Building Systems to Address Tobacco Use in Oncology: Early Benefits and Opportunities From the Cancer Center Cessation Initiative

Brian P. Jenssen, MD, MSHP; Frank Leone, MD; Sarah Evers-Casey, MPH; Rinad Beidas, PhD; and Robert Schnoll, PhD

The 2014 Surgeon General’s report underscored the importance of helping patients with cancer quit smoking, because continued smoking after a diagnosis is causally linked to cancer-specific and all-cause mortality. More than 50% of patients with cancer who smoked before diagnosis continue to smoke after diagnosis and treatment, leading to calls from NCCN, ASCO, and the American Association for Cancer Research to implement tobacco cessation treatment within oncology care. Despite being uniquely positioned to intervene, only half of NCI-designated Cancer Centers systematically identify tobacco use among patients, and few centers and oncology practices consistently provide smoking cessation services. To enhance patient outcomes, improved systems are needed to consistently identify patients who smoke and to ensure that they more effectively engage in evidence-based treatments.

In recognition of these issues, NCI developed the Cancer Center Cessation Initiative (C3I) in 2017, with support from the Cancer Moonshot initiative, to build and sustain an infrastructure across the nation’s cancer centers to ensure patients with cancer are systematically screened for tobacco use and provided evidence-based smoking cessation treatment. This program supported 22 cancer centers around the United States initially, and an additional 20 were funded in the fall of 2018, with biannual meetings for grant recipients, scientific and technical support from a coordinating center at the University of Wisconsin, and collaborative efforts focused on sustained institutional cancer center commitment to reduce patient tobacco use. This commentary describes the progress made at Abramson Cancer Center at the University of Pennsylvania to build a sustainable and implementation-science-informed infrastructure to address patient tobacco use, including initial program effects on clinical treatment and future directions that might inform other efforts.

Tobacco Use Treatment Service

With support from C3I, we developed and implemented the Tobacco Use Treatment Service (TUTS) at Abramson Cancer Center, using the “Ask-Advise-Connect” framework. This approach (1) systematically identifies smokers, (2) provides personal and persuasive advice to quit smoking, and (3) facilitates referral to evidence-based smoking cessation treatment, including counseling and FDA-approved medication for tobacco dependence. Supported through the use of clinical decision support (CDS) embedded within the electronic health record (EHR), our approach involved standardizing a mandatory assessment of smoking status for all oncology patients, integrating cancer-relevant cessation advice into patient-focused materials, and automating a mechanism for electronic referral to a certified tobacco treatment specialist. The primary metrics for determining success were the rate of clinician tobacco use assessment and the rate of referral to tobacco cessation treatment.

We incorporated a number of critical elements in our approach to ensure program sustainability beyond the funding cycle for this initiative. First, to minimize any potential interruption to clinical workflow and reduce “friction,” we automated the assessment and referral process within the EHR. The essential components of the TUTS program are implemented as part of standard care. Second, we leveraged a...
A reimbursement model that can fund the program in the long term. Although reimbursement for tobacco cessation treatment varies by insurer and contract, as a general rule, clinicians can be compensated for tobacco use treatment services. The program follows the requirements and definitions that govern reimbursement, using billing providers (e.g., physicians) to perform face-to-face evaluation and management visits, assessment, and referral services, and certified tobacco treatment specialists to provide the intervention.9

Additionally, we used the Consolidated Framework for Implementation Research (CFIR),10 a leading implementation science framework, as a guide for building and implementing the program (Table 1). First, we ensured institutional commitment to the service, engaging with the cancer center director and senior leadership to keep them informed, integrate their feedback, and leverage their influence. Second, we built a multidisciplinary team with the expertise needed to successfully complete this initiative, including capabilities in addiction science, clinical workflow, clinical care, informatics, and implementation science. Third, we collaborated with our EHR clinical informatics team to help inform service design, develop and implement the user interface, and monitor the program through an automated data reporting system. Fourth, we met with cancer center division chairs and attended division faculty meetings to present the program, solicit feedback, and build awareness and enthusiasm.

| Table 1. Essential Steps to Implement TUTS | Description | Implementation Action/Strategy |
| Consolidated Framework for Implementation Science | Leadership engagement, implementation climate | Ensure institutional commitment | Met with cancer center director and senior leadership and leveraged their support |
| | Formally appoint internal implementation leaders, champions | Build a multidisciplinary team | Expertise in addiction science, informatics, clinical workflow and clinical care, and implementation science |
| | Available resources, design quality and packaging, costs | Engage with electronic medical record expertise to build system | Worked directly with EPIC team at Penn to develop, implement, and monitor service (workflow and cost) |
| | Engage, opinion leaders, external policies and incentives, knowledge and beliefs about the intervention | Engage clinicians and clinic leadership | Met individually with division chairs and previewed the service at faculty meetings |
| | | Provide training | Held small group training sessions with medical assistants and nurses |
| | Create and distribute marketing materials | Developed promotional material (e.g., banners, fidget spinners) and branded the service (NCI) |
| | Compatibility, adaptability, trialability | Pilot test procedures | Held a limited launch in radiation oncology to determine if procedures needed revision |
| | Reflect and evaluate | Monitor progress | Initiated monthly assessments of key metrics (e.g., rate of identification, rate of referral, rate of patient treatment engagement) |
| | | Assess challenges and barriers | Conducted interviews with patients, clinicians, and administrators to determine if the service requires redesign |
| | | Broaden deployment | Expanded the service incrementally across the cancer center |

Abbreviation: TUTS, Tobacco Use Treatment Service.
Once the workflow was agreed on, the CDS tool was built with end-user feedback. The CDS workflow used an “opt out” framework, placing an unsigned order in the encounter record and allowing clinicians to assess suitability for tobacco use treatment before signing the order and referring to tobacco use treatment (Figure 1). Oncologists, nurses, and medical assistants received brief, in-person training in use of the CDS tool, emails regarding use of the tool for reference, and, when requested, additional training through one-on-one discussion in the clinical setting. Finally, we established procedures to collect the needed program metrics and conduct informant interviews to improve the program and guide subsequent program expansion.

Changes in Identification of Smokers and Smoking Cessation Treatment Engagement

As part of this initiative, we identified the baseline preprogram rates of identification of smokers and engagement in evidence-based smoking cessation treatment over a 6-month period. We then reassessed these metrics over the 12 months after the program launched. Rates of tobacco screening remained similar across the 2 time periods (92% vs 88%), with the current self-reported smoking rate remaining stable at 7% to 8%. The rate of treatment engagement among smokers, however, increased from 0% preprogram to 36% postprogram (Figure 2). Across the 12 months, 85 oncology clinicians used the tool (57 hematologist-oncologists and 28 radiation oncologists).

Figure 1. Clinical decision support tool in clinical practice. The individual responsible for check-in and rooming would screen for tobacco use (A). If the patient was positive for current tobacco use (defined as tobacco use in the past 30 days), user would select “Order” and an unsigned order would be placed in the patient’s encounter record (B), prompting the oncologist to assess suitability for tobacco use treatment before signing the referral-to-treatment order.
Regarding program barriers, we identified order cancellation as an important obstacle to treatment engagement early in program implementation. Through discussions with medical oncologists during education and technical support sessions, concerns were raised about low patient willingness to engage in tobacco treatment, the appropriateness of addressing tobacco use at this time and in this context, and perceived lack of efficacy regarding available treatments for tobacco dependence. Other barriers included patient characteristics (eg, treatment stage, cancer type), caseload, visit type (eg, second opinion, inpatient vs outpatient), and the provider’s interest in retaining primary responsibility for tobacco cessation treatment as part of patient care. We provided additional support to address some of these barriers, including education regarding the effectiveness of tobacco use treatment and the role of TUTS in supporting the relationship between oncologist and patient. Canceled orders were modifiable through this additional education and technical support effort, decreasing from 60% overall to 42% after additional training.

**Reflections and Future Directions**

This investment from C3I and the NCI Cancer Moonshot initiative allowed for the development and implementation of a sustainable program to increase patient engagement in evidence-based treatment of tobacco use. The TUTS program has maintained a high rate of tobacco use assessment and substantially increased the rate at which smokers with cancer are engaged in evidence-based tobacco use treatment. Essential steps in developing and implementing this program included relying on a multidisciplinary team with the requisite expertise, leveraging institutional commitment, training and pilot-testing the system, and monitoring progress and initial barriers to successful implementation—elements consistent with the CFIR model. Importantly, implementation success was driven by a commitment to ensuring that clinic workflow remained uninterrupted and that the program used a financial reimbursement model that promoted self-sustainability. Furthermore, retraining with oncologists directly has yielded reductions in order cancelation, which will even further improve treatment engagement rates going forward.

---

**Figure 2.** Rates of identification of smokers and treatment engagement includes assessments for 6 months before and 12 months after implementation of the Tobacco Use Treatment Service (TUTS) at Abramson Cancer Center. Period 1 was assessed 6 months after implementation; period 2 was assessed 12 months after implementation.

**RINAD BEIDAS, PhD**

Rinad Beidas, PhD, is an Associate Professor of Psychiatry and Medical Ethics and Health Policy at Perelman School of Medicine. She directs the Penn Implementation Science Center at the Leonard Davis Institute (PISCE@LDI). She is an established expert in implementation science; a recent social network analysis identified her as among the top 10 implementation science experts nationally. Dr. Beidas has published more than 100 articles and is the co-editor of the only book published on evidence-based practices in youth: Dissemination and Implementation of Evidence-Based Practices in Child and Adolescent Mental Health. Dr. Beidas’s work has been funded by the NIH continuously since 2012, and she has received more than $10 million dollars in funding as a principal investigator (PI) or as a multiple PI. She is PI on an R01 on fidelity measurement of cognitive-behavioral therapy for youth in the community; and is a multiple PI on a T32 and P50 on implementation science; and serves as the implementation science methodologist on a number of grants from NCI, National Heart, Lung, and Blood Institute (NHLBI), and National Institute of Mental Health (NIMH). Dr. Beidas is deeply committed to partnering with community stakeholders to understand the best way to implement evidence-based practices and improve behavioral health and health services across a variety of settings.
Although our efforts reveal that focused institution efforts can help more patients with cancer who smoke engage in evidence-based care, there are important limitations to this work. A substantial proportion of patients are still not engaged in evidence-based treatment. Ongoing work involves conducting key informant interviews with oncologists to help develop effective approaches to address clinician concerns, similar to our successful efforts to improve tobacco use treatment in primary care. Furthermore, our reassessment period of 12 months is likely too short an evaluation period to be representative of potential impact. Long-term efforts will assess both oncologist engagement with the CDS tool across multiple patient encounters and smoking cessation rates among the patients in the TUTS program. The TUTS program provides smoking cessation counseling tailored to the needs of patients with cancer, medication navigation, and long-term follow-up without exclusions. Thus, we have the opportunity to document the direct impact of this initiative on patient smoking in real-world clinical practice.

Conclusions
With support from the NCI Moonshot initiative and C3I, we established a sustainable, low-cost program of tobacco use assessment and treatment at Abramson Cancer Center. Initial results show stability in identifying patients who smoke and substantial increased patient engagement in evidence-based tobacco use treatment. Moreover, this initiative established a sustainable and robust platform on which to test new interventions designed to improve the clinical management of tobacco use among patients with cancer through targeted efforts to reduce implementation barriers. Thus, NCI’s investment in the infrastructure of cancer centers across the nation to implement sustainable tobacco treatment services is poised to have a critical influence on reducing tobacco use among patients with cancer in the years ahead.

Acknowledgments
The authors wish to thank Dr. Michael Fiore and his staff at the University of Wisconsin for serving as the coordinating center for the C3I; Dr. Glen Morgan for reviewing a draft of this manuscript; Drs. Rebecca Ashare, Lynn Schuchter, Lawrence Shulman, and James Metz for helping to support the TUTS program; and Ms. Tierney Fischer and Ms. Jody Nicoloso for operating TUTS.

Disclosures: Dr. Beidas has disclosed that she is a consultant for Merck & Co., Inc. Schnoll has disclosed that he receives grant/research support from Pfizer, and is a consultant for Pfizer, GlaxoSmithKline, and Curaleaf. The remaining authors have no conflicts to disclose.

Funding: This project was supported by a grant from the NCI (P30 CA016520-41S4) and from the National Institute on Drug Abuse (K24 DA045244). Dr. Jenssen is supported, in part, by the NCI (K08CA226390).

Disclaimer: The views expressed here are those of the authors only and do not represent any of the NCI or NIH.

References


