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# Beyond the Ask and Advise: Implementation of a Computer Tablet Intervention to Enhance Provider Adherence to the 5As for Smoking Cessation

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ABSTRACT

*Background:* The 5As for smoking cessation is an evidence-based intervention to aid providers in counseling patients to quit smoking. While most providers "ask" patients about their tobacco use patterns and "advise" them to quit, fewer patients report being "assessed" for their interest in quitting, and even fewer report subsequent "assistance" in a quit attempt and having follow-up "arranged".
*Purpose:* This article describes the design of an implementation study testing a computer tablet intervention to improve provider adherence to the 5As for smoking cessation. Findings will contribute to the existing literature on technology acceptance for addressing addictive behaviors, and how digital tools may facilitate the broader implementation of evidence-based behavioral counseling practices without adversely affecting clinical flow or patient care.
*Methods:* This project develops and tests a computer-facilitated 5As (CF-5As) model that administers the 5As intervention to patients with a computer tablet, then prompts providers to reinforce next steps. During the development phase, 5As' content will be programmed onto computer tablets, alpha and beta-testing of the service delivery model will be done, and pre-intervention interview and questionnaire data will be collected from patients, providers, and clinic staff about 5As fidelity and technology adoption. During the program evaluation phase, a randomized controlled trial comparing a group who receives the CF-5As intervention to one that does not will be conducted to assess 5As fidelity. Using the technology acceptance model, a mixed methods study of contextual and human factors influencing both 5As and technology adoption will also be conducted.
*Conclusions:* Technology is increasingly being used in clinical settings. A technological tool that connects patients, providers, and clinic staff to facilitate the promotion of behavioral interventions such as smoking cessation may provide an innovative platform through which to efficiently and effectively implement evidence-based practices.


## 1. Introduction

Smoking is the leading cause of preventable morbidity and mortality in the United States (U.S. Department of Health and Human Services, 2014). Approximately 18% of Americans currently smoke, and about 480,000 annual deaths are attributed to smoking (Jamal et al., 2014). The U.S. Public Health Service's 5As model (Fiore, Jaen, Baker, et al., 2008) is considered the gold standard evidence-based practice for conducting smoking cessation counseling. The 5As model consists of asking patients about their tobacco use patterns, advising them to quit, assessing willingness to quit, assisting those who are willing to do so, and arranging follow-up assessments. In primary care, delivery of the 5As is often incomplete (King, Dube, Babb, & McAfee, 2013; Tong, Strouse, Hall, Kovac, & Schroeder, 2010), with commonly cited obstacles including time constraints, lack of expertise, financial incentives, patient privacy, and stigma about smoking (Schroeder, 2005).

Technological tools including telephone quitlines (Stead, Hartmann-Boyce, Perera, & Lancaster, 2013) and Web-based cessation programs (Civljak, Stead, Hartmann-Boyce, Sheikh, & Car, 2013; Munoz et al., 2009) help people quit. Self-help and telephone-based interventions, however, are less effective than in-person clinician interventions, and they do not connect cessation with ongoing medical care (Fiore et al., 2008). Furthermore, although provider hand-held devices and electronic reminders improve cessation efforts, they often exacerbate clinician time

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pressures (Marcy et al., 2008). Physician advice to quit is associated with increased odds of tobacco abstinence (Fiore et al., 2008; Stead et al., 2013), and smokers who ask their physician for assistance with quitting receive smoking cessation services more frequently than those who do not (Quinn et al., 2005); thus, patient factors cannot be overlooked.

Although computer screeners, electronic decision support, and other technological tools are increasingly used for behavioral interventions in primary care (Hunt, Haynes, Hanna, & Smith, 1998; Souza et al., 2011), substantial adoption and implementation barriers to such interventions remain (Sciamanna et al., 2004). An innovative smoking cessation delivery system would include both patient and provider, while still addressing the user and system obstacles of time, counseling expertise, cost, and stigma. This system should capitalize on evidence-based practices like the 5As, be acceptable to diverse patients, tap local cessation resources, and be minimally disruptive to clinic flow.

### 1.1. The computer-facilitated 5As service delivery model

This paper describes the study protocol for a smoking cessation delivery system designed to address potential facilitators and barriers to adoption and implementation of such technology. In an implementation study funded by the National Institute on Drug Abuse, we will evaluate the use of computer tablets to deliver the 5As for smoking cessation in adult primary care clinics. We aim to apply technology to facilitate implementation of evidence-based behavioral counseling practices, without adversely affecting clinical flow or patient care. Thus, we will be evaluating the implementation of the 5As and tablet technology and predictors of adoption of both the 5As and the tablet.

As described by Proctor et al. (Proctor et al., 2009), implementation strategies that influence change span a variety of levels, including systems (e.g. policies), organizations (e.g. health care organizations), groups (e.g. clinics), and individuals (e.g. health care providers). In this study, we specifically focus on addressing individual provider behaviors in implementing the 5As for smoking cessation. On a group level, the implementation of tablet technology into the pre-existing clinic workflow will also be evaluated.

Specifically, we will develop a computer-facilitated 5As (CF-5As) service delivery model and test its effects on 5As fidelity in primary care, beginning with a patient self-administered computer tablet intervention in the waiting room and ending with a patient–provider exchange to reinforce key messages, provide additional cessation assistance (including pharmacotherapy if appropriate), and arrange follow-up. This takes advantage of the convenience, privacy, and time-savings of computers while using the social influence, (computer-supplemented) clinical expertise, and prescribing capacity of primary care providers. More broadly, this study will also elucidate patient, clinician and system drivers and inhibitors of technology acceptance and 5As implementation to inform future technological approaches in health care settings.

## 2. Methods/Design

This study will progress through two key phases: (i) program development (year 1) and (ii) program evaluation (years 2–4; Fig. 1 and Supplementary Figure). Development includes computer programming and alpha/beta-testing of the CF-5As intervention, and development of semi-structured interviews and questionnaires to assess key staff and provider attitudes, beliefs, and behaviors about smoking cessation and technology adoption. Program evaluation consists of a randomized controlled trial (RCT) to assess the effects of the CF-5As intervention on provider adherence to the 5As compared to a control group that does not receive the 5As intervention. Evaluation will also include a mixed methods study of contextual and human factors influencing both 5As and technology implementation.

### 2.1. Conceptual model for implementation

This study tests innovative implementation strategies to facilitate both tablet and 5As adoption based on recent adaptations to the theory of planned behavior and social cognitive theory (Ajzen & Fishbein, 1980; Bandura, 1986). Our implementation study is guided by the technology acceptance model (TAM; Davis, 1989, 1993). TAM draws from the theory of planned behavior (and the closely related theory of reasoned action) to explain behavior by looking at the relationships between external stimuli, cognitive responses (beliefs), affective responses (attitudes), and consequent behavioral intentions to act (Venkatesh & Davis, 2000). TAM posits that behavioral intention (to use the technology) is influenced by attitudes, which, in turn, are influenced by perceived usefulness (PU), i.e. the perception that using the technological device enhances job performance, and perceived ease of use of the technology (PEOU; Fig. 2). Recent adaptations to the model have added variables such as social norms and influence (SNI), which refers to an individual's perception of the opinions of important others, and facilitating conditions (FC), i.e. an individual's perception of environmental factors that may impede or facilitate use of the technology (Venkatesh & Bala, 2008; Venkatesh, Morris, Davis, & Davis, 2003).

In our study, we manipulate PEOU for the 5As by placing the 5As on a computer tablet and doing the majority of the work for the clinicians in the intervention condition. We have further manipulated PU by having the computer tablet create two handouts: a tailored, resource guide for patients, and a clinical summary with decision support tools for the clinician. By increasing PEOU and PU, we hope to promote the "acceptance" of the 5As and the computer tablets. We do not directly manipulate either SNI or FC, but assess these as important co-variants.

Our study design includes the use of iterative mixed methods (structured and semi-structured interviews and surveys) with medical staff and clinicians, and direct observation of social and organizational factors to identify factors that promote and inhibit 5As implementation. Survey items and interview prompts are explicitly based on core TAM constructs—i.e. PU, PEOU, SNI, and FC. These repeated assessments will allow us to determine if our manipulations were successful (for PEOU and PU) and to capture important co-variants (SNI, FC). Thus, our trial will allow us to answer important questions regarding the operative factors in technology acceptance and 5As implementation. Our exploration of the interdependence of patient, tablet, and clinician may point to innovative strategies to better integrate technology into (and around) the medical visit while preserving patient-centeredness and capitalizing on the powerful effects of clinician influence.

### 2.2. Phreesia computer tablet system: A systems/operations perspective

Used throughout the United States, the Phreesia tablet is a wireless, touch-screen, mobile tablet designed for patient self-service check-in and health data collection. It is portable, has a long battery life, and wireless connectivity, thereby allowing patients to use it anywhere in the waiting area. All data are encrypted before being stored in the Phreesia database; no patient data are stored on the tablet. Tablets are supplied and maintained by Phreesia for a minimal subscription charge paid by the practice.

The computerized self-reported "patient interview" is a series of questions asked and answered in text via the tablet about patient demographics and insurance data, personal/family medical history, and other relevant clinical information during the check-in process. It also collects signatures for typical medical practice agreement forms. Phreesia-delivered interviews occur in both English and Spanish.

Phreesia provides a secure Web accessible practice portal that staff and providers can access from computer workstations. Through the portal, practices can access patient information, view and edit individual records, and print and export patient data. The printout is a paper and/or PDF record of a patient's tablet interview that is automatically