

Behavioral Economics Can Help Cancer Patients Quit Smoking

BY CATLIN NALLEY

A team of researchers found that cancer patients who continued to smoke following their diagnosis were more likely to receive tobacco use treatment when clinicians received “nudges” via the electronic health record (EHR) (*J Clin Oncol* 2023; <https://doi.org/10.1200/JCO.23.00355>).

“More than 50 percent of patients who smoke prior to their cancer diagnosis continue to smoke after they are diagnosed,” said first study author Brian Jenssen, MD, MSHP, Assistant Professor of Pediatrics in the Perelman School of Medicine at the University of Pennsylvania. “This can worsen quality of life and accelerate tumor growth.”

“Routine, evidence-based tobacco use treatment (TUT)—usually involving a referral to a smoking cessation clinic for counseling and potentially using medication to help address tobacco use—reduces the risk of death caused by cancer and other health issues,” he noted. “Despite its benefits, only about half of cancer centers identify patient tobacco use and even fewer engage patients directly in adopting a TUT strategy.”



Jenssen, alongside his colleagues at the Perelman School of Medicine at the University of Pennsylvania and Children's Hospital of Philadelphia (CHOP), initiated the current study to explore strategies based on behavioral economics to help not only increase the use of tobacco use treatment among cancer patients, but also improve clinician willingness to engage in TUT.

“Oncologists are faced with the challenge of responding to each patient's individual cancer, so we wanted to see if we could develop a strategy for making their lives as easy as possible by providing simple, timely nudges to help patients engage in tobacco use treatment options,” explained Jenssen, who is also Primary Care Pediatrician and Medical Director of Value-Based Care in the CHOP Care Network, and a member of the Abramson Cancer Center's Tobacco and Environmental Carcinogenesis Program.

“Clinicians can help their patients find ways of improving their health by helping them quit smoking in a nonjudgmental way.”

Study Methodology

Jenssen and colleagues conducted a four-arm cluster-randomized pragmatic trial across five hospitals and six clinics within Penn Medicine's Abramson Cancer Center that compared the “effect of strategies informed by behavioral economics on tobacco use treatment engagement during oncology encounters with cancer patients.”

Investigators designed and delivered EHR-based “nudges,” which Jenssen described as brief messages intended to remind clinicians and

their patients to integrate tobacco treatment into their care plan.

“These nudges were designed to counteract mental biases that work against tobacco use treatment, such as concerns about the safety of tobacco treatments versus their potential benefits, and the potential distraction from medical treatment,” he said.

Clinician clusters were randomized into four arms: clinician nudge, patient nudge, both clinician and patient nudge, or usual care (no nudge). Researchers nested patients with the clinician clusters.

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—Frank T. Leone, MD, at Penn Medicine

“Clusters were formed between clinicians with overlapping patient pools to reduce cross-cluster contamination,” Jenssen and team stated. “The clusters were not site-specific as many clinicians worked at multiple sites. Patients were nested under clinician clusters and assigned to an arm based upon the clinician they saw at their index visit, preventing crossover.”

Physicians and advanced practice providers (APPs) within medical, radiation, and gynecologic oncology clinics were included in the clinician sample. Eligible clinicians, according to the study authors, were currently practicing at an included site, had prescribing authority in Pennsylvania or New Jersey, cared for at least one patient who used tobacco within the 30-day period preceding recruitment, and spoke English.

“Eligibility criteria for patients included any International Classification of Diseases-10 cancer diagnosis, self-reported current tobacco use assessed by staff initiating the visit, a scheduled appointment with a participating clinician, and English-speaking,” Jenssen and colleagues outlined. “Patients were accrued as they were seen by an eligible clinician.”

The primary outcome of this study was the penetration of tobacco use treatment, which was defined by researchers as the proportion of patients with documented TUT referrals or a medication prescription in the EHR).

“Our primary analysis was intent-to-treat (ITT) so that all patients who completed the subsequent visit were included regardless of whether all interventions were received (N=2,146),” Jenssen and colleagues noted. “In a secondary analysis, we examined a GEE model that included only encounters wherein all nudges were received as intended (i.e., a completer-only analysis; N=1,795).”

Research Takeaways

From June 2021 to July 2022, 246 clinicians were randomly assigned to 95 clusters. TUT penetration data was collected from their

encounters with 2,146 eligible patients who smoked while receiving cancer care.

Among patients who received the patient nudge, 55 percent opened the message. Of those, 85 percent opened it on the day it was sent. The average time to open was 1.39 days. Data showed that patients who did not receive the nudge were older (62.9 vs. 62.2). They were also more likely to be male (17.8% vs. 14.7%), non-White (20.2% vs. 14.4%), Hispanic (33.3% vs. 16%), single (18.7% vs. 13.8%), or seen by a gynecologic oncologist (30% vs. 15.5% vs. 18.9%), the researchers reported.

The ITT analysis demonstrated that the clinician nudge resulted in a significant increase in tobacco use treatment penetration when compared with usual care (35.6% vs. 13.5%), Jenssen noted. “Patient nudges did not impact the implementation of TUT, suggesting that clinical staff are more effective targets to collaborate with their patients to adopt tobacco use treatment strategies and that there is a need to continue to explore ways to improve patient-facing methods to increase TUT engagement.”

The completer-only analysis revealed a similar impact (37.7% clinician nudge vs. 13.5% usual care), according to the study authors, who also reported that clinician type was associated with TUT penetration rates in both models. While there was no difference between APPs and physicians within the patient-only and combined nudge arms, Jenssen and colleagues observed higher penetration rates for advanced practice providers in the usual care and the clinician-only arms. Similarly, in the completer-only model, patients treated by APPs experienced higher TUT rates in the usual care and the clinician nudge cohorts.

Additionally, the findings showed no association between race and tobacco use treatment penetration. “However, on the basis of our a priori interest in assessing equity, our post hoc analyses suggested an uneven impact of race across arms in the completers model: non-White patients had significantly higher TUT rates in the usual care and both-nudges arms,” wrote Jenssen and colleagues.

“This pattern of TUT penetration across arms and race was similar in the intent-to-treat model: higher TUT rates were observed in the usual care and both-nudges arms, but not in the patient or clinician nudge arms, suggesting that the influence of race on the completer-only model may have been a proxy for the influence of race across all arms,” they continued.

This research effort used a pragmatic design engaging both patients and clinicians, so there is potential for “these implementation strategies to be both highly impactful and generalizable to other clinical settings and systems,” the investigators suggested, while also acknowledging the limitations of their work.

“Because our outcomes focused on clinical behaviors that are generally the result of a negotiated plan between clinician and patient, one key limitation is that clinician decision-making may be moderated by unmeasured patient refusals,” Jenssen and team explained. Additionally, given the multidisciplinary nature of cancer care, there was the potential for confounding due to contamination despite efforts by the researchers to minimize its effect.

Approximately 17 percent of patient nudges weren’t delivered effectively and more remained unread, according to the study authors. “Patients who did not receive the nudge may have had more advanced stages of disease necessitating accelerated visit schedules, no online portal account created, or another health care access-related disparity. This represents a significant opportunity for enhancement. Nevertheless, the results were remarkably consistent across the intent-to-treat and completer-only models.”

In summary, introducing clinician nudges that sought to counteract omission bias and were delivered through the EHR led to more than a three-fold increase in TUT engagement rates, according to Jenssen and colleagues. Adding a patient nudge did not have an impact on TUTS engagement rates. When looking at different clinician types, advanced practice providers were more likely to engage in tobacco use treatment compared with their physician counterparts.

Clinical Implications

These findings support the use of behavioral economics or targeting predictable patterns in human decision-making to overcome barriers to behavior changes and improve outcomes for cancer

patients, Jenssen told *Oncology Times*. “When done well and in a non-judgmental way, the EHR nudge can help clinicians to increase engagement in TUT.”

“This study shows that a behavioral economics nudge strategy can increase tobacco use treatment in the oncology setting, which we hope will help more patients with cancer control their tobacco dependence and enjoy better cancer care outcomes,” said senior author Frank T. Leone, MD, Director of the Comprehensive Smoking Treatment Program at Penn Medicine, Professor of Pulmonary Medicine in the Perelman School of Medicine, and a member of the Tobacco and Environmental Carcinogenesis Program at the Abramson Cancer Center. “We look forward to continuing to build on this research and further increase engagement with tobacco use treatment in the oncology setting.” **OT**

Catlin Nalley is a contributing writer.

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Learning Objectives for This Month’s Activity:

After participating in this activity, readers should be better able to

1. Evaluate the impact of clinician and patient “nudges” regarding tobacco use treatment (TUT) for cancer patients as it relates to health equity.
2. Identify the effect of clinician and patient nudges on TUT referrals or medication prescribed for TUT for cancer patients.

Disclosure: All authors, faculty, staff, and planners have no relevant financial relationships with any ineligible organizations regarding this educational activity.