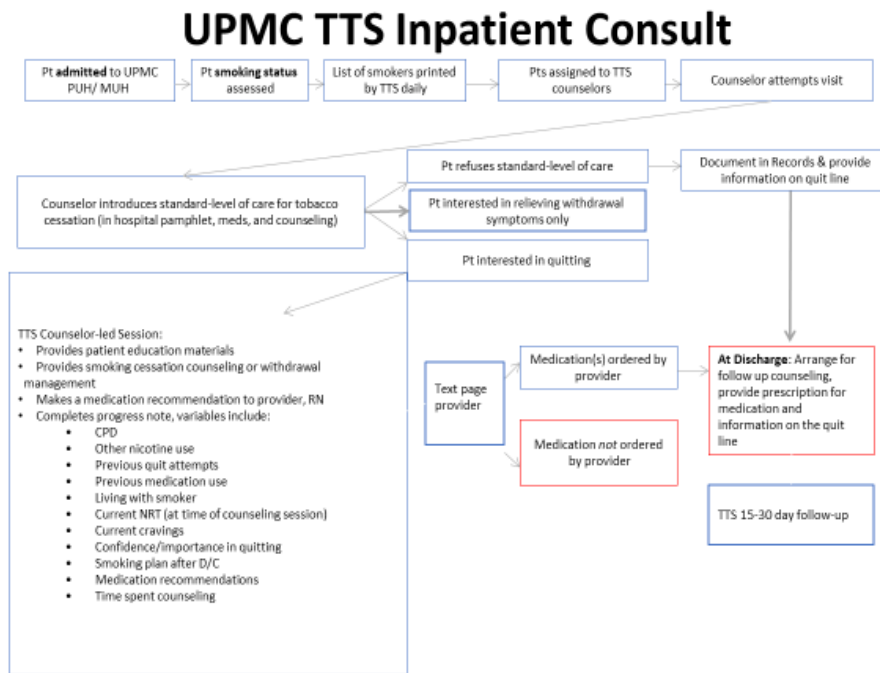
Figure 2 UPMC TTS Patient Workflow

2.0 Literature Review

2.1 Consultation Services

Hospital inpatient consultation services are part of the standard quality of care for patients admitted to the hospital (Bauer & Maroon, 2010). They allow patients with critical needs to be treated on a priority basis. Customized hospital services provide the best quality of care for a patient (Stevens, Johansson, Schonger, & Howell, 2013). Consultation services allow physicians to access the expertise of those who have dedicated their lives to their specialty. In addition, in the Medicare population, $1.9 billion was spent on over 12 million consultations in 2008 (Stevens et al., 2013).

Physicians cannot rely on their own knowledge alone to provide the highest quality of care for patients. Without the use of consultation services, a physician could misdiagnose a patient at the hospital. This creates a significant issue, because an incorrect diagnosis will lead to incorrect treatment. This directly affects the quality of patient care. A study investigating dermatology consultation services for adults over the age of 60 found that 10 of 33 consultations required a change in diagnosis or treatment (Bauer & Maroon, 2010).

Stevens et al. (2013) investigated consultation services in the intensive care unit (ICU). The authors argued that, in general, consultation services provide procedural assistance or intellectual assistance. They identified four specific reasons for ordering a consultation: to seek expert opinion, to provide a technical skill, in response to a system protocol requiring a consultation, or at the patient or family's request. Stevens et al. (2013) investigated barriers to high-quality consultations and found that there were several key factors that impacted the level of

quality of a consultation in the ICU. Barriers to a high-quality consultation include an inexperienced member not asking the correct questions for consultation or misunderstanding when to consult the team. Other factors are the consulting team deciding to limit the involvement of the attending team or the team that ordered the consult; poor communication between the medical teams; and external factors, such as insufficient time to provide a high-quality consultation to the team.

Trout, Ripley-Moffitt, Meernik, Greyber, and Goldstein (2017) investigated provider satisfaction with a consultation tobacco treatment hospital service. The study found that 35% and 36% of physicians reported ordering a TTS consultation "often" or "sometimes," respectively. Eighteen percent of physicians said they put in a consultation "most times," while 12% said they "rarely" ordered a TTS consultation. Almost all providers (97%) voiced the importance of having a TTS, and 59% rated the service as excellent. Providers' reasons for ordering a TTS consultation were ease of ordering, promptness of response to the consult, expertise of consultations, and consult team recommendations (Trout et al., 2017). Having a TTS consultation service has an impact on providers' behavior: Most providers indicated that being exposed to or using the TTS had a positive influence on their counseling and prescribing behaviors. Providers were also more likely to discuss a patient's tobacco use and provide tobacco recommendations upon discharge due to the tobacco treatment consultation service (Trout et al., 2017).

2.2 Medication Orders and Tobacco Pharmacotherapy

Medication orders optimize treatment to provide the best quality of care for a patient (Hohl et al., 2015). The electronic medical record systems are used to document and order

medications. These electronic medical record systems aid health professionals in decision-making when requesting medication. The medication ordering process starts when a physician or healthcare provider orders medications he or she feels is appropriate for the patient, which are then reviewed by another healthcare professional (Hohl et al., 2015). The medication review is usually conducted by a pharmacist and involves creating a personalized treatment plan, reviewing medication history, identifying and discontinuing any contraindicated medication, and ensuring that the medication is taken appropriately (Hohl et al., 2015).

The Food and Drug Administration has approved bupropion, varenicline, and nicotine replacement therapy (NRT) as effective first line nicotine treatments. Nicotine replacement therapy consist of nicotine patches, gum, lozenges, inhalers, and nasal sprays. Proper use of NRT prevents partial nicotine withdrawal (Gómez-Coronado, Walker, Berk, & Dodd, 2018). The use of NRT can thus prevent cravings to smoke cigarettes. Combination use of NRT, such as nicotine patch with nicotine gum, is as effective as varenicline (Cahill, Stevens, Perera, & Lancaster, 2013).

Varenicline, commonly known as Chantix, is a partial agonist of nAChRs with $alpha_4$ and $beta_2$ receptors (Gómez-Coronado et al., 2018). These receptors act in the brain when given nicotine to release dopamine. Two different meta-analyses showed increased efficacy in quitting smoking at a dosage of 2 mg/day during a 12-week treatment when compared to placebo or bupropion (Gómez-Coronado et al., 2018). Bupropion is a dopamine and norepinephrine reuptake inhibitor and a nicotine receptor antagonist and is commonly used for major depression (Gómez-Coronado et al., 2018). Bupropion is shown to decrease smoking cessation rates long-term. Cahill et al. (2013) found there was not a significant difference between bupropion and NRT and suggested it as an option for people who did not care for NRT.

Tobacco pharmacotherapy is more often covered for patients with private insurance or a military health plan than those covered by Medicaid or Medicare. Individuals who are uninsured are less likely to use tobacco pharmacotherapy (Ignacio, et al., 2018). Dube, Pesko, and Xu (2016) found that 47% of individuals who were willing to use smoking cessation medication were willing to pay $150 or more. Convenience of receiving the medication increased the amount a patient was willing to pay and willingness to use the medication. A study by Hoogendoorn, Feenstra, Hoogenveen, and Rutten-van Mölken (2010) found tobacco pharmacotherapy to be cost-effectiveness for individuals with COPD in comparison to all other treatment methods. The study looked at tobacco pharmacotherapy treatments, counseling treatment, and usual care, which involved no treatment interventions. This, along with the effectiveness of tobacco pharmacotherapy, shows that the best way to treat patients diagnosed with COPD is through the use of tobacco pharmacotherapy.

2.2 Facilitators and Barriers to Evidence-Based Program Implementation

There is an increasing amount of literature available that investigates the facilitators and barriers of healthcare programs (Forsner, Hansson, Brommels, Wistedt, & Forsell, 2010). Researchers have created a variety of theoretical ideas on implementing new healthcare programs (Barnett, Vasileiou, Djemil, Brooks, & Young, 2011). A large body of research on healthcare innovation is strongly influenced and shaped by Rogers's (1983) seminal work on diffusion of innovation. Within this work, healthcare innovations are adopted and diffused more easily when certain conditions are favorable. New programs implemented in the correct organizational

environment, are likely to succeed and have a substantial impact as well as compatibility with the healthcare organization's values (Barnett et al., 2011).

Rogers proposed an innovation-decision process involving five steps: knowledge, persuasion, decision, implementation, and confirmation. While all the steps are important, for the current literature review, the focus is on the implementation and confirmation stages, since the TTS is an established and implemented program. Once implemented, the innovation loses its unique qualities, and the program loses its new idea appeal (Rogers, 1983). This is when reinvention begins. Reinvention is how the idea changes during the adoption and innovation process. The next stage, the confirmation stage, is when the individual looks for support for his or her decision to implement the innovation (Rogers, 1983). At this stage, the decision to implement the new program can be reverse-dependent on the success of the program.

Fleuren, Wiefferink, and Paulussen (2004) created a theory of determinants of implementation based upon Rogers's work. Fleuren et al. (2004) defined determinants of implementation as factors that either impede or facilitate a new idea within a healthcare organization that is meant to improve healthcare operations or quality of care. Fleuren et al. (2004) argued that to implement new programs within a healthcare organization, it is imperative to create a strategy built around these determinants of implementation. Cahill, Murch, Cook, Heyland, and the Canadian Critical Care Trials Group (2014) also suggested that creating intervention strategies around potential barriers to implementing clinical programs may result in greater improvements in the program's intervention. Cahill et al. (2014), based upon experts on determinants of implementation and referring to literature reviews, scored determinants of implementation from 1 to 32 with an average score of 8.1. The score of impeding determinants was 2.5 times higher than that of facilitating factors, and nearly every determinant that was considered to facilitate its

14

opposite facilitating factor was considered impeding (Cahill et al., 2014). The inverse was not the case, however, as one-sixth of cases that were impeding the opposite were considered facilitating (Cahill et al., 2014). This suggests that there are more barriers to programs than facilitators, and incorrectly implementing a facilitating method can change it to a barrier. This stresses the importance of understanding how to create facilitating methods because doing so incorrectly could lead to failure of the program to implement and thrive. Facilitators are important, but a focus on barriers leads to a frank and honest discussion that shows sensitivity to the complexity of the issue. Cochrane et al. (2007) categorized professional boundaries as a barrier to implementation. Cochrane et al. (2007) developed a model to calculate the weight of barriers to physician adherence (Figure 2). Barriers differ in their weight or impact on program implementation. For example, behavioral barriers (e.g., a physician resisting actions that do not fit into his or her daily routine) are more difficult to address than knowledge barriers, which are often due to a lack of educational updates and training.
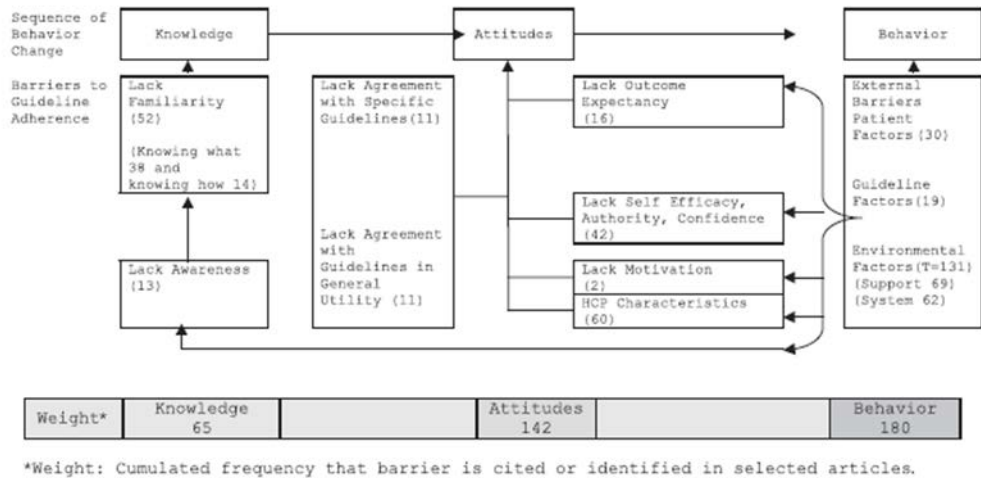
Figure 3 Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change

(Cochrane et al., 2017)

Cochrane et al. (2007) conducted a literature review to identify facilitators of and barriers to implementing programs in a healthcare setting and categorized them into multiple categories. Cochrane et al. (2007) argued that interventions created to change practice are best based on an accurate assessment of the determinants that support or obstruct the intervention. The theoretical framework for the current inquiry is rooted in the work of Cochrane et al. (2007) and Wierenga et al. (2013). Three levels of determinants of implementation are proposed to investigate the specific needs of the hospital (Table 2): characteristics of the socio-political context, characteristics of organizational culture, and characteristics of the implementer. These mirror the socio-ecological model's levels of health programs: community level, interpersonal level, and intrapersonal level (Smedley & Syme, 2000)

Table 2 Determinants of Implementation (Cochrane et al., 2007; Wierenga et al., 2013)

Characteristics of the Socio-Political Context
• Barrier: Attitudinal/Rational Emotive
• Barrier: Cognitive/Behavioral
Characteristics of Organizational Culture
• Facilitator: Leadership Support
• Barrier: Leadership Support
• Facilitator: Intervention Staff Support
• Facilitator: Peer to Peer
• Barrier: Acknowledging the Need for the Program
Characteristics of the Implementer
• Facilitator: Healthcare Professional
• BarrierHealthcare Professional

2.3 Determinants of Implementation: Characteristics of the Socio-Political Context

The focus at this level is on the prevailing rules, regulations, policies, informal structures, norms, and attitudes across institutions as they relate to tobacco use, non-use, and efforts to not use tobacco products.

2.3.1 Barrier: Attitudinal/Rational Emotive

Healthcare providers' attitudes toward a health concern matter for a program to be able to address the concern. The compatibility of a program with societal developments (attention to health in society) is the concept that if the behavior change is prominent in society, it is then more of a concern within healthcare settings. Stakeholders are more understanding of what is happening in society and are willing to implement health initiatives to prevent health issues related to such behavior. An example is how attitudes towards smoking in a public area have changed. As a better understanding was attained of how secondhand smoke impacts work environments, employers started to create smoke-free work campuses (Daube & White, 2018). Resources and materials for smoke-free workplaces are offered by organizations such as the U.S. government, American Cancer Association, and World Health Organization. Critical to the current study is Cochrane et al.'s (2007) finding that when a health concern has a stigma or is seen as risky within the larger socio-political context, then this can create a barrier to a program's addressing the concern. Clearly, physicians who have a positive perception of a health concern and its treatment are active facilitators of the program. Conversely, if a program or practice (e.g., smoking) is one with a stigma, then this might be a barrier.

2.3.2 Barrier: Cognitive/Behavioral

Healthcare providers' knowledge and skill regarding a health concern matter. Furthermore, training and education among healthcare professionals on how to address the concern need to be prioritized. A study by Hancock et al. (2014) investigating the barriers to diagnosing patients with heart failure found that general practitioners were not comfortable using the equipment necessary to diagnose such patients. However, cardiology physicians and nurses were willing to use the equipment to diagnose the condition. This suggests that the practitioners' unwillingness to diagnose patients because they did not have the proper education was a barrier to implementing programs. This shows the importance of training. Forsner et al.'s (2010) study on implementing clinical guidelines in psychiatric care found the lack of skills to implement an innovation to be a substantial barrier. Physicians understood there was a need to implement the program and that it would improve the quality of care for the patients but did not feel comfortable implementing the guidelines. One physician mentioned that they understood there was a gap between what needed to be done and what they were going to do (Forsner et al., 2010). Based upon these studies, to successfully implement an innovation, it is imperative that there is enough training for the physicians to feel comfortable with the new process or method. If physicians do not feel they have the skills necessary to carry out the process successfully, then they will not do it. Individual efforts to improve knowledge and skills are critical; however, without sustained institutionalized initiatives, efforts to fully implement and improve programs are hindered. Prime examples of healthcare priorities can be found in healthcare board certifications and licensing procedures.

2.4 Determinants of Implementation: Determinants of Organizational Culture

The focus at this level is on the prevailing knowledge and attitudes at the organizational level (i.e., hospital service), focused on interpersonal processes and primary groups, including colleagues, peers, and supervisors.

2.4.1 Facilitator/Barrier- : Leadership Support

Successful healthcare leadership is needed in light of the current challenges of ensuring access, quality and safety, and affordability. The leadership within an organization (here, a hospital) is both a program facilitator and a barrier. Leadership roles are spread throughout the hospital, at different administrative levels and in different departments and units, with varied spheres of authority and responsibility. Clinicians delivering care (residents, nurses, physician assistants, etc.) are also leaders. For example, nurse managers are responsible for supervision of their unit(s), including staffing, maintaining budgets, ensuring excellent nursing practice, facilitating quality improvement, and promoting patient safety. Wye, Stockings, Bowman, Oldmeadow, and Wiggers (2017) used leadership to improve nicotine dependence treatment by the hospital staff. This was done though consultations with senior medical professionals, senior nurses, and facility management staff and unit-level meetings with managers and clinical leaders using motivation interviewing techniques.

Li, Lam, Heise, Reid, and Mullen (2014) cited lack of support from leadership as a significant barrier to successful implementation of a tobacco cessation program in the hospital setting. The nurse counselors did not receive support from the physicians overseeing the patients' care and felt the need for more support to increase implementation of the cessation program.

Attending physicians, who are the ultimate medical decisionmakers for patients, appeared to be critical in the process of gaining support.

Both sides of leadership in healthcare settings are described by Forsner (2010). Leaders are facilitators when they consistently and clearly communicate the importance of evidence-based guidelines for effective program implementation and provide support to their staff to adapt and tailor guidelines to best fit patients. Conversely, practitioners who felt they did not have the authority (i.e., lacked leadership support) to impact how the implementation of an intervention in their practice were less likely to thoroughly incorporate the intervention (Forsner et al., 2010).

2.4.2 Facilitator: Intervention Staff Support

Staff are critical to effective program implementation. Hospital programs are in extremely complex health care organizations that by their nature operate in a constantly changing environment. It is unrealistic for any individual staff member to have expertise in all hospital programs and services. Access, guidance, and support from the staff of a particular program are determinants of a program's implementation (Mikkola, Suutala, & Parviainen, 2018). Li et al. (2014) investigated the barriers and facilitators of a smoking cessation program in a hospital and determined that collaboration with the program staff across the hospital is essential to create a supportive smoking cessation environment. Most of the hospital staff and healthcare professionals voiced the importance of the program staff being members of their service teams to support smoking cessation and help patients quit smoking cigarettes. Building on this work to increase program staff interactions and support, Wye et al. (2017) had program staff work with and support hospital staff to create clinical floor champions as a strategy to increase implementation of nicotine dependence treatment.

2.4.3 Facilitator: Peer to Peer

Relationships among hospital staff influence services' planning and implementation (Hunt et al., 2007). This differs with support from leadership in that this is the relationship with staff members' direct supervisors. These are the individuals that staff interact with the most. In the healthcare system, this could be the unit director, or, for a medical student, the physician they are learning from. Another factor of organizational culture that may influence worker participation is a history of employees gathering for social activities, such as yearly cookouts, holiday parties, and volunteer activities (Hunt et al., 2007). Due to these activities, the worksite culture supports social interaction between management and their employees, which allows for a smooth transition to integrating innovations (Hunt et al., 2007).

2.4.4 Barrier: Acknowledging the Need for the Program

A barrier to acknowledging the need for a program is a reflection of the complexity of healthcare settings. Obviously, tobacco use is important. Clearly, to be implemented, healthcare programs need to be acknowledged as important. However, barriers to program acknowledgement at the hospital service level are a matter of priority and workload (Bruinewoud, Meer, Gulden, Anema, & Boot, 2015). Barriers to acknowledging the need for a program are created when it is not viewed as relevant and a major issue at that moment at the service level. The risks to staff time and energy of engaging with a health issue (here, tobacco) given other service needs are viewed as too high for the service's evaluation and production. The resistance is seen in the view that it is just not the role of this particular service to be involved with the particular health concern. This

may also lead to the service receiving less information and training on a program (Bruinewoud et al., 2015).

2.6 Determinants of Implementation: Characteristics of the Implementer

The focus at this level is on the individual characteristics that influence behavior, such as knowledge, attitudes, beliefs, and skills.

2.4.5 Facilitator/Barrier: Healthcare Professional

Healthcare providers are both program facilitators and barriers. A study by Cahill et al. (2014) found that for physicians, a lack of agreement on how to treat the patients, their own experiences dealing with similar patients, and the significance of the impact that the intervention method would have on the patient are barriers to the physician carrying out the intervention as intended. However, how recently a physician completed his or her residency also has an effect— younger physicians tend to be more complicit in carrying out the intervention (Cahill et al., 2014). This is thought to be due to how physicians were taught, as younger physicians have more faith in evidence-based medicine. A study on barriers to treating patients based on evidence-based guidelines determined that lacking awareness, familiarity, agreement, self-efficacy, and outcome expectancy were all reasons that physicians did not feel comfortable prescribing daily inhaled corticosteroids (Cabana, Abu-Isa, Thyne, & Yawn, 2000). The study concluded that barriers to smoking cessation counseling include issues of a lack of self-efficacy and of outcome expectancy. Some physicians felt that a rapport needed to be built with the patient before they could have that discussion, or it would just aggravate the patient and therefore would be a waste of time (Cabana et al., 2000).

Providers gave examples of not feeling comfortable providing anxiolytics, antidepressant drugs, or nicotine replacement therapy to parents who wanted to quit smoking cigarettes due to their children's asthma. Providers also mentioned poor outcome expectancy as another reason they did not want to provide care for parents' smoking. Providers believed that even if the parents did want to quit smoking cigarettes, it might not have a positive impact due to other factors that would impact the child's asthma (Cabana et al., 2000). In addition, providers felt the need to address issues they felt were more urgent.

Physicians' professional responsibilities also play a role in their decision-making. Physicians feel they need to address the most pressing issues at hand, and if there is enough time, they will address secondary issues (such as tobacco use). Some healthcare professionals do not address a patient's tobacco use, as they do not feel responsible for helping patients quit smoking (Meijer, Kampman, Geisler, & Chavannes, 2018).

2.5 Other Tobacco Treatment Services

Inpatient hospital cessation programs are most successful when the intervention is first conducted in an inpatient setting (Rigotti et al., 2012). An alternative tobacco treatment service known as an opt-out program is a common practice in hospital systems (Buchanan et al., 2017). In such programs, tobacco treatment is simply standard practice. In the Medical University of South Carolina health system, the hospital implemented an opt-out program for perinatal patients. The study had an overall reach rate of 67% of perinatal tobacco users admitted to the hospital. In addition, a follow-up study to this program found that patients who received counseling were able

to maintain their abstinence longer than those not counseled. However, 90% of patients did return to smoking cigarettes within 1 month after discharge (Buchanan et al., 2017).

A study comparing intervention methods to usual care found a substantially greater use of the Quitline in the intervention group as well as an increase in smoking cessation at 3 months and 1 year (Bernstein et al., 2015). The team identified low-income patients who were treated in the emergency department. The study involved two arms of treatment: One was usual care, which was an informational pamphlet on smoking cessation and the Quitline. The intervention arm involved brief counseling, nicotine replacement therapy as appropriate, and a direct referral to the Quitline to provide additional support to smokers upon discharge. The use of the Quitline increased from 18.8% to 32.0% from usual care to intervention, respectively, and 7-day abstinence increased from 8.5% for usual care to 16.6% for intervention (Bernstein et al., 2015). The findings support that tobacco cessation programs can make a significant difference in improving smoking cessation rates.

Two essential guidelines are counseling patients regardless of their willingness to quit and offering or providing nicotine replacement therapy to patients when appropriate. Also, programs providing warm-referrals or consultations have a higher rate of patient participation in smoking cessation programs and ensure that patients receive counseling (Bernstein et al., 2015; Buchanan et al., 2017). This, along with the use of nicotine replacement therapy, is proven to increase smoking cessation rates compared to those who try to quit on their own (Public Health Service, 2008).

3.0 Methodology

3.1 Inquiry Questions

The inquiry questions are:

1. How do physician-ordered consultations vary by service and patient demographics of everyday smokers?

2. What are facilitators of and barriers to physician-ordered consultations by service and patient demographics of everyday smokers?

3. How do tobacco pharmacotherapy orders vary by service and patient demographics of everyday smokers?

4. What are facilitators of and barriers to pharmacotherapy orders by service and patient demographics of everyday smokers?

3.2 Inquiry Design

This a quality improvement initiative approved by UPMC's quality improvement division to investigate the occurrence of service requests by physicians to identify factors that influence TTS physician consultations and medication orders. Mixed methods were used, including a secondary analysis and semi-structured interviews.

3.3 Setting

The inquiry setting is UPMC Presbyterian Hospital, a large teaching hospital founded in 1893. The hospital is a Level I regional resource trauma center and one of 41 nationally certified comprehensive stroke centers. The hospital consists of 43 services, with more than 750 medical/surgical beds and 150 critical care beds, and employs 4,800 physicians. Hospital staff consist of nurses, physicians, advanced practice providers, and allied health professionals such as physician therapists, occupational therapists, tobacco treatment specialists, and speech therapists.

There are approximately 32,000 inpatient admissions a year, and the hospital is staffed by 1,300 full-time faculty members. In 2017, nearly 9,500 patients who were admitted to the hospital were someday or everyday tobacco users. Approximately 50% of tobacco users admitted to the hospital receive counseling from a TTS counselor—this amounts to slightly more than 400 patients a month between three counselors.

3.4 Key Informants

The hospital services analyzed as part of this inquiry were selected from the UPMC Presbyterian Hospital Services that participate with the TTS (Table 3). The three hospital services with the most physician-ordered consultations and the three with the fewest physician-ordered consultations were selected. Semi-structured interviews were conducted with physicians and advanced practice providers on the hospital services. Selection of physicians and APPs was based upon which hospital service they were affiliated with and their history of consultation orders. When applicable, APPs were interviewed first, as APPs typically have the most interaction with

the patients and the TTS staff. The APPs consisted of physician assistants and certified nurse practitioners. Physicians were interviewed in situations when APPs were not available for the hospital service. The hospital physicians included hospitalists and residents who worked with the targeted hospital services. Hospitalists include internal medicine or family practice physicians who specialized in the care of hospitalized patients; residents are individuals who hold a medical degree but practice medicine under the supervision of a physician; and medical interns are individuals who have completed medical school and are in their first year of practicing medicine.

Table 3 UPMC Presbyterian Hospital Services Served by the TTS

Anesthesiology	Thoracic Surgery	Pulmonary Medicine
Dermatology	Plastic Surgery	Orthopedic Surgery
Hematology/Oncology	Oral Surgery	Nephrology
Ophthalmology	Internal Medicine	Gastroenterology
Pediatric Surgery	Emergency Medicine	Cardiothoracic Surgery
Surgical Oncology	Cardiology	Colon/Rectal Surgery
Unspecified	Vascular Surgery	General Medicine
Urology	Toxicology	Neurology
Otorhinolaryngology	Radiology	Transplant
Critical Care Medicine	General Surgery	Neurosurgery
Pathology	Rheumatology	Trauma

3.5 Data Collection

This study includes a two-step data collection process: a secondary analysis of existing hospital data and a thematic analysis of semi-structured interviews.

First is a secondary analysis of the hospital's calendar year 2017 data related to patient tobacco use. Data are collected on all patients upon hospital admission. Patients are asked about their tobacco use during the nursing admission assessment. Patients who self-identify as actively

using tobacco products every day are classified as *everyday tobacco* users. For the year 2017, the aggregated UPMC Presbyterian Hospital admission data were queried to determine the three hospital services with the most and the three with the fewest physician-ordered consultations, looking at the patient demographics of age, race/ethnicity, sex, and health insurance (Carrillo et al., 2017; Hirschfeld, Wagner, & Zernikow, 2015).

3.6 Interviews

Two Apps or physicians members from each of the six hospital services were interviewed for a total of 12 interviews. Interview questions were adapted from Barnett et al. (2011) and Forsner et al. (2010), with the aim to determine facilitators of and barriers to consultations and medication orders. The questions mirror the socio-ecological model's levels of health programs (Smedley & Syme, 2000): community level (socio-political context), interpersonal level (organizational culture), and intrapersonal level (implementer). Each interview question (Table 4) is grounded in the literature and designed to discuss barriers and facilitating determinants in regard to physician consultation and medication orders. Interviews were conducted face to face in a private hospital room and recorded with a cell phone with the consent of the interviewee. Interviews were transcribed verbatim by the interviewer.

Table 4 Interview Questions

Interview questions	Looking for	Literature
What are your views on tobacco dependence in general? Has it	*Attitudinal/rational*	*Attitudinal/rational:* A study by Hancock et al.

Table 4 continued

changed since you started here or the program was first implemented? (Attitude) Prompt: How would you address a patient's tobacco dependence if they said they did not want to quit smoking cigarettes? Prompt: What do you believe is the purpose of the TTS? Prompt: On a scale of 1–10, how relevant do you believe the TTS is and why? What can you tell me about the evidence-based guidelines that the TTS with UPMC was built on? Prompt: What are the tobacco pharmacotherapy treatments (Knowledge)? How would you describe your medical philosophy? (e.g., evidence-based, . . .) Prompt: How would you address a patient's tobacco dependence if they said they did not want to quit smoking cigarettes?	*Cognitive/behavioral/ acknowledging program need/healthcare professional*	(2014) investigating the barriers to diagnosing patients with heart failure found that general practitioners (GP) were not comfortable using the equipment necessary to diagnose patients with heart failure. However, cardiology physicians and nurses were willing to use the equipment to diagnose the condition. This suggests that the practitioners' unwillingness to diagnose patients because they did not have the proper education was a barrier to implementing programs. *Acknowledging a program need:* In a study on barriers and facilitators for role models when implementing a preventative program for hand eczema, individuals who acknowledged a need for the program were viewed as internal facilitators (Bruinewoud et al., 2015). The workers' attitude changed, and they

		were internally motivated to perform the task, enjoyed being role models for the program, and finally took the task of being a program role model seriously (Bruinewoud et al., 2015). *Healthcare professional:* A study by Cahill et al. (2014) found that for physicians, a lack of agreement on how to treat the patients, their own experiences dealing with similar patients, and the significance of the impact that the intervention method would have on the patient are barriers to the physician carrying out the intervention as intended.
What does your leadership think about tobacco dependence? (Support) Prompt: Why do you think they feel that way? What do your peers think about tobacco dependence? (Support) Prompt: Why do you think they feel that way?	*Support from leadership/support from staff/peer to peer*	*Support from leadership:* Worksites with the highest worker participation had support from leadership (Hunt et al., 2007). *Management support* was identified as a willingness to release workers from their usual work tasks to attend events, participate

		fully in the interventions, and engage in planning throughout the intervention (Hunt et al., 2007). *Peer to peer:* This differs from support from leadership in that this is the relationship with the direct supervisor. Good leadership and consistent communication were described as strong facilitators (Forsner et al., 2010).
Under what circumstances would you order a TTS consult and why? Prompt: When would you order a TTS consultation?	*Acknowledging program need*	Per a study on barriers and facilitators for roles models when implementing a preventative program for hand eczema, individuals who acknowledged a need for the program were viewed as internal facilitators (Bruinewoud et al., 2015). The workers' attitude changed, and they were internally motivated to perform the task, enjoyed being role models for the program, and finally took the task of being a program

		role model seriously (Bruinewoud et al., 2015).
Why or when would you not follow a recommendation from a consultation service?		
How would you improve consultation services/medication ordering processes?		

3.7 Analysis

3.7.1 Quantitative

The secondary analysis consisted of descriptive statistics on how physician-ordered consultations and physician-ordered medications varied by patient demographics for the three hospital services with the most and fewest consultations with at least 150 everyday smokers admitted to their hospital service in the 2017 calendar year. Patient demographics were UPMC health insurance (yes/no), race/ethnicity, sex, and age (Carrillo et al., 2017; Li, Lee, Chen, Jeng, & Chen, 2018) (Table 5). As a first step, referral rates were calculated for each hospital service and each demographic category overall. Differences across categories were statistically evaluated using the chi-square test and binary logistic regressions. For demographic categories that were associated with the TTS referral rate during the first step, differences in referral across services within each demographic category were further tested using the chi-square test (differences in the

referral rate across services were tested separately in men and women) for TTS consultation rates. This process was done for nicotine pharmacotherapy ordered as well. Along with the chi-square test, binary logistic regression models were calculated to create a predictive analysis between physician-ordered consultations and the variables in question. Binary logistic regressions were calculated for tobacco pharmacotherapy orders. Data were organized into an Excel spreadsheet and organized by patient demographics. In addition, descriptive statistics were calculated using SPSS and Microsoft Excel. Tables were created to compare quantitative outcomes between the hospital services.

Table 5 Secondary Analysis Rationalization

Outcome	Rationalization
Age	Li et al. (2018) used age as an outcome to determine factors for the number of consultations for children with chronic pain.
Sex	Li et al. (2018) used sex as an outcome to determine factors for the number of consultations for children with chronic pain.
Health insurance	Carrillo et al. (2017) examined how age, race/ethnicity, and insurance status were statistically different when investigating tobacco treatment service usage in an inpatient setting.
Race/ethnicity	Carrillo et al. (2017) examined how age, race/ethnicity, and insurance status were statistically different when investigating tobacco treatment service usage in an inpatient setting.

3.7.2 Qualitative

Qualitative data were analyzed to determine barriers and facilitators in the characteristics of the socio-political context, characteristics of the implementer, characteristics of the intervention

program, and characteristics of the participant (Wierenga et al., 2013). Once the number of barriers and facilitators was determined, the six services were analyzed based upon how many barriers or facilitators they had in place. The qualitative analysis was based on a thematic analysis, a type of analysis that can determine a repeated pattern among hospital services (Braun & Clarke, 2006). The thematic analysis was done inductively, where coding and categories were created based on the content of the data. This approach allowed the data to exemplify the meaning of each of the interview responses. Patterns and themes were identified and then categorized into areas that most closely matched the determinants of innovation. The thematic analysis of the data identified key reoccurring themes through four stages of analysis. The first stage was to become conversant with the data, the next step was to start the initial coding, the third stage consisted of categorizing the themes and subthemes of the data, and the last used comparative analytical categories with the qualitative analysis software NVivo. The credibility of the data was established through double-coding with a graduate student familiar with the tobacco treatment service.

This study sought trustworthiness through credibility and transferability. The trustworthiness of the study rather than its generalizability is an important feature of the research. The credibility of the researcher is key (Patton, 1990). The primary investigator was a paid employee of the facility, where he was a trusted and viable part of the team. Prolonged engagement and observation, combined with thick description and detail, added to the credibility of the study (Patton, 1990). The credibility of the researcher is increased by engaging in bracketing, a self-reflective process whereby the researcher recognizes his or her own a priori knowledge and assumptions and sets them aside (Gearing, 2004). Although the findings of this inquiry may not be applicable to hospital physician qualitative research (i.e., interviews), the reader may decide the

extent to which these findings are transferable to other populations with similar contexts and backgrounds.

Testimonial validity was used to mitigate any bias from the interviewer. This entailed a check on the accuracy of the interpretation of the interviewees' responses to the interview questions (Stiles, 1993). Also, the credibility of the data was established with the assistance of the program NVivo.

4.0 Chapter 4: Results

The inquiry focused on six UPMC Presbyterian Hospital services; three hospital services with the highest number of physician-ordered consultations and three hospital services with the lowest physician-ordered consultations. The high ordering physician-consultation services were Neurology, Cardiology, and General Medicine. The low ordering consultations services were Otolaryngology (Ear Nose Throat—ENT), Surgical Oncology and Emergency Medicine.

4.1 High Ordering Physician-Consultation Services

Neurology is a busy hospital service within the UPMC Presbyterian Hospital system. In 2017, almost 600 patients admitted to the Neurology service identified as everyday smokers. Reasons patients are admitted to Neurology service are for head trauma, seizures, movement disorders, neuromuscular disease, strokes, and migraines. The floors for Neurology are busy due to the patients increased need for assistance with performing daily tasks. The mornings are typically filled with healthcare professionals caring to the patient's many needs. Patients admitted under the Neurology service may suffer various types of aphasia, meaning patients are unable to understand or vocalize words and making communication difficult. The Epilepsy Monitoring Unit (EMU) is also part of the Neurology Service where patients are admitted to determine the cause of their seizures.

Founded in 1893 the Cardiology service offers advanced cardiovascular care and is a world-renowned Heart Transplantation Program, and one of the country's first Artificial Heart Programs. Cardiology has several step-down units as well as a couple of ICU units. The Cardiology treat patients who have experience a myocardial infraction, need a procedure such as a bypass, has issues with heart failure as well as many other heart related issues. Specialized services offered by UPMC Division of Cardiology include General, Preventive, and Rehabilitative Cardiology Services, Advances Cardiac Imaging Program, Cardiac Electrophysiology Program, Advanced Heart Failure Center, Cardiac Catheterization Program, Cardiovascular Genetics Program, Women's Heart Program and Hypertrophic Cardiomyopathy (HCM) Center.

General Medicine is one of the largest divisions of the hospital and referred the most TTS physician-ordered consults in 2017. General Medicine includes a hospitalist inpatient resident teaching service and a consult service supervised by the division's faculty. In addition, the inpatient service includes a full-time hospitalist service offered by the division's faculty in the Section or Hospital Medicine. The service is made of 40 American Board of Internal Medicine-certified internists. The hospitalist physicians coordinate both routine and highly specialized care and provide care throughout Presbyterian Hospital. Multiple General Medicine units are located throughout UPMC Presbyterian Hospital and have multiple units. Hospital units are sections where the hospital services are typically located (i.e., 10 East, 8 North, 7G). Hospital Medicine also offers specialized programs for the following: Orthopedic Medicine Co-Management Team, Transplant Medicine Team, Gastroenterology, and Nutrition Team, Sickle Cell Co-Management Team, Tobacco Treatment Program and Palliative Care and Medical Ethics

4.2 Low Ordering Physician-Consultation Services

Otolaryngology (Ear Nose Throat—ENT) consists of highly trained board-certified physicians who diagnosed and treat a wide range of ear, nose, and throat related conditions. Physicians typically work in conjunction with plastic surgery physicians to provide surgical procedures related to ENT. Many patients diagnosed with head and neck cancer are also admitted to this service. The hospital unit is a smaller unit and some of the patients admitted to the service are unable to communicate verbal post-surgery due to the locations of their surgery. Physicians in this unit are spending the majority of their day performing surgical procedures, however, they do find time to visit with patients admitted to the hospital in the early mornings or late afternoons. In addition, the service has multiple sub-specialist; they can focus their expertise in specific areas of ear, nose, and throat. ENT encompasses multiple areas including Skull Based Tumors, Head and Neck Cancer, Facial Plastic Surgery, Plastic Surgery and more.

The Surgical Oncology division offers patients high tech surgical care for many forms of cancers. The staff includes 30 surgical oncologists with a variety of skills and expertise. The Surgical Oncology unit consist of a variety of specialist who also works with Physician Assistant (PAs) to provide additional care. UPMC offers specialized care for the following areas: Breast Cancer, Melanoma, Sarcoma, and Upper gastrointestinal malignancies, Pancreatic Cancers, Colorectal Cancers, Hepatobiliary Cancers, and Endocrine Tumors.

Emergency Medicine in 2017 treated 53,000 plus patients. The facility is a Level-1 Regional Resource Trauma Center and receives urgent referrals from large areas of western Pennsylvania, surrounding areas of West Virginia, eastern Ohio and western Maryland. The

faculty provides teaching to 48 EM residents and as non-EM resident trainees, over 100 medical students, and four to six fellows. Due to the unplanned nature of patient attendance, the Emergency Medicine provides initial treatment for a broad spectrum of illnesses and injuries, some of which may be life-threatening and require immediate attention. Emergency Medicine is an entry point for individuals without other means of access to medical care. It operates 24 hours a day, although staffing levels may be varied in an attempt to reflect patient volume.

4.3 Physician-Ordered Consultations, Medication Orders: Sex, Age, Race/Ethnicity, and Health Insurance

In 2017, 8,183 everyday smokers were admitted to Presbyterian Hospital, of which 447 received a physician-ordered consultation for tobacco treatment service. Hospital services were selected based upon the number of TTS physician-ordered consultations that were ordered for everyday smokers and had at least 150 everyday smokers admitted to the hospital service in 2017. Cardiology, General Medicine, Neurology were the three highest hospital services with TTS physician-ordered consultations. ENT, Emergency Medicine, and Surgical Oncology were the three lowest hospital services with TTS physician-ordered consultation services. Table 6 shows the number of everyday smokers that received and did not receive a physician-ordered consultation across the three highest and lowest hospital services. As well as the percentage of everyday smokers that received a physician-ordered consultation. Among the highest services the percentage ranged from 6.95% to 11.03%. The range for the lowest services is 0.087% to 2.12%.

39

Table 6 Hospital Services, Everyday Smokers and Physician-Ordered Consults

Service (n)	(n %) Physician-ordered consults
Anesthesiology (n) 8	12.50%
Cardiology (n) 408	**11.03%**
Cardiothoracic Surgery (n) 241	3.73%
Colon/Rectal Surgery (n) 70	4.28%
Critical Care Med (n) 174	4.60%
Dermatology (n) 4	0%
Emergency Medicine (n) 368	**1.09%**
Gastroenterology (n) 76	1.31%
General Medicine (n) 2,301	**6.95%**
General Surgery (n) 1,014	3.88%
Hematology/Oncology (n) 1	0%
Internal Medicine (n) 644	6.06%
Nephrology (n) 2	0%
Neurology (n) 594	**7.92%**
Neurosurgery (n) 594	3.53%
Ophthalmology (n) 17	0%
Oral Surgery (n) 30	0%
Orthopedic Surgery (n) 341	3.23%
Otolaryngology (n) 189	**2.12%**
Pathology (n) 1	0%
Pediatric Surgery (n) 5	0%
Plastic Surgery (n) 43	6.98%
Pulmonary Medicine (n)146	1.37%
Radiology (n) 1	0%
Rheumatology (n) 1	0%
Surgical Oncology (n) 343	**0.87%**
Thoracic Surgery (n) 29	6.90%
Toxicology (n) 14	0%

Transplant *(n) 64*	1.56%
Trauma *(n) 93*	3.22%
Urology *(n) 38*	2.63%
Unspecified *(n) 3*	0%
Vascular *(n) 186*	3.23%

Note: Services in bold print were selected for the sample size

The majority of patients receiving a physician consultation across the six hospital services utilized are 25 years of age and older with the modal age group of 45 to 64 (Table 7).

Table 7 Physician-Ordered Consults by Age Group (n) among six hospital services

Variables	(n%) Physician-ordered consults
17 and under (*n* 4)	(0%)
18–24 (*n* 170)	(4.7%)
25–44 (*n* 1,211)	(6.0%)
45–64 (*n* 2,079)	(8.0%)
65 and up (*n* 739)	(6.0%)

White and African Americans patients receive the majority of the physician-ordered consultations across the six hospital services utilized. The percentages for each group are 7% and 8.6% (Table 8).

Table 8 Physician-ordered consults by Race/ethnicity

Variable	Physician-ordered consult
African American (*n)* 1,003	8.6%
White (*n)* 2,925	7.0%
Other (*n)* 275	6.5%

The percentage of the total number of patients with UPMC insurance is 18.5% among the six hospital services utilized. Across insurances—UPMC or non-UPMC—the percentage of physician-ordered consultations were 7.8% and 7.3% (Table 9) among the six hospital services utilized.

Table 9 Physician-Ordered Consultations by Insurance among the six hospital services

Variable	Physician-ordered consult
UPMC (*n* 781)—18.5%	(7.8%)
Non-UPMC (*n* 3,422)	(7.3%)

Across all six hospital services the medication orders for Nicotine ranged from 21.9%-44.8% for service patients who were everyday smokers (Table 10). The orders for Varenicline and Bupropion ranged from 0% to 4.9%. This pattern is consistent with the pattern across all hospital services (including the six in the current study).

Table 10 Hospital Service and Medication Orders

Service	Nicotine Orders	Varenicline Orders	Bupropion Orders
Surgical Oncology *(n) 343*	21.9%	0.0%	2.3%
ENT *(n) 189*	24.9%	1.1%	2.1%
Emergency Medicine (n) *368*	26.9%	0.23%	1.9%
Cardiology (n) *408*	35.5%	0.2%	4.9%
Neurology *(n) 594*	42.3%	0.5%	1.9%
General Medicine (n) *2,301*	44.8%	0.6%	4.1%

Examining the age distribution of medication orders reveals the same pattern of majority Nicotine medications with the age group of 45 to 64 with the highest percentage of medication orders across all age groups (Table 11).

Table 11 Medication Orders by Age Groups

Variables	Nicotine (n%)	Varenicline (n%)	Bupropion (n%)
17 & under (n 4)	(25%)	(0%)	(0%)
18–24 (n 170)	(35.9%)	(1.1%)	(0%)
25–44 (n1,211)	(40.4%)	(0.4%)	(3.6%)
45–64 (n 2,079)	(41.2%)	(0.6%)	(5.0%)
65 and up (n 739)	(32.5%)	(0.1%)	(2.9%)

Medications orders analyzed by Race/ethnicity revealed similar percentage of orders across races/ethnicities (Table 12). The majority patient populations are African American and White races. Nicotine medication orders are 36% and 40%. Bupropion the percentages are 2.1% and 4%. Varenicline orders were 0.7% and 0.4%.

Table 12 Medication orders by Race/ethnicity

Variable	Nicotine	Varenicline	Bupropion
African American *(n)* 1,003	36.0%	0.7%	2.1%
White *(n)* 2,925	40.2%	0.4%	4.0%
Other *(n)* 275	40.7%	0.7%	2.2%

Medication for nicotine for patients with UPMC and Non-UPMC insurance are 36% and 40% respectively (Table 13). The prescription medications, Varenicline and Bupropion, UPMC insurance is 0.8% for Varenicline and 2.6% for Bupropion. For Non-UPMC insurance Varenicline is 0.4% and Bupropion is 3.7%.

Table 13 Medication Orders by Insurance

Variable	Nicotine	Varenicline	Bupropion
UPMC (n 781)	36%	0.8%	2.6%
Non-UPMC (n 3,422)	40%	0.4%	3.7%

A chi-square test of independence examined the relationship between physician-ordered consultations and everyday smokers admitted to the six hospital services. In other words, is the admitting hospital service and receiving a physician order consultation related? Medical service and physician-ordered consultations were significant, $\chi2$ (5 N=4,203) =86.36, p = <0.001 indicating that the medical service an individual is admitted to is not independent of an everyday smoker receiving a physician-ordered consultation. All other variables are not significant (table 14). Further analysis supported what was seen earlier in Table 6 that admission to a high physician-order consultation service increases the probably of receiving a physician-ordered consultation.

Table 14 Chi-square test of physician-ordered consultation and variables among all six services

Variable	χ^2	df	p
Age groups	7.81	4	0.099
Race/ethnicity	2.27	2	0.322
Sex	0.81	1	0.369
UPMC Insurance	0.21	1	0.648
Medical Service	86.36*	5	<0.001

Note: * = Significant

Analysis of the medication orders revealed a similar pattern to what was seen in Table 8 and discussed as part of Table 10 that admission to a high physician order consultation service increases the probably of receiving a medication order. Furthermore, that receiving a physician consultation order relates specially to receiving a nicotine medication order. Likewise, for the age groups 25–44 (5 N=4,203) = 39.84 p= <.001; 45–64 (5 N=4,203) = 67.18 p=<.001: and 65 and up (5 N=4,203) =12.04 p=.05. Medication orders for race were nearly significant (table 15). Health insurance coverage relates to receiving a medication order.

Table 15 Nicotine orders vs variables

Variable	χ^2	df	p
Race/ethnicity	5.76	2	0.056
UPMC Insurance	4.54*	1	0.033
Sex	3.41	1	0.064
Age group	19.35*	4	<0.001
Medical Service	117.84*	1	<0.001

Note: *= Significant

Binary logistic regressions found patients admitted to Cardiology, General Medicine, Neurology hospital services are more likely to receive a physician-ordered consultation (Cardiology (OR 13.87 95% CI 4.27–45.08) p= <0.001, General Medicine (OR 8.40 95% CI 2.66–26.50) p = <0.001, and Neurology (OR 16.54 95% 5.17–52.89) p = <0.001) (Table 16).

Table 16 Odds Ratio: Physician-Ordered Consultations and Service

Hospital Service	Exp (B)	CI	p
Surgical Oncology*	1.00(Reference)	-	-
Emergency Medicine	1.25	0.54-11.07	0.24
ENT	2.45	0.28-5.61	0.76
General Medicine	8.47	2.69-26.69	<0.001
Cardiology	14.05	4.33-46.63	<0.001
Neurology	16.38	5.12-52.35	<0.001

*= Constant

Age group 25-44 is significantly less likely to receive a physician-ordered consultation than age group 45-64 (table 17).

Table 17 Odds Ratio: Age and Physician-Ordered Consultation

Age group	Exp (B)	95% CI	p
45-64*	1.00 (Reference)	-	-
17 and under	0.00	-	1.00
18-24	0.57	0.28-1.18	0.13
65 and up	0.73	0.52-1.02	0.72
25-44	0.74	0.57-0.98	0.04

*= Constant

African Americans are 1.23 times more likely to receive a physician-ordered consultation however, these results are not statistically significant (table 18).

Table 18 Odds Ratio: Race and Physician-Ordered Consultation

Race/ethnicity	Exp (B)	95% CI	p
White*	1.00 (Reference)	-	-
African American	1.23	0.94–1.61	1.61
Other	0.973	0.60–1.63	0.97

*= Constant

Receiving a physician-ordered consultation is related to receiving nicotine medication. (OR 1.39 95% CI 1.20–1.77) $p < 0.05$ (table 19).

Table 19 Odds Ratio: Nicotine Order and Physician-Ordered Consultation

Race/ethnicity	Exp (B)	95% CI	p
No Nicotine*	1.00	Ref	<0.001
Nicotine	1.39	1.20–1.77	0.007

*= Constant

4.4 Facilitators and Barriers

Findings are reported from 12 interviews. The majority of inquiry participants (interviewees) are residents and advanced practice providers (i.e., Nurse CRNP, Physician Assistants). When available the interviews were conducted in a private setting, otherwise completed in a public space as a staff lounge. Interviews range from 24 to 11 minutes (Table 20).

Table 20 Inquiry Key Informants Demographics

Service	Hospital Position	Length	Location
General Medicine	#1 General Medicine Hospitalist	16:46	Presbyterian Hospital
	#2 Attending Physician	24:04	Montefiore Hospital
Cardiology	#3 Nurse CRNP	16:31	Presbyterian Hospital
	#4 Nurse CRNP	13:10	Presbyterian Hospital
Neurology	#5 Neurology Resident	16:24	Presbyterian Hospital
	#6 Neurology Resident	15:18	Presbyterian Hospital
Emergency Medicine	#7 Emergency Medicine Resident	11:51	Presbyterian Hospital
	#8 Emergency Medicine Resident	10:52	Presbyterian Hospital
Otolaryngology (ENT)	#9 ENT Resident	10:58	Montefiore Hospital
	#10 ENT Resident	13:11	Montefiore Hospital
Surgical Oncology	#11 Surgical Oncology Physician Assistant	14:45	Presbyterian Hospital
	#12 Surgical Oncology Physician Assistant	19:39	Montefiore Hospital

Interview responses were coded and counted into categories of facilitators and barriers (Cochrane et al., 2007; Wierenga et al., 2013) with the intention to gain insights from the perspectives of the caregivers (i.e., residents and advanced practice providers) of the hospital's TTS socio-political context, organizational culture, and implementers. The larger quantitative and qualitative analysis context (i.e., problem of practice) is the concern that in 2017, 8,183 everyday smokers were admitted to Presbyterian Hospital but only 447 (5.4%) received a physician-ordered consultation for tobacco treatment service. Specifically, the qualitative analysis focus is to understand the current practices to make improvement recommendations.

From the aggregate data more facilitators are coded than barriers (Table 21). Characteristics of the Implementer are most commonly coded. The residents and advanced practice providers talked mostly about how they personally viewed the TTS in comparison to discussing the TTS from a Socio-Political Context, or Organizational Culture. Characteristics of the

Implementer doubled Socio-Political Context and was counted 19 times more than Organizational Culture. When given the opportunity almost participant discussed their medical philosophy as a healthcare implementer and mentioned the importance of evidence-based guidelines. Prior to that asking residents and advanced practice providers about the TTS evidence-based guidelines as part of the interview none of the participants could explain the evidence-based guidelines the Tobacco Treatment Service was built upon. Most had a general idea about nicotine pharmacotherapy and basic knowledge of brief intervention. Only one inquiry participant mentioned the 5As during the interview process. It was recognized and freely discussed that healthcare professionals are both supporters and barriers to TTS implementation. When discussing the Organizational Culture of the hospital the inquiry participants talked mostly about how interactions with the support staff delivering the intervention mattered. Trusting the TTS counselors to deliver effective counseling and provide the correct medication recommendations. Most participants acknowledged the need for the TTS, with only three coded responses (out of the total 188 responses) reporting concerns about the need for the program. Finally, the Socio-Political context is important but overall less discussed among the inquiry participants in comparison to the other categories.

Table 21 Response Breakdown: 112 Facilitators + 76 Barriers = Total 188 Coded Responses

Characteristics of the Socio-Political Context		**35**
	Barrier Attitudinal/Rational Emotive	15
	Barrier Cognitive/Behavioral	20
Characteristics of Organizational Culture		**67**
	Facilitator-Support from Leadership	6
	Barrier-Support from Leadership	10
	Facilitator: Support Staff for the Intervention	34
	Facilitator: Peer to peer	14
	Barrier-Acknowledging a Need for the Program	3
Characteristics of the Implementer		**86**
	Facilitator—Healthcare Professional	58
	Barrier—Healthcare Professional	28
		188

Next in the qualitative data analysis is the comparison of the coded responses of the high and low physician-ordered consultation services (Table 22). Looking first at the high ordering services more facilitators than barriers are recorded. Participants talked equally and mostly about the caregivers and organization. Healthcare professionals are reported more as TTS facilitators than barriers. Staff Support is another facilitator mentioned multiple times throughout the process. Leadership is a facilitator and not a barrier. Socio-Political Context concerns although lower than the other concerns are present speaking to the lack of knowledge and self-efficacy of providing tobacco treatment counseling.

Looking now at the low ordering consultation services more barriers than facilitators are recorded. Half the time spend with the participants from the low ordering services was focused on discussing caregivers. The participants discussed caregivers as facilitators (almost at the same rate as the high ordering services). However, the low ordering participants shared more concerns (i.e., barriers) than their counterparts. The pattern was the same when discussing the organizational culture. Participants identified facilitators, but they also identified barriers. In particular the participants were concerned with the leadership support.

Comparison of the total responses of the high physician-ordered consultation services and low physician-ordered consultation services are similar, 92 and 96 respectively. Both high and low hospital services recorded highest numbers among Characteristics of the Implementer and Characteristics of Organizational Culture. Low ordering hospital services recorded close to the same number of Characteristics of Socio-Political Context as did Characteristics of Organizational Culture. High hospital services reported the organizational culture only as a facilitator (no barriers reported). In comparison low hospital service participants had concerns about organizational barriers (i.e., Leadership and Program need). Furthermore, low hospital services report Healthcare Professionals more equally as supports and barriers, fewer support staff value comments and greater sensitivity to the Socio-Political context of TTS in comparison to the high hospital services.

Table 22 Comparison: High Ordering and Low Ordering Consultation Services Response Breakdown

		High	Low
Characteristics of the Socio-Political Context		**14**	**21**
	Barrier Attitudinal/Rational Emotive	6	9
	Barrier Cognitive/Behavioral	8	12
Characteristics of Organizational Culture		**39**	**28**
	Facilitator-Support from Leadership	4	2
	Barrier-Support from Leadership	0	10
	Facilitator: Support Staff for the Intervention	25	9
	Facilitator: Peer to peer	10	4
	Barrier-Acknowledging a Need for the Program	0	3
Characteristics of the Implementer		**39**	**47**
	Facilitator—Healthcare Professional	31	27
	Barrier—Healthcare Professional	8	20
		92	**96**

4.5 High Hospital Services Facilitators and Barriers

Three areas dominate the High hospital services participant responses: Healthcare professional, support staff and peer to peer (Table 23). Physicians and advanced practice providers' personal attitudes about their responsibility are salient when listening to them talk. Physicians and advanced practice providers address a patient's behavior regardless of their admittance being related their cigarette smoke or the patient's attitude. As Healthcare professional that feel that especially things that are directly impacted by patients' tobacco use need to be address by a TTS counselor. Likewise, staff voices the need to order more TTS consultations. They voice confidence in the TTS. They trust the TTS to provide more in-depth counseling than they themselves could. Barriers were also presented by high ordering services. The majority were in relation to the Socio-political context as well as lack of self-efficacy to provide counseling.

Table 23 High Ordering Consultation Services Response Comparison Breakdown

		General Medicine	Cardiology	Neurology
Characteristics of the Socio-Political Context		**2**	**5**	**7**
	Barrier Attitudinal/Rational Emotive	1	2	3
	Barrier Cognitive/Behavioral	1	3	4
Characteristics of Organizational Culture		**13**	**13**	**13**
	Facilitator-Support from Leadership	0	2	2
	Barrier-Support from Leadership	0	0	0
	Facilitator: The Number of Support Staff for the Intervention	9	9	7
	Facilitator: Peer to peer	4	2	4
	Barrier-Acknowledging a Need for the Program	0	0	0
Characteristics of the Implementer		**16**	**13**	**10**
	Facilitator—Healthcare Professional	13	10	8
	Barrier—Healthcare Professional	3	3	2
		31	**31**	**30**

Below are excerpts from the interviews to bring into the analysis the voice of the residents and advanced practice providers.

(1) Healthcare provider's attitude towards the patient's behavior (Socio-political context—Barriers—Attitudinal/Rational Emotive). Participant's #3 is a certified nurse practitioner with Cardiology Service. Her attitude to address patient tobacco use is that it is important depending of other health concerns. She understands how tobacco impacts a patient's heart health and feels it is an important issue, but not always something that needs to be addressed.

So, when there is a patient that does smoke I tried to figure out if they are willing to stop, but it is not my first and foremost concern usually we see them in either an acute setting or outpatient setting where a patient is going to do a procedure, so it is usually on the backburner. (Participant #3)

(2) Healthcare providers' confidence to prescribe nicotine replacement therapy to patients admitted to their hospital service (Socio-political context—Barriers—Cognitive/Behavioral). Participant #5 a Neurology resident physician does not view ordering tobacco pharmacotherapy medication as something they typically do. The resident works closely with patients admitted to the hospital for strokes. The resident shares lacking self-efficacy of order nicotine replacement therapy and understanding hospital-based tobacco intervention.

"Treating for smoking cessation, so usually we are going to be leaving that up to the PCP, we do often times prescribe nicotine replacement which I haven't done too much I don't know if it is something that is beyond our scope, but I don't know if it is something that we typical do" Participant #5

(3) Participant #1, a General Medicine Hospitalist, working with many people admitted to the hospital for a variety of reasons. He recognizes evidence-based medicine indicating the patient's health is directly impacted by their tobacco use. Participant #1 feels it would be best to be address by a TTS counselor. The healthcare provider wants to address what is causing the problem, not just treat the problem. That is what TTS does. (Organizational Culture Intervention—Facilitator—Intervention Support Staff)

Patients come in with lung cancer those are the patients we usually refer more often. I think because there's a direct correlation to their smoking. It's one of the first things that

56

comes to mind. In those cases, I think we do it more often. Circumstances we do it less

often is when patients come in with cellulitis or something that is not related to their

tobacco use. We tend to miss those more I think. (Participant #1)

(4) Staff voice the need to order more TTS consultations. Participant #1, a General Medicine Hospitalist feels a personal sense of responsibility to provide TTS consultations. The physician views the service as one that is beneficial to increase patient care and allows them to focus on other issues (Organizational Culture Intervention—Facilitator—Intervention Support Staff)

I think it's a 7–8 for most patients, I think the biggest problem is that . . . Well I think as

physicians we don't do a very good job as we should in the inpatient setting especially, to

do counseling and to tobacco cessation counseling especially, and we really think it's great

that we have a service. (Participant #1)

(5) Staff voice confidence in the TTS. A multi-disciplinary team improves, gives each team a sense of responsibility for the implementations. Participant #5, a neurology resident physician, relies on the expertise of the TTS to provide intervention to address patient negative health behavior. They see many patients who experienced a stroke as a direct result of their tobacco use. They value a multi-disciplinary approach (Organizational Culture Intervention—Facilitator—Support Staff Intervention).

. . . because most of the time it is with strokes I think that it is critical that we make a good

effort as much as possible to help them quit and whereas it might not be the focus as me

and my team it is just one piece of what we do and it is just nice to have another team [the

TTS] that is going to focus on that and often times that is the most important thinks patients can do to reduce their stroke risk. (Participant #5)

(6) Trust the TTS to provide more in-depth counseling than they themselves could provide. Participant #2 an Attending General Medicine physician see the TTS as providing a pathway for a client that she herself cannot. Participant #2 teaches new residents best practice protocols and medicine. Staff for an intervention are critical for its success. Support from both leaders and co-worker is connected to improve health outcomes (Organizational Culture Intervention—Facilitator –Support Staff Intervention)

"I think it is to that piece of a bigger exploration of saying here you are and saying two things it is going to be a little hard to smoke here let's come up with a short-term plan. And in the bigger plan of your smoking history tell me a little bit about your smoking, have you tried to quit. Maybe do some counseling and see if we can do more than just making them happy for the next few days."—Participant #2

(7) Healthcare professional personal attitudes about their responsibility. Participant #6, a neurology resident physician who works with stroke patients. The physician understands how a patient tobacco use directly impacts the patient's hospital treatment. The physician understands the evidence supporting increase quit rates when addressing a patient's behavior during an inpatient hospital stay (Implementer—Facilitator—Healthcare Professional).

I mean like an 8. I mean again maybe it is not the immediate acute thing that is saving the person's life or whatever. Especially to us, especially on stroke, and to a lot of other cases too it is a huge risk factor. So, it is something that we should be addressing, patients that are coming in with this problem. (Participant #6)

4.6 Low Ordering Consultation Services Facilitators and Barriers

Low hospital services participant responses have the greatest depth and variability (Table 24). Expressed are healthcare professional as both facilitators and barriers. Staff support and peer to peer are important for the low ordering services. Concerns are voiced about leadership. The need for the program was questioned. Finally, participants have socio-political concerns.

Table 24 Low Ordering Consultation Services Response Comparison Breakdown

	Emergency Medicine	Otolaryngology (ENT)	Surgical Oncology
Characteristics of the Socio-Political Context	**6**	**5**	**10**
Barrier Attitudinal/Rational Emotive	2	1	6
Barrier Cognitive/Behavioral	4	4	4
Characteristics of Organizational Culture	**7**	**8**	**13**
Facilitator-Support from Leadership	0	2	0
Barrier-Support from Leadership	2	1	7
Facilitator: The Number of Support Staff for the Intervention	2	4	3
Facilitator: Peer to peer	1	1	2
Barrier-Acknowledging a Need for the Program	2	0	1
Characteristics of the Implementer	**20**	**17**	**10**
Facilitator—Healthcare Professional	9	12	6
Barrier—Healthcare Professional	11	5	4
	33	**30**	**33**

Below are excerpts from the interviews to bring into the analysis the voice of the residents and advanced practice providers.

(1) Participant #8, an emergency resident physician, feels that providing inpatient TTS consultation is not worth the time of the patient to be in the hospital (Socio-political context—Barriers—Attitudinal/Rational). The physician expressed that the patient can receive the same service in an outpatient setting. The physician's attitude towards the intervention is one that is it not necessary and therefore does not need to be completed. Furthermore, if a patient wants to smoke during their admission to the hospital they should be able allowed. If the patient does not want to quit smoking cigarettes, the resident is not going to address the issue any further.

Holding up a bed for an inpatient consultation service to come down and do all this stuff. It's going to take more than the 30 minutes I could turn around and just get them out of here otherwise. (Participant #8)

Then I say hey man you can light up right outside that is fine with me. I'm not going to talk to them at all basically. (Participant #8)

(2) Participant #9 an ENT resident who work closely with patients diagnosed with head, mouth, and neck cancer. He earlier stated he feels strongly about tobacco negative health impact but was unaware of the TTS ((Socio-political context—Barriers—Cognitive/Behavioral).

Honestly, I did not know that you guys exist. (Participant #9)

(3) Having the TTS gives physicians choices and options beyond what they can provide improves program implementation (Organizational Culture Intervention—Facilitator—Intervention Support Staff). Participant #10, an ENT resident physician, is very busy and often

perform complex surgeries. The physician understands they do not have time to address every factor impacting the patient's health, thus relies on hospital programs (i.e., TTS) staff support to provide proper treatment.

> *[TTS Consultations] are a way to counsel patients efficiently. In the context of a busy medical team, addressing tobacco use is sometimes put a side, or not thought of because the thought is that there is more important or acute issues to take care of. And it's just too much if you have to take care of this too and treating tobacco use I think takes a lot of effort, a lot of time and it can be frustrating because of all the times it is not successful. So, I think teams, don't prioritize it because of that reason, so this is a way to address that. (Participant #10)*

(4) Participant #12, a Surgical Oncology Physician Assistant. They see the benefits of a TTS and think it is a good service to have in the hospital. However, due to her Attending physician she feels their service will not benefit from using the TTS (Organizational Culture Intervention— Barrier—Leadership)

> *I'd give it a lower number. I appreciate what they do because sometimes I am not thinking about it. I think it's great to have someone that says "By the way, this person needs this can you please order it." So I think it is very helpful and very relevant but for my service in particular I would give it a lower number I'd say a 4 or 5 simply because of the fact that my attending physicians really for the most part, in certain circumstances, especially with certain bowel connections, do not want the patients on the nicotine post-operatively and would prefer that since they are in the hospital anyways they would try to wean themselves*

off of nicotine. Their opinions do change if the patients get too irritable and start causing

a raucous. (Participant #12)

(5) Participant #8, an emergency medicine resident feels that patients are coming to the Emergency Department for a specific reason. Anything outside the specific reason does not matter. The goal is to treat the patient for their specific issue and move on to the next patient (Organizational Culture Intervention—Barrier—Program need).

I mean people do not come to the ED because they want to quit smoking. (Participant #8)

(6) Participant #7 is an emergency resident physician who feels tobacco is detrimental to an individual's health. Surprised that despite the wealth of knowledge about the negative health impacts of tobacco use that people still use it (Implementer—Facilitator—Healthcare Professional).

I think that tobacco continues to be an ongoing issue in the health world for sure and I will

say in medicine in general. I am surprised by how many people are actively still smoking

especially younger people who you think would have grown up knowing it can be

detrimental. (Participant #7)

(7) Participant #7, the emergency resident physician who previously mentioned that he was surprised that people still smoke cigarettes but did not feel it was something that should be addressed in the Emergency Department, felt it would impact the daily workflow and that it is important to get the patient out of the ED as quickly as possible (Implementer—Barrier—Healthcare Professional).

The goal is that if it does not have to be done in the ER then not to do it in the ER. Because

it is not the best environment for most things or it is not the most cost-effective. So specific

to tobacco cessation most of the time it is not going to be relevant to whether or not that

patient is not going to live or die acutely so whether or not that patient gets a consultation

in the ED it would have to not impact the rest of the flow. (Participant #7)

4.7 Final Open-Ended Question

The final interview question was an open-ended question left for the inquiry participants to add any thoughts or ideas they believe would improve consultation services or how the TTS is implemented overall. These responses were not coded, several participants discussed improvements in system workflow or the electronic health records. Almost every participant reported they would change the way hospital consultation services would communicate with each other. Participants reported feeling it is too difficult to determine who is overseeing a patient's plan of care but recognizes the difficulty as it changes throughout the day depending on the patient's need. Participant #5 mentioned they felt having a practice protocol or a something in the electronic health record that alerts physicians that it would be appropriate to order a TTS consultation. Participant #1 said they struggle with finding the notes from the TTS and feel they should put the notes where the other services write so it will be more visible to the attending physician.

5.0 Discussion

The goal to understand potential barriers and facilitators for ordering physician-ordered consultations and tobacco pharmacotherapy orders. Overall the hospital has low physician-ordered consultations with the highest percentage being 11.03%. Patients who are admitted to a hospital service with a higher number of physician-ordered consultations are more likely to receive a physician-ordered consultation for tobacco. Looking closer physician-ordered consultations and at each individual hospital service and the variables, none of the data were significant among hospital services except for Surgical Oncology. Surgical Oncology significance is likely attributed to the low number of physician-ordered consultations in the hospital service. Concluding that age, Race/ethnicity, sex, and insurance status are independent of receiving physician-ordered consultations.

Data were significant between tobacco pharmacotherapy and physician-ordered consultations. Indicating when a physician orders a consultation, a patient is more likely to receive a nicotine order for their tobacco use. Among nicotine orders in comparison to the other variables used all of the values were significant except for sex and race/ethnicity showing that whether a patient is male or female or race has no bearing on the ordering of nicotine. Examining age groups closer, age groups 25–44, 45–64, and 65 and up were significant indicating these age groups are more likely to receive an order for nicotine medication than age groups 17 and under and 18–24. This is not surprising and falls in line with other research. West et al. (2018) and Chui et al. (2018) found the average age of individuals to use tobacco pharmacotherapy to be approximately 46 and 51, respectively. The patient's age group is an indicator of how likely they are to receive nicotine replacement therapy (NRT). In addition, physician-ordered consultations and nicotine orders are

64

most common for age group 45–64. Concluding that patients admitted to one of the high-physician ordered consultation services and are in the age range between 45–64 are most likely to receive a physician-ordered consultation and as a result will likely receive a nicotine replacement order. Majority of cigarette smoker's start around the age of 18 (Marcon et al., 2018). There is a sharp drop off before the age of 25 and then a slow decline in cigarette smokers as people age (Marcon et al., 2018). By these standards those who have continued to smoke have been a smoker for 20 plus years and their chances of developing smoking related health issues are much greater than if they would have stopped earlier in their life.

Chi-square values for Race/ethnicity were not significant, but were nearly significant. These results contradict with Solberg, Parker, Foldes, and Walker (2010) research on tobacco cessation and disparities. The study found groups receiving fewer orders than their comparison group were Asian, Hispanics, and non-English language preference patients (Solberg et al., 2010). This may be attributed to patients not feeling comfortable asking for help to quit smoking cigarettes, especially with patients with other language preferences (Solberg et al., 2010). In addition, these patients may not be familiar with the tobacco pharmacotherapy medications that are available (Solberg et al., 2010). Lastly, interactions with patients of different races/ethnicities are less confrontational and more mutual. Physicians therefore indirectly encourage their behavior (Solberg et al., 2010).

Patients admitted to Neurology (high consultation ordering service) are significantly more likely to received Bupropion when a patient receives a physician-ordered consultation. This is intriguing due to the fact that Bupropion is a medication that has been known to lower the seizure threshold and thus increases the likelihood of a seizure. One could argue that interview responses from the Neurology physicians support this data as they do trust the relationship and expertise of

the TTS. Another possibility could be due to patients taking Wellbutrin prior to their hospital admission for other medical reasons.

The predictability model for the binary logistic regressions were fairly strong. When examining physician-ordered consultations the three highest hospital services were at least 8.4 times more likely to order TTS consults although there was a wide range of CI. This is not surprising since these hospital services were selected for their low or high number of TTS consultations. Increasing physician-ordered consultations would increase the number of nicotine replacement orders provided for patients while they are in the hospital. According to Kruger et al. (2016), receipt of the 5 A's which should be done during the process of counseling along with nicotine pharmacotherapy is best practice to treating patients with tobacco dependence and thus this would increase the patient's quality of care.

5.1 Facilitators and Barriers

Overall there are more facilitators than barriers when looking at all six hospital services. Hospital services with the highest-number of physician-ordered consultations, had the highest number of tobacco pharmacotherapy orders, and the highest number of facilitators. The three hospital services Cardiology, General Medicine, and Neurology also had the lowest number of barriers.

Both high and low physician-ordered hospital services voiced similar barriers and facilitators. Majority of the hospital staff interviewed see tobacco as something that is important and detrimental to an individual's health. Characteristics of the Socio-Political Context was the lowest of all the characteristics indicating that the hospital as a whole view tobacco use as

something that is detrimental to an individual's health. The discrepancy comes with physician's lack of knowledge of medications available and proper ordering of the medication. Characteristics of the implementer is the most common, indicating the characteristics with the most impact is with those who are ordering the consultations. Characteristics of the Implementer barriers such as time, whether they view it as something that is part of their job responsibilities, attitude towards the patient, and remember to use the service seem to be barriers to utilizing the service to its fullest. In theory impacting this determinant alone could be enough to significantly increase the number of physician-ordered consultations.

5.2 Barriers

Every hospital service had at least one barrier mentioned during their qualitative interviews. However, the number of barriers among high physician-ordered consultation hospital services were lower than their counterparts. This indicates that the number of barriers per hospital service has a negative impact on physician-ordered consultations or some barriers are weighted heavier their others. This aligns with Cochrane et al. (2007) that some barriers have a greater impact than others and are more difficult to overcome.

Surgical Oncology and Emergency Medicine had the highest number of barriers, and each had one of the lowest percentages of physician-ordered consultations. Emergency Medicine also had the highest number of Healthcare Professional barriers (11) which indicates that they feel it is not part of their profession to treat patients admitted under Emergency Medicine to treat patients for their tobacco use. A statement by one of their residents was *The goal is that if it does not have to be done in the ER then do not do it in the ER, because it is not the most cost-effective."—*

67

Participant #7. A similar statement was used by a Surgical Oncology resident which is summarized by their condition does not directly impact their outcome at the hospital right then and there then it is something for their PCP to cover.

Surgical Oncology also had the highest number of Leadership barriers (7) among all six hospital services. Interviews with Surgical Oncology were done with APPs. The APPs work closer with the patients and often must check with their attending physician before making medical decisions. Several times during the interviews Surgical Oncology APPs said they do not order nicotine replacement therapy or other medications because their attending physician feels the medication is a contraindication to the patients healing process. One APP mentioned that despite how they feel about nicotine replacement therapy or the TTS it does not matter because ultimately if their attending physician feels differently and that is what matters. When asked how relevant the APP felt the TTS was she responded,

> *So I think it is very helpful and very relevant but for my service, in particular, I would give it a lower number. I'd say a 4 or a 5[of 10] simply because of the fact that my attending physicians, really for the most part, in certain circumstances, especially with certain bowel connections do not want the patients on nicotine post-operatively and would prefer that since they are in the hospital anyways they wean themselves off of nicotine. (Participant #12)*

Based upon these examples one could suggest that some barriers are more difficult to overcome than others or have more significance than others. Another example of this is with ENT. When asked about tobacco pharmacotherapy medications one physician reported, *"[There are] nicotine patches but we rarely use that post-operatively because our plastics surgeon doesn't like it"* *(Participant #9).*

5.3 Facilitators

Healthcare professionals were coded to be the greatest facilitator among physicians and APPs. Physicians reported they felt it was part of their job or their responsibilities to address the patients' tobacco use regardless if the patient wanted to quit smoking or not. When one physician asked how to address a patient who does not want to quit smoking, they responded:

"So my approach has usually been, talk to them about it and explain to them the risk factors and what the risk are, and trying to talk to them sometimes about the cost of cigarettes and the subsequent health cost. And I try to still counsel them even if they don't want to quit. . . . I mean, even if they don't want to quit I spend at least 4–5 minutes counseling them about considering smoking cessation even if they don't want to" (Participant #1).

Another process mentioned by a Neurology resident, which is the department with one of the highest percentages of physician-ordered consultations was that TTS consultations were part of their best practice protocol that would alert when treating a patient that was admitted for a stroke and using tobacco products. When a physician asked about when he would order a TTS consultation the response was *"[It's] standardize in that if a patient comes in with a stroke we are going to consult the TTS, so I think that's always a part of the approach" (Participant #5).* This aligns with Ripley-Moffitt, Neutze, Gwynne, and Goldstein's (2015) study, which suggests that having a clinician workflow-focused intervention (clinical decision support tool) can increase implementation for many chronic conditions and tobacco use.

5.4 High vs. Low Hospital Services

When comparing various hospital services, the biggest difference between the high and low services seems to be Leadership. The hospital services categorized as high physician-ordered consultation did not have any Leadership Support barriers. Low ordering hospital services had high numbers of Leadership Support barriers and no Leadership Support facilitators. However, other barriers such as physicians' time, knowledge, and patient barriers such as lack of ability to communicate also play a role in their physician-ordered consultation numbers.

The exception to this being ENT. ENT is a hospital service that seems to be unique from the others since it had more facilitators than barriers. ENT works heavily with patients who have been diagnosed with head and neck cancer as a result of their tobacco use. This is likely the reason why leadership supports the TTS. One of the ENT resident said during interviews that they opinion against tobacco use have gotten stronger from their time as an ENT resident. Both physicians from ENT feel that having the TTS is extremely important and beneficial. When asked how relevant one physician feels the TTS is he said, *"I think very relevant, I would say a 10" (Participant #9).* Barriers associated with ENT would need to be explored further.

A more in-depth analysis of barriers need to be completed to understand what is preventing this hospital service from increasing the number of physician-ordered consultations. These physicians work closely with patients directly impacted by their tobacco use and have seen the effects of being an everyday smoker. This is likely why there is a high number of facilitators for this service. One prominent barrier is the lack of knowledge of the TTS. When asking one physician about what he believes the purpose of the TTS was he stated, *"Honestly I did not know you guys exist."—Participant #9.* Developing a best practice protocol pop-up in the documentation system could be a solution to this. A best practice protocol was mentioned during interviews with

Neurology physicians. Physicians reported having TTS as a pop-up protocol acts as a reminder to physicians and could be a reason why the service has one of the highest percentages of physician-ordered consultations.

Differences stand out between high and low services in the area of Staff Support Intervention. High ordering services had high numbers in the Staff Support Intervention indicating they have confidence in the TTS ability to provide the patients better care than they themselves or other hospital consultation services could. In comparison low ordering hospital services indicated: There was a lack of knowledge of what the TTS does, does not believe they can get the consultation completed in the time allotted, or has another service that they utilize to assist patients with behavior change.

5.5 General Conclusion

When combining the quantitative data and interview responses a mismatch appears. Meaning that while physicians feel it is important and beneficial to use the TTS, data from the 2017 calendar year indicates otherwise. Physicians and APPs either do not realize how little they are ordering consultations, or maybe they do not see the value of order consultations. The recommendations below are not a one size fits all. Hoekstra et al. (2017), stated that adapting programs to each hospital service is essential, and each hospital service presents its own unique sets of needs. The hospital services at UPMC Presbyterian are no different. Some of these recommendations may not fit the needs of a hospital service such as Emergency Medicine. However, implementation of changes that impact the implementer of the TTS, physicians, and advanced practice providers will likely make a significant different among the hospital services.

More likely is a need for more TTS education and training. Almost every physician or APP mentioned that evidence-based guidelines are an important part of their medical philosophy, yet none of physicians or APPs knew of the TTS evidence-based guidelines when asked directly. When asked the question again in a different format (i.e., what are your thoughts on Tobacco Pharmacotherapy Medicine, or what are your thoughts on brief intervention) almost every physician or APP was able to go into more details about the value of each one and its impact on their practice. They seem to connect the TTS as an evidence-based practice. This is not an uncommon problem. Girvalaki et al. (2018) addressing this issue investigated teaching physician the evidence-based guidelines to increase their delivery of evidence-based tobacco treatment. Tobacco pharmacotherapy medication orders were not impacted by whether a patient had UPMC insurance or did not have UPMC insurance. This is surprising due to UPMC Presbyterian being under the umbrella of UPMC as a whole, one would think that individuals with UPMC insurance would receive more medications due to better know of insurance coverage. The study found a significant increase in knowledge, self-efficacy and delivery rates of tobacco treatment services. In theory removing barriers with the greatest impact will may help increase implementation. Hospital services increasing the number of physician-ordered consultations to at most 8% of everyday smokers that are admitted to the service can make a significant difference.

5.6 Limitations

A limitation of this study is the number of hospital services used for this study. Using a greater number of hospital services could provide a better indication of the impact facilitators and barriers have on a hospital service. In addition, due to time constraints, interview questions were

brief at 10 to 15 minutes to fit the interviews into the physician's busy schedule. Having more interview questions could allow for further investigation on different facilitators and barriers and could allow for more in-depth questions about the facilitators and barriers. Another limitation was randomly selecting physicians, multiple times physicians from the 2017 calendar year have moved on to different hospital facilities or did not respond back to any contact attempts that were made to set up an interview. The researcher of this study during the time of data collection was a counselor of the TTS and moved on to another position after data collection. Some bias were present in this study, the most prominent bias being interview bias as the interviewer was an employee of the TTS. This could have impacted physician's answers during interviews as well as any non-verbal cues the interviewer may have been giving. To remove this bias it would be best to have a non-UPMC employee one that is familiar with how a TTS works but is not well-known throughout the hospital. In addition, not every facilitators and barrier were examined during the qualitative piece of this study and is an opportunity for further research. Cochrane et al. (2007) discussed other facilitators and barriers that seemed to be evident in some of the physician's interview responses. One of the most prominent facilitators or barriers not investigated that was mentioned by physicians or APPs was system protocol.

5.7 UPMC TTS Program Improvement Recommendations

Recommended are TTS program improvement strategies to increase the number of physician order consultations, expand the age groups of the patients that receive physician-ordered consultations and increase tobacco pharmacotherapy medication orders and utilization of all the available medications when appropriate.

- **Use the 5A's to balance and heighten the focus on tobacco use as a societal issue with major health impact.** Tobacco use is a chronic problem that while pervasive and underlying many hospital admissions, its chronic management is overshadowed by the need to address patient specific tobacco—related disease symptoms and problems. The negative health effects of tobacco are well known among all hospital services. Recommended is at the hospital-wide level to balance a focus on tobacco use as a pervasive far reaching chronic disease (i.e., societal issue) and a patient-centered care focus that addresses specific patient needs (Nolte & McKee, 2008). Use of the 5 A's is shown to increase smoking cessation rates 1.6 times. Heighten awareness of the 5 A's can increase patient care and will remove physician's cognitive and attitudinal barriers (Caplan, Stout, & Blumenthal, 2011). Caplan et al. (2011) created and implemented training sessions physicians to increase knowledge of epidemiology of tobacco use, describe local tobacco related illnesses, and usage of the 5 A's. A second training displayed use of the TTS guidelines, quit lines and a tobacco cessation program. Recommended are similar 5 A's trainings and information campaigns across UPMC Presbyterian Hospital that includes all staff, patients and patients' family members and supports.

- **Increase visibility and training of the TTS program and implementation among residents and APPs.** High ordering hospital services and low ordering hospital services are not fully aware of what the TTS offers or how patients are identified to be counseled. Focus on explain directly to residents and APPs what the TTS offers and how the service identifies patients. Currently through the UPMC Winter Institute for Simulation, Education, and Research

(WISER) a multidisciplinary training and research facility a course is offered (https://www.wiser.pitt.edu/default.asp). The Tobacco Treatment Training course provides clinical staff training on the dosing and administration of pharmacotherapy and the use of motivational interviewing to treat tobacco use and nicotine dependence (https://www.wiser.pitt.edu/apps/courses/courseview.asp?course_id=9047). Recommended is to develop an additional module on the TTS program process, background as how patient utilization tracked and reported. As currently structured, the course provides continuing education credits for physicians and APPs. The new module would also yield CEUs. However, since residents and APPs are critical to the TTS it is recommended to create and use an interactive learning training module that TTS staff can use in-person with the residents and APPs. The interactive training aim is to skill build and practice talking with patients using the 5A's. Girvalaki et al. (2018) utilized an interactive learning training module to increase physician's delivery skills of a tobacco cessation program and saw a significant increase in self-efficacy and delivery of the intervention. Physicians and APPs being well versed in the TTS protocol and implementation hospital staff facilitates the services' relationship with the TTS. This is one of the strongest facilitators among high physician-ordered hospital services.

- **Identify and encourage small logistic changes to support TTS engagement by the services.** Hospitals are complex organizations. Each hospital service is unique in its personal, patients, environment and medical conditions. Recommended is to identify and encourage small logistic changes to support TTS engagement by the services. These can be shared through both informal and formal hospital networks. One example of such a change is a hospitalist suggested changing the TTS documents location in the patient's chart to increase their visibility. The

hospitalist reported he feels the TTS counselors' recommendations are important but often the recommendations go unseen. He mentioned if they were located with other services such as physical therapy or speech therapy documents, the TTS recommendations will more likely be seen and read.

- **Provide a smoking cessation inpatient hospital programs and resources training for all hospital staff.** Wye et al. (2017) recommend a training on smoking cessation inpatient hospital programs and resources for all hospital clinical staff and managers. As part of the training staff received information on tobacco use health impacts, treatment process guide and flowchart, mental health promotion materials and Nicotine replacement therapy overview (i.e., nicotine patches, gum, lozenges, inhalers, and nasal sprays). The training evaluation found staff had increased self-efficacy to refer and support patients' TTS participation. Recommended is to develop WISER course for all UPMC Presbyterian staff. Similar to the resident and APPs WISER modules the participants will receive continuing education credits (i.e., social workers, physical therapists, occupational therapist, nursing assistants).

- **Support attending physicians TTS leadership role.** Several times throughout the interviews APPs mentioned in either positive or negative fashion the impact that leadership has on medical decision making. Leadership roles are spread throughout the hospital and at different administrative levels, departments and units with varied spheres of authority and responsibility. At the hospital service level, the attending physicians are key to the TTS. The attending physicians are the hospital staff / physicians who are oversee patients care and are the ultimate medical provider decision maker (service leader). They are responsibility for the patient's

wellbeing, and have the final say in medical decision making. Recommended is to support attending physicians as leaders who model and lead collaboration with the TTS. Recommended are face to face meetings with attending physicians. Share with them their TTS service data and utilization. Brainstorm how to increase the services' TTS patient engagement and prioritization. Furthermore, identify and recruit attending physician champions to support and advocate for the TTS as part of routine hospital attending physician meetings and review process. For example in such meetings the attending physicians might discuss how as part of feedback to residents and APP's by the attending physicians to talk about and provide feedback and support on their TTS consultation orders and medication orders (Wye et al., 2017).

- **Physicians and APPs are extremely busy and benefit from a best practice system alert.** Physicians are making multiple decisions and considering many different factors when considering a patient's plan of care. Having a best practice system alert assists and supports physicians in their decision making. During interviews the Neurology staff mentioned the benefits of having a best practice protocol alert to serve as reminder for hospital staff order TTS consultations. Stevens et al. (2013) discussed that there were four reasons why physicians order consultations with one being a system alert. A system alert model already exists at UPMC Presbyterian. In the Neurology hospital service when a patient is admitted to the hospital for a stroke and identifies as a tobacco user a best practice alert comes up in the electronic health record system and tells the physician best practice dictates ordering a TTS consultation. Recommended is to replicate this best practice alert system in other UPMC Presbyterian services.

- **The increased emphasis of the TTS evidence-based guidelines.** During interviews, many physicians verbalized the importance of using evidence-based guidelines in medicine and considered their medical philosophy to involve some part of evidence-based medicine. Physicians also mentioned they were unaware of the TTS evidence-based guidelines. Increasing knowledge of TTS evidence-based guidelines might increase TTS utilization. Physician understanding the evidence-based guidelines of tobacco cessation programs has increase self-efficacy and delivery (Girvalaki et al., 2018). Recommended at UPMC Presbyterian are two strategies. The first in Grand Rounds discuss the TTS evidence-based guidelines and how they are implemented at UPMC Presbyterian. The second is during department meetings with the various hospital services discuss the TTS evidence-based guidelines along with data supporting tobacco intervention specific to the hospital services. Barnett et al. (2011) discussed the importance of having meetings to show hospital staff concrete evidence (i.e., TTS evidence-based guidelines) that the intervention contributes to improved patient quality of care.

- **Expand the age groups of the patients that receive physician-ordered consultations with a system alert plus additional strategies.** Focus on age groups younger than 45–64. Based on the quantitative analysis patients between the ages of 45–64 are significantly more likely to receive a physician-ordered consultation. However, most individuals start smoking young under the age of 18 (Marcon, 2018). The largest percentage of smokers quit before the age of 25 (Marcon et al., 2018). There is a missed opportunity to reach younger populations of every day smoker to help minimize the damage smoking at already done in later years of life. Males that quit smoking cigarettes at the age of 35 lived 6.9–8.5 years longer than those who

continued to smoke cigarettes (Taylor et al., 2002). Females that quit at 35 years of age lived 6.1–7.7 years longer than those who continued to smoke cigarettes (Taylor et al., 2002). This would indicate one of the best age groups to target for smoking cessation is 25–44 as these individuals may see the greatest benefit from quitting smoking. Most of the smoking related mortality could be avoided if quitting by the age of 35 (Taylor et al., 2002). There were also significant benefits of decrease smoking related mortality if quitting by middle age (Taylor et al., 2002). Recommended is to institute an Electronic Health Record (EHR) system alert. An alert would populate on the EHR when an everyday smoker between the ages of 25 to 44 is admitted to the hospital reminding physicians to order a tobacco consultation. Further it is recommended to highlight and create a special focus on the everyday smoker patient group ages 25 to 44 as part of each the training and campaigns discussed above. These include the broad 5A's trainings and information campaigns across UPMC Presbyterian Hospital that includes all staff, patients and patients' family members and supports. The WISER modules and courses for residents, APPs and all hospital staff. As part of the work with the Attending Physicians, seek to find strategies that work with the 25 to 44 age group on their service. For examples create specific service educational materials that address the needs of this age group matched with their health condition (i.e., benefits of quitting smoking, medical complications, wound healing). Finally, patients in the age group 25 to 44 use technology in many areas of their lives at high rates including health domains where they navigate health systems using automated-telephone menu systems, operate blood pressure devices, and use wearable personal health monitoring devices frequently linked to a mobile telephone (Olson, O'Brien, Rogers, & Charness, 2011). Recommended is to harness digital health technology to create and support a multicomponent program for everyday smokers in the age group 25 to 44 upon hospital

79

admission. A porotype of such an intervention is the Pivot program a comprehensive digital solution combining a Food and Drug Administration–cleared carbon monoxide (CO) breath sensor; cigarette logging; a six-phase, app-delivered smoking cessation program based on the US Clinical Practice Guidelines; and dedicated human coaching via text-based chat (Patrick, Fujii, Glaser, Utley, & Marler, 2018). The program is designed to support users along the spectrum of quitting, from being unsure or on the fence about quitting to maintaining a smoke-free life.

- **Increase usage of Bupropion and Varenicline.** Both medications are effective means to treat individuals with tobacco cessation (Public Health Service, 2008). However, usage of the medications across all hospital services were shown to be not significant in comparison to the utilization of nicotine replacement therapy, implying there is a hesitation to use the medications. This is may be due to both medications side effects. Likewise, nicotine replacement therapy are available over the counter whereas Bupropion and Varenicline are not available. Recommended is to conduct an inquiry on the utilization of Bupropion and Varenicline, using a similar method of the current inquiry: interview physicians and APPs to identify barriers and facilitators to ordering the medications. Upon identification of the barriers, suggestions can be made to remove or minimize their impacts as well as to increase facilitators. A second recommendation is to investigate the health insurance coverage for the medications. During interviews both a resident and APP said they are more likely to order a medication knowing it is covered by the patient's insurance because then the patient can continue to use the medication post-discharge.

Appendix A Recruitment Email

Dear UPMC Staff Member,

I am conducting an inquiry as a doctoral student at the University of Pittsburgh's Health and Physical Activity Program. The focus of this study is to gain a better understanding of barriers and facilitating methods and protocols that allow for program innovation to thrive or fail. Completion of this study will fulfill the dissertation requirements for my doctoral degree and is also my hopes that it contributes to the research regarding program innovation in a healthcare setting and increase the patient care of the Tobacco Treatment Service.

You have been chosen to be a participant in this inquiry based on your role within the UPMC healthcare system and are considered to be someone who has worked extensively within the UPMC healthcare system with patients and other physicians and advanced practice providers. I would appreciate your consideration to be a part of this study. The next step of this inquiry is to use the data collected to improve the program fidelity of the Tobacco Treatment Service and other hospital consultation services moving forward.

This study will explore how each individual hospital service could be impacting the program fidelity of the Tobacco Treatment Service by investigating potential determinants of program innovation that are unique to each individual hospital service. By having a better understanding of these determinants of innovation we can look at ways to change the hospital service environment to better support innovations.

The design of this study is to investigate various hospital services that work closely with the Tobacco Treatment Service and look at what determinants of innovation are helping the program succeed and what determinants of innovation are impeding the program. This will be

done through a collection of quantitative data of patients that were admitted to UPMC Presbyterian and Montefiore hospitals in the 2017 calendar year. Interview responses from individuals such as yourself will be collected and coded and used to establish the determinants of innovation of each hospital service.

I will be using Microsoft Excel, SPSS and Nvivo to analyze the quantitative and qualitative data and all responses will be kept underline confidential. Interviews will take approximately 10-15 minutes, and I personally will be conducting the interviews.

There are no direct benefits, and I would like to buy you a cup of coffee or tea for your time. Your participation is completely voluntary, and you may choose to discontinue at any time. There is no risk associated with your participation. Approval from UPMC Quality Improvement Board was received.

Should you wish to receive results of the study, you may request a copy by emailing me at jcw83@pitt.edu. Your information will be kept completely anonymous and will not be connected to your name. As mentioned previously, your responses to the interview will be de-identified and kept completely confidential. The data collected will be available to me as a researcher, as well as my advisor and committee member Dr. Carl Fertman. If you have any questions or concerns about the study, you can contact Dr. Fertman at carl@pitt.edu for additional information.

It is my hope that you choose to participate in this study, but I will understand should you not want to move forward with being a part of this inquiry.

Should you agree to participate, please print a copy of this email and sign the bottom indicating that you've received this informed consent letter, are participating voluntarily, and grant me permission to utilize your de-identified data as part of the study's report.

Thank you in advance for your consideration and willingness to contribute to the study.

Respectfully,

James C. Weeden

Health and Physical Activity Doctoral Candidate

Attest:

I, _____, understand the terms of participating in this

(Print Name)

Inquiry and am willing to accept this opportunity fully.

_____   _____

Signature   Date

Today I am going to ask you some questions about your perceptions and behaviors of the Tobacco Treatment Service and the evidence-based guidelines with UPMC. I am conducting this interview as part of my dissertation at the University of Pittsburgh EdD program. It is also a QI project with UPMC. My goal is to use the answers that will be provided to me today to identify potential barriers or facilitating methods that may be impacting the program implementation of the Tobacco Treatment Service. I will be collecting and analyzing the data. Your responses will be kept completely confidential. This should take approximately 10-15 minutes. Do I have your consent to ask these questions and use this information for my dissertation? Do I have your permission to record this interview?

What are your views for tobacco dependence in general? Has it changed since you have started here or first was implemented?

Prompt: How would you address a patient's tobacco dependence if they said they do not want to quit smoking cigarettes?

Prompt: What do you believe is the purpose of the TTS?

Prompt: On a scale of 1-10 how relevant do you believe the TTS is and why?

What can you tell me about evidence-based guidelines of the TTS with UPMC was built on?

Prompt: What are the tobacco pharmacotherapy treatments?

Prompt: What are your thoughts on brief intervention?

What does your leadership think about tobacco dependence?

Prompt: Why do you think they feel that way?

What do your peers think about tobacco dependence?

Prompt: Why do you think they feel that way?

Prompt: What have you been taught or told about how to treat patients with tobacco dependence? (Resource/Material)

How would you describe your medical philosophy? (e.g., evidence-based, . . .)

Under what circumstances would you order a consult and why?

Prompt: When would you order a TTS consultation?

Why or when would you not follow a recommendation from a consultation service?

How would you improve consultation services/medication ordering processes?

Thank you again for your time. This has been extremely helpful with my dissertation/QI project.

Appendix C Approval Letter

From: Quality Improvement Project Submission

To: Weeden, James; Davis, Esa; Douaihy, Antoine

Cc: Martin, Susan C; Brown, Aaron M; Chelluri, Lakshmipathi; Craig, Ruth; Dekosky, Allison; Dueweke, Eric; Higgins, Linda; Weeden, James; Freel, Jennifer F

Subject: 1640 -- QI Project Submission Approved -- Implementation fidelity trajectories of a smoking cessation program across hospital services

Date: Tuesday, May 01, 2018 1:36:15 PM

Project Sponsor,

The Quality Improvement Review Committee is pleased to inform you that your QI project has been approved.

We have also notified your local quality department of this approval and encourage you to share updates on the project's progress.

Please note that results of QI projects must be reviewed by local quality directors and approved by the Chief

Quality Officer prior to dissemination (via presentation or publication) outside of UPMC. UPMC has adopted the [Standards for Quality Improvement Reporting Excellence (SQUIRE) guidelines](#) as the suggested reporting format.

For multi-center projects, the QRC approval refers only to that part of the project being performed at UPMC facilities and the sponsors are responsible for obtaining approval from other non UPMC facilities participating in the project."

We suggest that you share your findings on this project with the QRC. When your project is complete, please click on the project link ([Implementation fidelity trajectories of a smoking cessation program across hospital services](#)) and update the Project Results field.

Projects reviewed and approved by the UPMC Quality Improvement Review Committee do not meet the federal definition of research according to 45 CFR 46.102(d) and do not require additional IRB oversight.

Project Title: Implementation fidelity trajectories of a smoking cessation program across hospital services Project ID: 1640

Sponsor: Weeden, James

Additional Information from the QRC:

[You can view the full project by clicking here.](#)

Thank you for submitting this to us for our review.

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