D.1. Overall Aim & Objectives:

Earlier this year leaders in tobacco control published a high-profile NEJM editorial[1] urging hospitals to "do the right thing" in providing guideline-based care in order to close the existing gap in most inpatient facilities between what national guidelines[2] and the Joint Commission (JC) recommend,[3] and what is delivered in practice to hospitalized tobacco users. Currently, our hospital system meets the first JC tobacco control measure (assessment of tobacco use on admission) for patients who smoke as well as those who use smokeless tobacco (SLT) products, but like most hospital systems around the country, we face challenges in meeting proposed JC measures #2 and #3 (offer of behavioral and pharmacologic quit aids on admission and discharge, respectively), and measure #4 (assessment of tobacco use status post discharge). Not only are these proposed JC measures likely to become mandatory in the near future, but they also represent a logical and promising blueprint to treat hospitalized tobacco users.

In conjunction with UPMC, which cares for millions of people across PA and surrounding states, Dr. Hilary Tindle, the PI of the current proposal, has been proactive in preparing to close this treatment gap by founding and directing an inpatient Tobacco Treatment Service (TTS) in two UPMC flagship hospitals, Presbyterian University and Montefiore University Hospitals (PUH/MUH), to improve the care of the ~8500 tobacco users admitted annually in these two facilities alone. However, the 3-FTE TTS will be able to approach approximately 1/3rd of all hospitalized tobacco users within these two facilities. **Thus, there is an urgent need to train and engage more clinical staff in multiple hospitals in the network in order to deliver tobacco cessation treatment to all smoke and SLT users upon admission and at discharge from hospital (JC#2 & #3). The current application leverages the existing TTS, which already utilizes our sophisticated and uniform electronic health record, and proposes a creative and efficient solution to the problem faced by all health care facilities trying to "do the right thing" for hospitalized tobacco users: *achieve adequate reach and sustainability over time*.** We propose to strategically train the cadre of ~80 nurses who oversee hospital admissions and discharges in 5 large facilities (MUH, PUH, Shadyside, Mercy, and McKeesport), and to educate nursing staff on the threshold for referral to more advanced tobacco treatment. Finally, we propose to augment the assessment of long term follow up after hospital discharge in order to quantify the impact of these efforts on long term tobacco cessation.

Objective 1: To provide formal training of ~80 admission and primary nursing care coordinators (PNCCs) at five hospitals to deliver evidence-based tobacco cessation counseling, including offer of pharmacotherapy, for patients at the time of admission and discharge. This formal training consists of the standardized online curriculum developed by the University of Massachusetts' Center for Tobacco Treatment Research and Training[4] which offers Nursing CEUs. In addition to greatly augmenting the percentage of capable tobacco control providers, achieving this aim will allow our health care providers to meet JC performance measures #2 and #3 (offer of combined behavioral and pharmacotherapy on admission and at discharge, respectively). We strategically focused on admission and PNCC nurses because these individuals are integral to the admission and discharge processes, respectively, on every single patient.

Objective 2: To implement formal training of admission and floor nurses to provide them with the skills to triage patients who may benefit from enhanced tobacco treatment, during hospitalization (via the TTS at PUH/MUH) and after discharge, through a network of existing UPMC-supported outpatient programs. Dr. Tindle and the TTS counselors, who have already undergone extensive in-person training for tobacco control, will supplement the online training by continuing the series of nursing in-service presentations which they began in spring 2012. The TTS will develop new materials for the ~80 trained nurses from Objective 1 in order to identify patients who most need enhanced tobacco cessation counseling. This aim further supports accomplishment of JC performance measures #2 and #3 and leverages the existing TTS. We will further enhance this training with training on the treatment of SLT, for which there is an epidemic of underutilization of effective treatments,[5] leaving many SLT users at elevated risk for cancer[6] and cardiovascular disease[7].

Objective 3: To augment the follow up assessment of counseled tobacco users (JC performance measure #4). Currently, at PUH/MUH we have the capability to do limited follow up on patients after discharge. The main limiting factor is personnel to conduct follow-up phone calls to patients who have received inpatient treatment. Having the additional resource of a dedicated counselor to reach more tobacco users in follow-up after discharge will enhance our ability to meet JC#4 for all discharged tobacco users who accept a follow-up call. Importantly, the ability to assess tobacco use status and relapse rates long term (6 months) provides a much more clinically-relevant time point by which to judge the impact of these extensive tobacco control measures.[2, 8, 9]

D.2. Current Assessment of Need in Target Area:

Throughout the UPMC hospital system, we identify *all* hospitalized tobacco users in our electronic health record (EHR) through a nurse admission note. However, only UPMC's two "flagship" hospitals, Presbyterian University and Montefiore University Hospitals (PUH/MUH), have the dedicated Tobacco Treatment Service (TTS) described above. Together, these two hospitals had over 40,000 admissions in 2010, with approximately 8500 unique tobacco users identified. 2011 admissions and tobacco use prevalence were of similar scope, with two other large UPMC hospitals (Mercy and Shadyside) admitting about 20,000 patients each annually. McKeesport is a smaller community hospital with approximately 10,000 admissions per year, but has traditionally had one of the most active tobacco control programs in the system. Together, these five hospitals represent 40% of the 220,000 total annual admissions at UPMC hospitals.

Individual Patient Care Needs: Data from the PUH/MUH Tobacco Treatment Service

At PUH/MUH, TTS Counselors receive a daily list of tobacco users admitted in the past 24 hours, attempt to see all priority patients (e.g., stroke, cardiovascular disease) via a TTS consult to the primary service, make recommendations for pharmacotherapy and behavioral treatment, and make follow-up calls 15-30 days after discharge per JC recommendations.

In initial data from the first month of operation of the PUH/MUH Tobacco Treatment Service (TTS) from September 10-October 16, 2012, we found that nearly 20% reported severe cravings after only 24 hours in hospital (Figure 1). Not only is providing consistent care important to our inpatient tobacco users, it can directly reduce the suffering from nicotine withdrawal experienced by patients. While these patients believe it is important to stop using tobacco (rating the importance to quit 7.8/10) and 72% want to remain abstinent after discharge, many do not feel confident in their ability to do so. Such low confidence in ability to quit is problematic in a setting where most patients are not aggressively offered behavioral and pharmacologic treatment while they are hospitalized, which is unfortunately the rule rather than the exception in most hospitals. To ameliorate this problem for patients hospitalized at PUH/MUH, Dr. Tindle founded and directs the TTS, which is based on the successful clinical service founded by Dr. Nancy Rigotti (Dr. Tindle's fellowship mentor from 2002-2005), at the Massachusetts General Hospital (MGH). However, even with this full time service, the TTS counselors are only able to provide care to about 33% of the admitted tobacco users. **Thus, additional training of clinical personnel, both at PUH/MUH and in other hospitals, is required to achieve greater reach and sustainability of tobacco control efforts.**

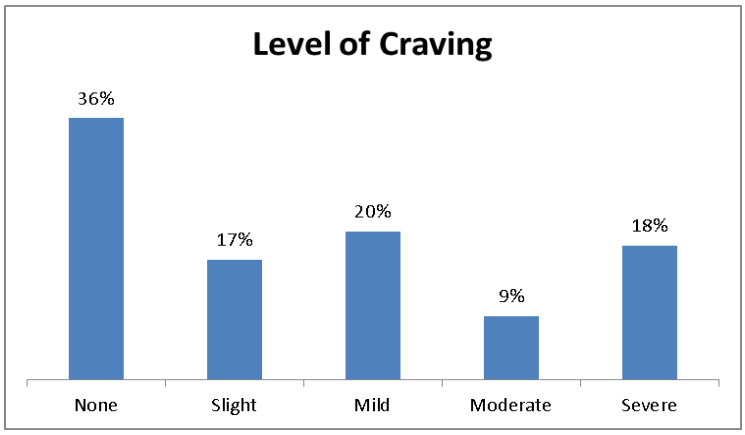

Figure 1. Level of craving on second inpatient day. N=103

Dr. Tindle and the TTS, working in conjunction with Nursing, Pharmacy, and IT, have created a standardized electronic assessment and follow-up note, (supporting the initial inpatient consult and the 15-30 day post-discharge follow up contact to fulfill JC performance measure #4) as well as a complete and streamlined order set for tobacco cessation medications. While these electronic TTS documents are approved for use in PUH/MUH, **wide-spread education efforts are needed to support their use in the delivery of tobacco treatment by health care providers at additional UPMC hospitals. Ultimately, adoption of this electronic infrastructure will allow network-wide tracking of tobacco control measures and quality improvement initiatives.**

Post-Discharge Follow-up for Counseled Tobacco Users:
The TTS counselors at PUH/MUH have received extensive formal training to deliver tobacco cessation counseling and provide pharmacotherapy recommendations for hospitalized tobacco users. The TTS also provides follow-up phone calls to patients 15-30 days after discharge, however, currently only about 1/3rd of counseled tobacco users have had a completed follow-up call, due mainly to limited resources. In addition, there are no local longitudinal data on quit attempts of discharged tobacco users. In order to focus efforts on treating inpatient tobacco users, additional effort is needed to augment the current TTS and provide follow-up calls to counseled tobacco users, as well as collect data on longer-term quit rates at 6-months [2], the

internationally clinically-relevant point for measuring tobacco cessation intervention efficacy [9]. **A greater proportion of counseled inpatients need to be followed post discharge, offering additional counseling or a bridge to outpatient tobacco cessation programs, while enhancing the capacity to perform longitudinal assessment of tobacco status.** Data gathered through this grant-supported position will be helpful to determine the level of staffing needed as other UPMC hospitals gear up to meet JC measures 1-4. Additionally, this information is very valuable to plan for possible future electronic means of gathering post-discharge follow up data, such as through electronic surveys, which may prove to be more efficient than human-based efforts.

D.3. Technical Approach, Intervention Design and Methods

Overview of the TTS at PUH/MUH

UPMC Presbyterian and Montefiore University Hospitals (PUH/MUH) is a combined 799-bed teaching facility which admits approximately 8500 unique tobacco users annually, according to our internal EHR database, out of just over 40,000 admissions annually. At PUH/MUH, UPMC has piloted tobacco treatment through the TTS as a new clinical service comprised of three individuals with extensive formal training in delivery of tobacco cessation: Valerie Kogut, MA, RD, LDN, Kathy Palombo, BSN, RN, RRT, and Beth Frenak, MSW, LSW. The TTS counselors provide evidence-based bedside cessation counseling to tobacco users using the Massachusetts General Hospital (MGH) Standard Care developed by Dr. Nancy Rigotti for newly admitted tobacco users. This model translates research into hospital practice in 3 steps: (1) tobacco use

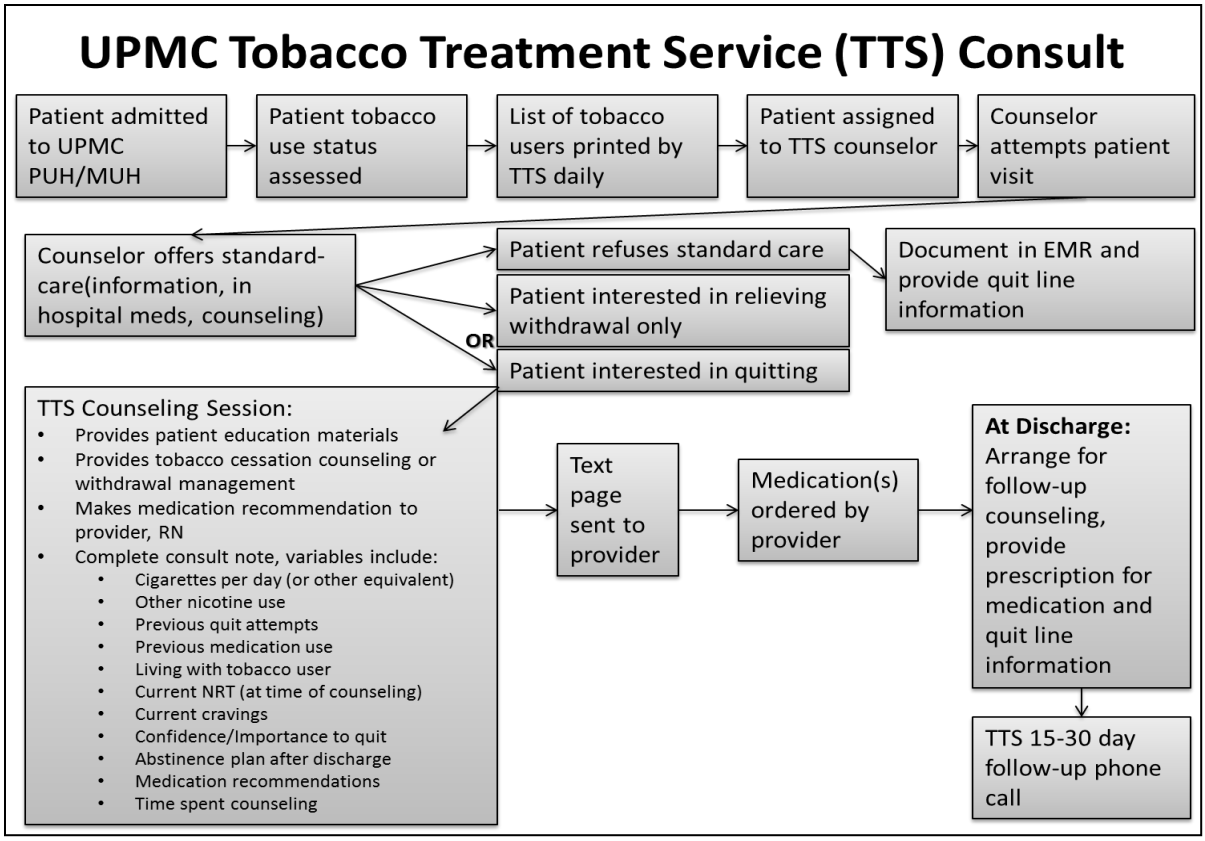

Figure 2. Tobacco Treatment Service flow chart for inpatients at PUH/MUH

status is routinely captured at admission by an admission nurse, (2) bedside counseling and pharmacotherapy is provided by a tobacco treatment specialist, and (3) tobacco users are connected to outpatient resources upon discharge. While the TTS is only now available at PUH/MUH, our goal is eventually to expand to additional UPMC hospitals using this service as the model of care. This proposal shows how the TTS functions at PUH/MUH, the improvements in tobacco treatment to meet JC measures at PUH/MUH. In addition, we describe proposed plans to augment tobacco treatment upon admission at five UPMC hospitals by training admission nurses at each site. In hospitals that include PNCCs (PUH/MUH, Shadyside, Mercy), we will offer training to augment tobacco treatment for patients at discharge.

Tobacco Use Identified *At Admission*: Current and Proposed

Each UPMC hospital has a dedicated team of nurses to complete admission assessments on each newly admitted patient. *Given that admission nurses already follow a standardized protocol at each of the five inpatient facilities participating in this proposal, they are the most logical group of nurses to undergo additional tobacco cessation training.* The admission nurse currently asks whether a patient is a current smoker, SLT user, or has quit in the past year. (JC #1). On select patients, the admission nurse additionally screens for withdrawal symptoms during previous quit attempts. This information is documented in coded fields in the hospital EHR. At PUH/MUH, all tobacco users are then referred automatically to the TTS through a daily electronically-generated list of tobacco users provided to counselors. The TTS is a service available both by consult or direct referral from providers, as well as an 'opt-out service', meaning that each patient may be offered the service without a direct referral, but retains the right to decline the consult. Currently, the TTS service completes consults on about one third of all identified admitted tobacco users. **The admission nurses at multiple UPMC hospitals are in a strategic position to offer treatment (pharmacotherapy and behavioral aids). For PUH/MUH hospitals, admission nurses will also learn to triage patients who would most benefit from a TTS consult at admission. At all five hospitals, these proposed strategies not only augment patient care, but also offer the added benefit of meeting JC#2.**

Bedside TTS practice at MUH/PUH

A TTS counselor (a trained Tobacco Treatment Specialist) uses the electronically-generated list to screen all admitted tobacco users, usually on the second hospital day. Counselors then offer treatment using a standard assessment which gauges the level of addiction (Fagerstrom Test for Nicotine Dependence[10]) and possible pharmacotherapy dosage. Counselors also gather information on type of tobacco, daily quantity, total duration of use, time to first use, nighttime use, and use of menthol products, as well as additional information to individualize referrals to behavioral quit aids (history of prior quit attempts, quit aids used, causes of prior relapse, perceived barriers to cessation, living with other tobacco users, tobacco use inside the home, importance and confidence to quit, etc) and to identify possible contraindications to medications. Counselors also ask about alcohol use (AUDIT-C), use of illicit drugs, and interest in quitting after discharge.

Counselors discuss and offer FDA-approved tobacco cessation medications that can be used in the hospital to reduce the discomfort of nicotine withdrawal and after discharge to assist the patient to stop using tobacco. Recommendations are sent by text-page to the physician of record, suggesting type and dosage of medications on hospital formulary (NRT [patch, gum, lozenge], bupropion, varenicline) to be used in the hospital and/or to be prescribed at discharge using the standardized treatment order set which Dr. Tindle and the TTS co-created with Pharmacy and which is embedded in the EHR. Counselors incorporate motivational interviewing techniques into the assessment to move patients along in readiness to quit, and include a discussion of risks associated with a patient's unique health conditions and continued tobacco use, along with benefits of cessation. In select hospital rooms, called SmartRooms (described below), patients may also view a video containing additional tobacco cessation and relapse prevention tips. The consult and in-hospital and discharge treatment recommendations are documented in the EHR.

The TTS counselors at PUH/MUH also have access to an exciting technological innovation developed at UPMC hospitals called SmartRooms. These rooms were developed in collaboration with IBM to display real time information from the EHR on a flat screen monitor in the patient room as a provider enters. There are more than 240 SmartRooms in PUH/MUH, in which all nurses and TTS counselors can upload stop smoking videos for patient viewing. As part of the educational mission of this grant, we will develop our own brief SmartRoom video. This capability is available to us free of charge through our patient education department.

Discharge Resources at PUH/MUH

Currently, TTS counselors see the patient once at the beginning of their hospital stay for about 20 minutes. Counselors encourage continuity of care by suggesting that physicians include any tobacco cessation medications provided during the patient's hospital stay on the discharge prescription list. The TTS counselor encourages tobacco users to stay quit after discharge, use FDA-approved tobacco cessation medication, discuss cessation with their PCP, and refers them for counseling support to the toll-free Pennsylvania Quitline (1-800-QUIT-NOW), a UPMC Health Coach (for UPMC Health Plan members), and/or local in-person tobacco cessation programs at various UPMC-associated clinics, such as Mercy and McKeesport. Print materials may also be provided to the patient, specific to their circumstances, containing helpful information and resources to stop using tobacco. Discharge instructions, including follow-up care and discharge prescriptions are given to all patients by the unit Primary Nurse Care Coordinator (PNCC). **The PNCCs at PUH/MUH are strategically located during the discharge process to augment their current practice with an offer of treatment (pharmacotherapy and behavioral aids), thus meeting JC#3 at the four hospitals which also have PNCCs (PUH, MUH, Shadyside, and Mercy.)**

Post Discharge Follow-Up at PUH/MUH

TTS Counselors ask patients at the completion of the assessment if they are amenable to a follow-up call in 15-30 days (as per JC #4). This follow-up call follows a standardized protocol that asks about current tobacco use, cause of relapse (if relevant), and use of pharmacotherapy

or behavioral quit aides since discharge. Counselors receive a daily list showing patients who received a TTS consult and were discharged in the past 15-30 days. First, the counselors ensure that the patient agreed to a follow-up call, then attempt to contact the patient. Up to 6 attempts are made in accordance with JC recommendations. All documentation of the calls is captured in the EpicCare out-patient documentation system that is used within most UPMC clinics, as well as many clinics around the country. Counselors are currently able to complete calls on only about 35% of counseled patients after discharge, with the main obstacle being the limited time to complete both inpatient consults and telephone-based after-care. **Hiring a dedicated professional trained in tobacco treatment, at PUH/MUH to make these calls would vastly improve the ability to follow-up with all TTS-counseled patients and thus meet JC #4 and to assess the feasibility of continuing this process as a telephone-based effort vs. converting to electronic efforts at contacting patients to assess their smoking status post-discharge.** Follow-up calls will also be initiated at 6-months post-discharge to examine longitudinal information about tobacco users, providing a much more clinically-relevant time point to examine the impact of this extensive tobacco control program [8, 9]. Documenting the resources needed to fully meet JC measures per patient will be invaluable for all UPMC hospitals, and especially for hospitals around the country seeking to establish JC compliant tobacco treatment services.

Proposed Tobacco Treatment Training for Nursing Staff at Five Hospitals

Achieving the aims of this project involves providing high quality education sessions for brief tobacco treatment interventions. We will advertise the training directly to admission and PNCC or discharge nurse teams at select hospitals in our network, beginning with PUH/MUH and continuing with Shadyside, Mercy and McKeesport facilities. Shadyside is the home of the Hillman Cancer Center and features a large percentage of cancer patients, Mercy is a large community hospital near downtown Pittsburgh, and McKeesport is a regional hospital located in McKeesport, PA. Advertisements will emphasize the skills and knowledge to be gained, opportunity for free training and potential to earn nursing CEUs. Each of our TTS counselors has completed intensive specialist training in addition to the online basic skills course offered by the Center for Tobacco Treatment Research and Training at UMass that we will offer to nurses. Thus, the TTS counselors and Dr. Tindle are well-positioned to supplement the standardized online training course. Each of these aspects of training is described below.

Standardized Online Training

The nationally-recognized Basic Skills for Working with Smokers [4] online training through UMass is designed for health workers to be well-grounded in the theory and practice of working with tobacco users. The 9-module course provides the basic skills and knowledge for healthcare professionals to develop proficiency in delivering evidence-based cessation counseling, including using pharmacotherapy to treat tobacco use, and to describe the health risks of continued use and the benefits of stopping tobacco use. The course also qualifies for continuing education units for nurses and other providers.

While designed as a self-study course, we will reserve a computer lab at PUH/MUH for a 2-day simultaneous training, or self-guided based on the desired format of the nurses. A TTS counselor will be present during the training to answer questions about how the TTS functions at PUH/MUH. We will offer a wide-scale online training program for up to 80 clinical admission and PNCC nurses across the five participating hospitals. As noted earlier, these two groups of nurses are ideal candidates to receive tobacco treatment training as they are strategically able to offer treatment at admission and discharge, and also represent small dedicated teams of nurses who can be trained efficiently (rather than attempting to educate all front-line staff, which may not be feasible at this level of intensity and in this time period). It should be noted that Dr. Tindle and the TTS will continue to provide periodic CEUs for floor nurses at PUH/MUH, as they have already been doing, and that those efforts are separate from this proposal.

UPMC Supplemental Training

Out TTS counselors and Dr. Tindle (PI) will develop supplemental materials for the training that are specific to tobacco treatment at UPMC facilities, using case-based examples that include both smoking patients and SLT users. Materials will include: 1) use of the electronic medication order set; 2) triaging patients to a TTS consult; 3) making a TTS referral, and 4) accessing resources recommended by the TTS consult at the time of discharge (such as referral to the Quit Line or PA Determined to Quit website. These materials will be presented during the computer-based training sessions or at in-service education sessions by a TTS counselor or Dr. Tindle, and will be accredited for CEU's through UPMC's Center for Continuing Education.

Building Upon Existing UPMC Initiatives to Achieve Sustainability

This proposed initiative builds on the existing UPMC-sponsored inpatient TTS (as described above), the electronic forms that it has created (consult note, follow up note, and medication order set), and the UPMC-wide network of tobacco control advocates, including designated "champions" at major inpatient facilities Mercy, Shadyside, and McKeesport. If awarded, the funds will greatly increase the reach of brief effective tobacco cessation treatment to all inpatient tobacco users. UPMC and the Chief Scientific Officer, Dr. Steve Shapiro, have committed to sustaining the PUH/MUH TTS through 2017 and support expansion of the program in scope to other hospitals. **In summary, while the Tobacco Treatment Service is uniquely positioned to accomplish outstanding clinical care of inpatient tobacco users and meet increasingly strict yet necessary regulatory requirements, additional training is required to fulfill our healthcare system's mission to broaden tobacco control efforts across multiple facilities, and eventually across *all facilities.* We refer to this mission as one to "Track and Treat" all tobacco users in the system. A valuable by-product of these efforts is that our health care providers will be in a position to meet JC and other regulatory requirements for optimal tobacco control.**

D.4. Evaluation Design

Overview

The project PI, Dr. Tindle, works closely with UPMC leadership in UPMC Corporate and PUH/MUH QI and has an existing approved QI project to improve the care of tobacco users in our network which will be amended to cover this current project. The TTS has already been working with QI teams to optimize our ability to meet all 4 measures on the maximal proportion of admitted tobacco users. We have also been meeting with our IT leadership and staff to support necessary changes in the EHR to support these clinical efforts, and how to best capture and report data from the TTS service. Many of these reports will require system-wide programming changes to the EHR over the next 1-2 years, and will based on the model of tobacco treatment at PUH/MUH. This current grant period is the ideal time to optimize the coming changes to the electronic infrastructure to include items for JC reporting, such as adding tobacco treatment items to the nursing assessment or discharge report.

Table 1. Evaluation Measures	
Outcome Measures	▪ # admission nurses trained/hospital ▪ # PNCC nurses trained ▪ Develop patient education video for SmartRoom ▪ # SmartRoom video viewings ▪ # of 15-30 day and 6-month follow-up calls

Outcome Measures

The outcome measures specific to the treatment of tobacco use within PUH/MUH we will obtain for this project include the number of admission and PNCC nurses that complete the online basic skills training, as well as the number of both 15-30 day (as recommended by JC measure #4), and 6-month follow-up calls that are attempted and completed. We will be able to track the number of times smoking cessation videos are viewed in our smart rooms, and be able to track by TTS and non-TTS staff. These measures will enable us to describe the resources necessary for other hospitals within our network and beyond, who build JC compliant tobacco treatment services. In addition to specific measures at PUH/MUH, we will also track the number of providers trained to offer tobacco treatment during admission and discharge at the other three participating UPMC hospitals. This training will lay the foundation for these hospitals to provide evidence-based treatment to tobacco users, and enhance their ability to meet the planned JC measures.

How the Proposed Aims Prepare Optimization of Future Tobacco Control

This grant proposal assists in the implementation of a model of care at PUH/MUH for tobacco treatment, which can ultimately be expanded to other hospitals through network-wide use of the existing consult and treatment order forms. As PUH/MUH gears up to meet the upcoming JC performance measures for tobacco treatment, we will be building the foundation within the existing electronic infrastructure that provides the ability for other hospitals to track and treat all smokers, from admission, through discharge, and in follow-up. Ultimately, we will plan to track the resources needed per patient to meet all JC measures, which will be important as

other hospital systems allocate resources to meet the upcoming measures. In addition, we are currently working with our QI to create reports which will provide important data on re-admission rates for tobacco users (expected to be available in the first quarter of 2013), as smoking cessation is associated with reduced rates of cardiovascular disease which are evident in a relatively short timeframe (i.e., within 1 year) [11].

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E. Detailed Work Plan and Project Outputs Schedule

Schedule of Project Outputs	
Output	**Timeframe**
Hire and train project coordinator	Month 0-3
Facilitate training program in-house in a computer lab for admission RNs and educators	Month 3-6
TTS counselor completes follow-up calls	Month 3-24
Outcome data reports	Month 6, 12, 18

The first phase of the project involves hiring and training the Project Coordinator (to be hired during months 0-3) and integrating this individual into the existing network of tobacco control efforts including Nursing, Pharmacy, and IT. This individual will be trained in tobacco treatment (by Dr. Tindle and the TTS), and will provide follow-up calls to counseled tobacco users throughout the grant period. The coordinator will receive EHR training from Valerie Kogut, the lead TTS Counselor at PUH/MUH, who is an EHR specialist and has already led these trainings within UPMC for years. Valerie will train the coordinator to use the relevant patient documentation systems for inpatient tobacco treatment at UPMC. During this time we will also work with IT to ensure that this staff member has access to lists of inpatients that were counseled in each UPMC inpatient facility. The post-discharge follow up note is already created and available in the EpicCare outpatient EHR.

The second phase involves providing training for nurses who are involved in the admission and discharge of patients at UPMC hospitals to offer tobacco cessation treatment. We will disseminate promotional materials (posters, emails) for the training session with up to 4 different two-day trainings. We will collect data during regularly scheduled reports currently in place for the inpatient TTS at PUH/MUH. This grant also provides a 6-month follow-up call and for this reason will report data at 6 month periods.