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How can technology support smoking cessation interventions?

The last ten years has seen astonishing growth in the availability and widespread use of various mobile devices – smartphones, tablet computers and, more recently, wearable devices such as smartwatches. These provide unprecedented opportunities for both capturing data and delivering or supporting behaviour change interventions. In this issue, a number of articles highlight the potential for technology to augment conventional smoking cessation treatments, and identify future directions that this research should take.

One important question is how technology can be integrated into existing interventions for maximum impact. Graham and colleagues (1) evaluated the impact of a social network intervention and free nicotine replacement therapy on adherence to different evidence-based components of a smoking cessation treatment delivered online. Smokers were randomized to one of four arms: (1) an interactive, evidence-based smoking cessation website alone; (2) the website in conjunction with a social network intervention designed to integrate participants into the online community; (3) the website plus free nicotine replacement therapy; and (4) the combination of all treatments. Website utilization metrics, use of skills training components, social support during treatment, and pharmacotherapy use were all assessed at three-month follow-up, and the combination of all components was found to outperform the other arms on all outcomes.

Alessi and colleagues (2) explore a similar question – how technology-augmented reinforcement can improve cessation outcomes. They report the results of a randomized trial of technology-augmented abstinence reinforcement for smoking cessation. Participants were provided with an abstinence-monitoring device that monitored smoking status daily using interactive voice technology on a smartphone, and a CO monitor. This was in addition to usual care (counselling and pharmacotherapy). Participants were randomised to also receive reinforcement for abstinence in the form of vouchers, or not (i.e., monitoring alone), on the basis of the results of daily monitoring for four weeks. Reinforcement (compared to monitoring alone) was associated with a greater proportion of smoking-negative CO tests, longer duration of prolonged abstinence, and greater point-prevalence abstinence during the four-week monitoring/reinforcement phase.

Developing technology-augmented interventions will require close engagement with end users during the development process. Grau and colleagues (3) used a qualitative approach to explore the perspectives of participants in a pilot study of texting support for smoking cessation, exploring the feasibility, acceptability, and personal relevance of the programme. The major themes identified included the programme being seen as a valued source of external support that provided useful strategies to reduce tobacco use, and that texting is perceived as feasible, acceptable, and helpful. Suggestions for improvement were also identified, including offering customizable options. This kind of qualitative approach will be invaluable when exploring these issues during intervention development.

However, if even technology-augmented interventions are effective and acceptable, they may be underused due to recruitment challenges. Sadasivam and colleagues (4) explored whether it is possible to successfully recruit smokers to a technology-augmented intervention using a peer marketing approach through a social network (Facebook). Smokers were recruited on Facebook using online advertisements, and these ‘seeds’ were provided with a peer recruitment app, as were subsequent waves of smokers recruited, known as ‘peer recruits’. Overall, this peer marketing approach quadrupled engaged smokers and enriched the sample with smokers not yet ready

to quit, and African American smokers. Technology may be useful not only in augmenting interventions, but also in promoting recruitment.

The future of technology-augmented interventions is outlined by Naughton (5), in a fascinating commentary on “just-in-time” smoking cessation support. It is well established that smartphones can deliver automated support (e.g., via text messages), but the full potential of this has not yet been realized. Smartphones allow users themselves to identify when they are at risk of a smoking lapse, perhaps triggering automated support, while sensors included in the smartphone can be used to dynamically monitor a smoker’s context and automatically trigger support when a high risk environment is sensed. The latter approach has perhaps the best potential to offer just-in-time support, given evidence that users do not reliably elicit trigger support, but these systems have not yet been evaluated comprehensively. These systems could also be used for data collection purposes. The potential of the vast and growing array of sensors included as standard on many smartphones, and other mobile devices such as wearables, is only just beginning to be realized.

Much of the success we have achieved in reducing smoking prevalence in high-income countries has come about through reductions in uptake among young people. In established smokers, cessation rates remain disappointingly low, despite most wanting to stop. Technology, in particular mobile devices, offers exciting opportunities for both augmenting existing evidence-based interventions, and supporting ecological data capture.

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References

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