eHealth interventions for smoking cessation: Evidence and implications for public health

Review on which this evidence summary is based:

Do HP, Tran BX, Pham QL, Nguyen LH, Tran TT, Latkin CA, et al. (2018). **Which eHealth interventions are most effective for smoking cessation? A systematic review.** *Patient Preference and Adherence. 12*: 2065-2084.

Review Focus

P   Current smokers in the general population

I   eHealth/mHealth smoking cessation including: (i) smoking cessation using web-based, (ii) mobile-based, (iii) computer-assisted approach and (iv) other platforms (e.g. social media, chat rooms, digital games)

C   Nonactive controls, usual practice or other smoking cessation methods not included in the interventions above

O   Seven-day smoking abstinence (e.g. up to 6 months, 6 months, > 6 months follow-up, any)

Review Quality Rating:	10 (strong) *Details on the methodological quality are available* [here](#).

Considerations for Public Health Practice	
Conclusions from Health Evidence™	**General Implications**
This systematic review is based on 108 unique studies with 110,372 participants. Of the 108 studies, 105 were randomised controlled trials, 2 were quasi-experimental studies, and 1 was a non-randomised controlled before and after study. Forty percent of the studies were assessed as low risk of bias, 42% moderate risk of bias and 18% high risk of bias. **Web-based programs:** • Interactive and tailored web-based programs vs. usual care: Significant large effect on 7-day smoking abstinence at 6-months (RR 2.03 [CI 1.7, 2.03], but this effect is no longer observed after 6 months (RR 1.06 [CI 0.99, 1.16]) • Web-based as an add-on to Nicotine Replacement Therapy (NRT) / Counselling: Significantly moderate effect on 7-day smoking abstinence (RR 1.29 [CI 1.17, 1.43]) **mHealth programs using text-messages:** • Compared to usual practice: mHealth texting SMS programs produce a significantly moderate effect on 7-day abstinence (RR 1.71 [CI 1.35, 2.16])	The overall findings suggest both web-based and mobile Health interventions may help people quit smoking. Mobile health interventions, such as using a smart phone with an app or a simpler mobile/cell phone with SMS text messaging are slightly better than other eHealth strategies. These effects are moderate. The long-term effects of some of the strategies upon quitting is unclear. Additional benefit is provided when web-based approaches are integrated with nicotine replacement therapy. Increasing the intensity of messaging from weekly to daily doesn't necessarily increase quitting. Low quality studies must be interpreted with caution as they overstate the effect. Although further research is needed, and size effects are not high, given both the availability of the technology and the harms from smoking, policymakers and health professionals should encourage their use.

• Compared to low frequency messages: high SMS texting results equivalent effect or no difference on 7-day abstinence (RR1.08 [CI1.02, 1.15]) • Compared with other online method: tailored SMS results in significant moderate effect on smoking cessation (RR 1.35 [CI 1.04, 1.75]) The magnitude of effect sizes from mHealth smoking cessation interventions was likely to be greater when the intervention included individually tailored text messages.	

Evidence and Implications

What's the evidence?	Implications for practice and policy
Web-based interventions vs. non-active controls **6 months follow-up** (7 studies, 5,560 participants) *Quality of the evidence = low* • Significant important increase (RR 2.03 [CI 1.7, 2.38]), low quality, may increase 7-day smoking abstinence **1 to 6 months follow-up** (5 studies, 11,078 participants) *Quality of the evidence = moderate* • Significant moderate increase (RR 1.21 [CI 1.08, 1.36]) **> 6 months follow-up** (11 studies, 11,344 participants) *Quality of the evidence = moderate* • Little or no increase (RR 1.06 [CI 0.99,1.16])	**Web-based interventions vs. non-active controls** These strategies typically begin with a small effect. There is good evidence that cessation is best at 6 months after commencement. However, there may be little effect upon cessation after 6 months. A successful quitter is one who maintains 6 months of abstinence. Thus, future eHealth smoking cessation interventions should focus on: i) strengthening the prolonged effect and ii) maintaining quit attempts and early abstinence over a longer period.
Tailored web-based interventions vs. untailored control group (18 studies, 23,493 participants) *Quality of the evidence = moderate* • Little increase (RR 1.09 [CI 1.02, 1.17]), probably little or no increase upon cessation	**Tailored web-based interventions vs. untailored control group** There is moderate quality evidence that there is little or no effect upon cessation.
Web-based interventions vs. control group, both groups receive NRT/counselling (11 studies, 3,619 participants) *Quality of the evidence = moderate* • Significant moderate increase for add-on (RR 1.29 [CI 1.17, 1.43], probably increases cessation slightly (include the statistics where there is an impact)	**Web-based interventions vs. control group, both groups receive NRT/counselling** There is moderate evidence that the add-on of a web-based program supports cessation.
mHealth interventions vs. non-active control (9 studies, 2942 participants) *Quality of the evidence = low* • Important increase (RR 1.71 [CI 1.35; 2.16]), may increase cessation	**mHealth interventions vs. non-active control** Current evidence supports the use for cessation, but caution is required as the quality of the evidence is low. The effect of mHealth smoking cessation interventions might not be improved by the high message frequency. Increasing the messages to daily is unlikely to provide an additional benefit. Increased messaging should be applied with caution as some people may feel annoyed by multiple reminders per day, resulting in negative outcome.
mHealth interventions, high frequency (daily) vs. low frequency (weekly) messaging (4 studies, 11,376 participants) *Quality of the evidence = low* • Little or no important increase (RR 1.01 [CI 1.02; 1.15]), may make little or no difference upon cessation	

Computer assisted smoking cessation interventions vs. active controls (9 studies, 13,435 participants) *Quality of the evidence = low* - *Significant moderate increase (RR 1.31 [CI 1.11, 1.53])* - <u>No impac</u>t *(little or no effect when computer assisted is compared to usual care)*	**Computer assisted smoking cessation interventions vs. active controls** When compared to an active control, there may be a significant moderate increase. This effect must be considered cautiously as the data are of low quality. These strategies appear to be no better than usual care. This conclusion must be considered cautiously as the data are of low quality.

Legend: MD – Mean Difference; b – regression coefficient; RR – Risk Ratio; CI – Confidence Interval; OR – Odds Ratio
*For definitions see the healthevidence.org glossary at http://www.healthevidence.org/glossary.aspx

Why this issue is of interest to public health:

Smoking is a significant modifiable factor of morbidity and mortality[1]. Although smoking rates in Canada have been declining, 16.2 per cent of the population, or roughly 5.3 million people smoke either daily or occasionally (2017)[2]. Smoking is responsible for about 45,000 deaths each year, costing the Canadian economy more than $16.2 billion. The total direct health care costs alone are $6.5 billion (2012)[3]. According to Statistics Canada, one-third of smokers say they have intentions to quit within the next 30 days[4]. One approach to help people quit smoking is to make smoking cessation programs more accessible. Electronic health strategies are considered to be advantageous as many people have ready access to technology such as apps on their smartphone[5, 6].

1. Soriano JB, Abajobir AA, Abate KH, et al. (2017). Global, regional, and national deaths, prevalence, disability-adjusted life years, and years lived with disability for chronic obstructive pulmonary disease and asthma, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet Respir Med. 5(9):691–706.
2. Statistics Canada. (2018). Health Fact Sheet Smoking 2017. Statistics Canada, Catalogue no.82-625-X Ottawa: Statistics Canada. Retrieved from https://www150.statcan.gc.ca/n1/en/pub/82-625-x/2018001/article/54974-eng.pdf?st=VNOGNt7C
3. Dobsrescu, A, Bhandari A, Sutherland G, Dinh T. (2017) The Costs of Tobacco Use in Canada 2012.Ottawa: Conference Board of Canada. Retrieved from: https://www.conferenceboard.ca/e-library/abstract.aspx?did=9185
4. Statistic Canada (2015). Smoking cessation: intentions, attempts and techniques. Ottawa: Statistics Canada, Retrieved from: https://www150.statcan.gc.ca/n1/pub/82-003-x/2009003/article/10904-eng.htm
5. Vogel MME, Combs SE, Kessel KA.(2017). mHealth and application technology supporting clinical trials: today's limitations and future perspective of smartRCTs. Front Oncol. 7(3):37.
6. Kreps GL, Neuhauser L. (2010). New directions in eHealth communication: opportunities and challenges. Patient Educ Couns.78(3): 329–336.

*Other quality reviews on this topic are available on **www.healthevidence.org**.*

Suggested citation:

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