

# New technologies link treatments to the patients who need them the most

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Dr. Jennifer Dahne holds smartphone-enabled devices that help patients participate in smoking cessation clinical trials remotely from across the state. Credit: Medical University of South Carolina

Many of South Carolina's nicotine addiction researchers are in

Charleston. But many of the smokers who need to quit live elsewhere in the state.

This poses a dilemma for researchers and smokers alike. Researchers can't enroll large and representative groups of smokers into their trials. And smokers who would like to quit cannot easily access investigational treatments that could help them to do so.

In many cases, remote trials could offer an answer. A suite of new technologies enables researchers in Charleston to reach out to smokers throughout the state, including those in rural areas hardest hit by smoking.

Ten years ago, lack of broadband internet access would have been an obstacle for enrolling participants in [rural areas](#) in remote trials. Although that remains an issue, one which the MUSC Telehealth Center of Excellence is seeking to address, the widespread adoption of smartphones among rural populations has begun to chip away at this challenge.

"The days of doing research in our ivory towers are over, as it should be," said Matthew J. Carpenter, Ph.D., a professor in the Department of Psychiatry and Behavioral Sciences at MUSC and co-director of the Cancer Control Research Program at MUSC Hollings Cancer Center. "The days are past when we would just wait for people to knock on our door. We should be going out to folks. Ten years ago, technology was not there to do that, but now we have all these capabilities, and we're starting to break down that ivory tower barrier."

Carpenter and fellow addictions researcher Jennifer Dahne, Ph.D., an assistant professor in the Department of Psychiatry and Behavioral Sciences, recently published an article in *Nicotine & Tobacco Research*, discussing new technologies that improve the feasibility of remote

smoking cessation trials.

"We're trying to bring our [clinical trials](#) to our research participants," said Dahne. "And by doing that, we hope to ensure a more representative, diverse sample for our research studies that more accurately reflects the true population of smokers."

Carpenter and Dahne also co-direct the Remote and Virtual Trials program for the South Carolina Clinical & Translational Research (SCTR) Institute—the Clinical & Translational Science Awards (CTSA) hub with an academic home at MUSC. Together, they are working across specialties to develop technologies to facilitate remote clinical trials and plan to share them with the broader CTSA consortium.

Running a clinical trial is a complicated endeavor. The study leader has to "cast" the trial with appropriately selected and consented patients, and study staff has to assess patients' status and medication adherence during the trial. Now, there's a suite of technologies to help to meet each of those challenges, and study participants can achieve remotely what they once would have had to do in person.

Previously, potential participants had to come to MUSC to be screened and consented for a trial. Geography, time and transportation all presented barriers. Now, thanks to electronic consent, participants can consent from home, using either e-consent functionality embedded within REDCap—a widely used Vanderbilt-developed tool that is made available to MUSC researchers through SCTR—or an online platform known as doxy.me, created by MUSC Biomedical Informatics Center researcher Brandon Welch, Ph.D. In partnership with Dahne and Carpenter, BMIC also created a REDCap plug-in that ensures each trial enrolls participants with the exact demographic profile the study team is seeking, helping to guard against the risk that younger, more tech-savvy participants could be overrepresented.

In the past, participants would then have needed to return to MUSC for all scheduled study visits. Now, much of the data can be gleaned remotely. Participants answer REDCap surveys about their symptoms, and those data are collected for review by researchers and clinicians. Participants can also provide objective data about their [health status](#) by using a fleet of smartphone-enabled devices, such as the carbon monoxide monitor, integrated with REDCap by Dahne for smoking cessation studies. This quantitative data can be used to confirm self-reported data about participants' efforts to quit.

Other devices, such as Smart Caps, which can track when a pill bottle is opened, could one day be integrated into REDCap and be used to monitor how well participants adhere to prescribed medication regimens.

"The biggest hurdle for remote trials has been the ability to obtain objective data on behavior remotely," said Carpenter. "So being able to collect those data using these smartphone-enabled devices is what I am most excited about."

Dahne has received a number of small business grants to develop app-based treatments for depression, another research interest. Most recently, Dahne received a small business technology transfer grant from the National Institutes of Health to integrate a [mobile app](#)-based intervention she developed for depression, called Moodivate, into the electronic health record. The app is intended to address a treatment gap for [primary care physicians](#) when it comes to depression.

"Primary care providers can't deliver psychological depression treatment on the spot during regular primary care visits," explained Dahne. "The app gives patients access to evidence-based treatment without having to use up the limited time they have with their doctors."

The integration with the electronic health record means that physicians

will be able to access the data from the app and see if patients are improving. If not, they can alter their treatment plans. The grant will also fund a 600-person clinical trial that will test whether patients benefit more from the app alone, the app plus provider review via the electronic health record or usual care.

Carpenter recognizes the value that Dahne brings to the remote trial effort at MUSC. "Jen has a flair for technology, and we benefit from her passion and vision," said Carpenter. "She's an innovator."

Not only could these new technologies facilitate remote clinical trials, they could also provide a means for researchers to share the results of trials with participants.

"Too often as researchers, we do our study, finish up the analysis and publish it. And then we're done," said Carpenter. "We scientists need to do a better job of telling the folks about the relevance of research to them. Remote platforms could be harnessed to do that."

"In a nutshell, we're making [trials](#) and their results more accessible for everyone by doing them remotely," said Dahne.

**More information:** Jennifer Dahne et al, Remote Methods for Conducting Tobacco-Focused Clinical Trials, *Nicotine & Tobacco Research* (2020). [DOI: 10.1093/ntr/ntaa105](https://doi.org/10.1093/ntr/ntaa105)

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