

A cross-sectional population survey of physicians in Alberta, Canada about a novel provincial contact tracing smartphone app

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ABSTRACT

Background The Canadian province of Alberta released the ABTraceTogether smartphone app in May 2020 to assist in contact tracing during the SARS-CoV-2 pandemic. Public engagement with this public health tool has been low, limiting the effectiveness of the intervention. This study examines physician knowledge of the app and practice patterns in relation to the app.

Methods We conducted a cross-sectional self-administered online English language survey of physicians and medical students in Alberta, Canada. The survey link was sent to all registered members of the College of Physicians and Surgeons of Alberta and was distributed by other provincial physician organizations and health zone leaders.

Results The survey received 317 responses. 96% of participants were aware of the app but only 27% had recommended the app to patients. The most common reason provided for not downloading or recommending the app was that participants had security concerns about the app. 23% of participants indicated they did not believe they had a responsibility to recommend the app to others.

Conclusions Our study provides insights into participants' knowledge and beliefs about the ABTraceTogether app. This information may be valuable to public health officials who wish to engage physicians in future public health campaigns.

Keywords communicable diseases, population-based and preventative services, public health, SARS-CoV-2

Introduction

The smartphone app ABTraceTogether was released on 1 May 2020 by the provincial government in Alberta, Canada to facilitate contact tracing of individuals exposed to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹ ABTraceTogether is the first contact tracing app to be released in North America.² The app identifies potential exposures by using a smartphone's Bluetooth signal to identify other phones running the app within 2 m.¹ If a user later tests positive for SARS-CoV-2, they are invited to share the encrypted encounter log from the app with the Alberta Health Services (AHS) contact tracers who can use the information to reach other app users.¹

Digital contact tracing is an appealing tool for public health officials because the use of technology can address some of the limitations associated with traditional contact tracing such as notification delays, recall errors and contact identification in public spaces.³ A limitation of digital

contact tracing apps is that their effectiveness is dependent on the degree to which the app is adopted by the population.³ When the ABTraceTogether app was released, health officials in Alberta stated the app would have to be used by at least 20% of the population to be effective.⁴ Modeling suggests that even with an adoption rate of 20%, the app would only be expected to identify up to 4% of contacts.³ Seven weeks after the app was released, it had only been downloaded by 210 093 individuals, representing less than 5% of the province's population.⁴ To the authors' knowledge, there has not yet been any other academic assessments completed to understand barriers and negative attitudes which may have inhibited the adoption of this public health tool by the general population.

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Physicians have both an opportunity and a responsibility to personalize and reinforce public health messaging with patients in the course of clinical encounters.^{5–10} Physician participation is especially important in emergency public health campaigns such as the response to the SARS-CoV-2 pandemic.⁵ Primary care providers are in a particularly strong position to reinforce public health messaging due to the nature of their relationships with their patients.^{8,9}

This study sought to assess physician knowledge of the ABTraceTogether app and determine physician practice patterns in relation to the app in the context of poor uptake of this public health tool during a global pandemic.

Methods

Survey development and design

We conducted a cross-sectional anonymous English language survey of all physicians and medical students in the province of Alberta, Canada. The survey was developed in accordance with the Checklist for Reporting Results of Internet training E-surveys (CHERRIES).¹¹ The draft survey text was reviewed by a physician (Family Medicine) and a researcher with a PhD in Public Health, and refined according to their feedback.

The survey was administered as an open survey hosted on the Google Forms platform (Google, Mountain View USA). Participants could access the survey from 26 May to 3 July 2020. A cover letter containing the elements of informed consent was provided on the landing page of the survey. Electronic consent was provided by answering a ‘yes/no’ question. Participants were offered the opportunity to submit their email address into a draw for a \$50 coffee gift card. Email addresses were collected in a separate Google Form and could not be associated with the participant’s responses on the survey.

The study was approved by a Research Ethics Board at the University of Alberta (Pro00101027).

Survey content

The survey consisted of three sections. In the first section, participants answered questions about demographic data. In the second section, participants were asked if they were aware of the ABTraceTogether app prior to their recruitment into the survey. Based on their response to this question, participants were directed to one of two possible final sections of the survey.

Participants who indicated they were aware of the app prior to recruitment were asked if they had downloaded the app and if they had recommended the app to others. Participants who answered that they had not downloaded or

recommended the app were asked to identify reasons why they had not done so and how likely they were to perform the action in the future (five point Likert scale, ‘extremely unlikely’ to ‘extremely likely’). Participants were then presented with a list of 14 statements about the app and asked to identify the correct statements. Four of the statements presented were correct and nine were incorrect. One statement was excluded from analysis because it was determined that the wording was ambiguous.

Participants who indicated they were not aware of the app prior to recruitment were provided with a description of how the app functions, adapted from the description on the Apple App Store.¹² Participants were then asked how likely they were to download the app in the future, and to recommend the app to others (Five point Likert scale, ‘extremely unlikely’ to ‘extremely likely’). Participants were also asked to identify reasons they would not download or recommend the app.

The cover letter and survey text are available as Appendix 1.

Survey recruitment

Advertisements of the study and the survey link were sent out by the College of Physicians and Surgeons of Alberta (CPSA) by email to all licensed physicians and medical students in the province on May 29 and June 11, 19 and 29. Advertisements of the study and the survey link were also sent out in email communications from the Alberta Medical Association (AMA) on June 4 and 18 and the Alberta College of Family Physicians on June 18 to their respective memberships. Finally, the study advertisement and survey link were distributed by all five AHS Zone Directors by email to their respective Zone medical leadership teams once during the study period.

Statistical analysis

Statistical analyses (including descriptive summaries) were conducted using the statistical software R.¹³ To examine patterns or differences in attitudes across respondent groups, logistic regression was used to independently model each of the three responses of interest (responses to questions 6, 7 and 12– see Appendix 1) while accounting for age, gender, primary clinical zone and clinical practice types, and possible interactions. Model selection was performed using a stepwise procedure with a BIC criterion. Tukey HSD-corrected *post-hoc* comparisons were applied to examine differences between demographic groups while Holm-Bonferroni (HB) corrections are used to account for multiple testing in model parameter estimates. Demographic differences between the analytic sample and anonymized population data provided by the CPSA were assessed using separate chi-squared goodness of fit tests.

Table 1 Respondent demographics

| | | Survey respondents N (%) |
|-----------------------------------|-------------------------------------|--------------------------|
| Type of clinical Practice | Family medicine/general practice | 174 (55.2) |
| | Surgery (general or specialized) | 12 (3.8) |
| | Anesthesia | 25 (7.9) |
| | Obstetrics and gynecology | 10 (3.2) |
| | Psychiatry | 13 (4.1) |
| | Internal medicine +/- subspecialty | 28 (8.9) |
| | Emergency medicine | 27 (8.6) |
| | Pediatrics | 17 (5.4) |
| | Public health/preventative medicine | 3 (1.0) |
| | Non-clinical | 6 (1.9) |
| | Medical learner | 21 (6.7) |
| | Other | 29 (9.2) |
| | Clinical zone worked in | North |
| Edmonton | | 80 (25.4) |
| Central | | 26 (8.3) |
| Calgary | | 143 (45.4) |
| South | | 34 (10.8) |
| Work in AB in a non-clinical role | | 1 (0.3) |
| Years in independent practice | 0–5 | 95 (30.2) |
| | 6–10 | 46 (14.6) |
| | 11–15 | 48 (15.2) |
| | 16–20 | 26 (8.3) |
| | >20 | 100 (31.7) |
| Age | <25 | 1 (0.3) |
| | 26–35 | 83 (26.3) |
| | 36–45 | 88 (27.9) |
| | 46–55 | 71 (22.5) |
| | 56–65 | 52 (16.5) |
| | >65 | 20 (6.3) |
| Gender | Female | 171 (54.3) |
| | Male | 131 (41.6) |
| | Non-binary | 1 (0.3) |
| | Not answered | 12 (3.8) |

Results

The survey received 317 responses. This represents a survey response rate of 2% of all physicians and medical students licensed with the CPSA during the study period. Two individuals did not consent to participate in the study. A further 12 participants chose not to identify their gender, one participant identified as non-binary and one participant indicated they did not work in Alberta. These responses were excluded in our analyses, leaving an analytic sample of 301 participants. Participant demographics are presented in Table 1.

Of the 301 participants in the analytic sample, 290 (96%) had previously heard of the ABTraceTogether app. The estimated model suggests little predictive power for the selected

predictors of age, gender and primary clinical zone (likelihood test against a null model, $P = 0.26$). Model summary tables are presented in Appendix 2. While model parameter estimates seem to suggest that after accounting for age and gender, respondents practicing in the North Zone had a lower odds of hearing about the app ($P = 0.088$), *post-hoc* comparisons give insufficient evidence of any differences between clinical zones (HSD-adjusted $P = 0.537$).

A chi-squared goodness of fit analysis showed no evidence to suggest differences in the distribution of age or practice type (defined as ‘Family’ or ‘Speciality’) between the analytic sample and the population. There is strong evidence ($P < 0.0001$) to suggest differences in gender and primary clinical zone between the analytic sample and the population.

Relative to the population data, the analytic sample had a higher representation of participants who are Female (57% versus 43%), and who work in the South Zone (11% versus 5%) the North Zone (10% versus 5%) and the Central Zone (9% versus 7%) while the analytic sample had lower representation of participants who work in the Edmonton Zone (26% versus 38%). In both groups, 45% of individuals work in the Calgary Zone.

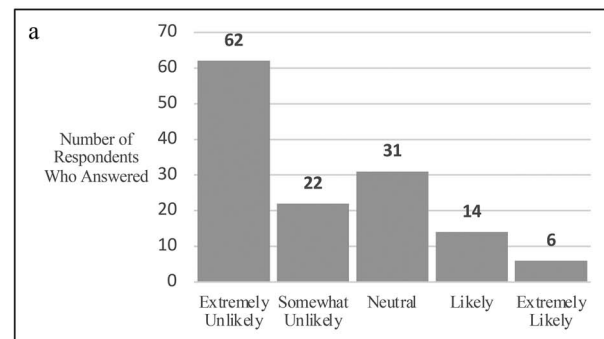
Participants who previously knew about the app

Of the 290 participants who knew about the app prior to recruitment, 163 (56%) reported they had downloaded the app onto their own phone. Other responses from these participants are reported in Figure 1. Taken together, the included variables age, gender, primary clinical zone and practice type were found to have significant explanatory power (likelihood test against a null model, $P = 0.039$). While model parameter estimates give moderate evidence to suggest that family/general practitioners have greater odds of having downloaded the app relative to those not in family/general practice (OR = 1.931, $P = 0.042$), no significant differences can be concluded when accounting for multiple comparisons (HB-adjusted $P > 0.75$).

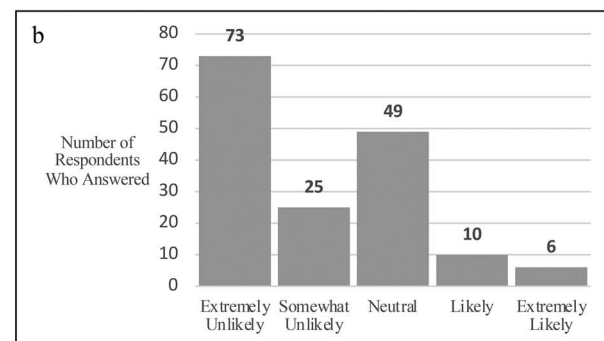
Of the 290 participants who previously knew about the app, 78 (27%) reported they had recommended the app in a clinical or professional setting. The same predictors as in the previous model were selected for inclusion in this model (likelihood test against a null model, $P = 0.061$). There was strong evidence from model estimates indicating that participants in the North Zone had a decreased odds of recommending the app relative to the Calgary zone, but this was ultimately inconclusive after accounting for multiple comparisons (OR = 0.154, HSD-adjusted $P = 0.101$). Similarly, while strong evidence from model parameter estimates suggested that family/general practitioners had an increased odds of recommending the app relative to those not in family/general practice, this was inconclusive after accounting for multiple comparisons (OR = 2.765, HSD-adjusted $P = 0.125$).

The most common response participants gave when asked why they had not downloaded the app themselves was security concerns about the app (62%) (Fig 2). The most common free-text response participants provided was distrust of the current provincial government in Alberta (11%), and the next most common free-text response was concern about being inappropriately identified as a contact following a clinical encounter.

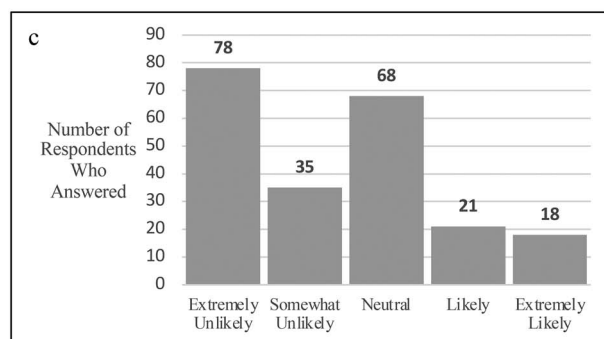
Participant knowledge about how the ABTraceTogether app functions are summarized in Figure 3. The majority of participants (84%) were aware that the app uses Bluetooth



Responses to:
"If not, how likely are you to download the app onto your own phone in the future?"



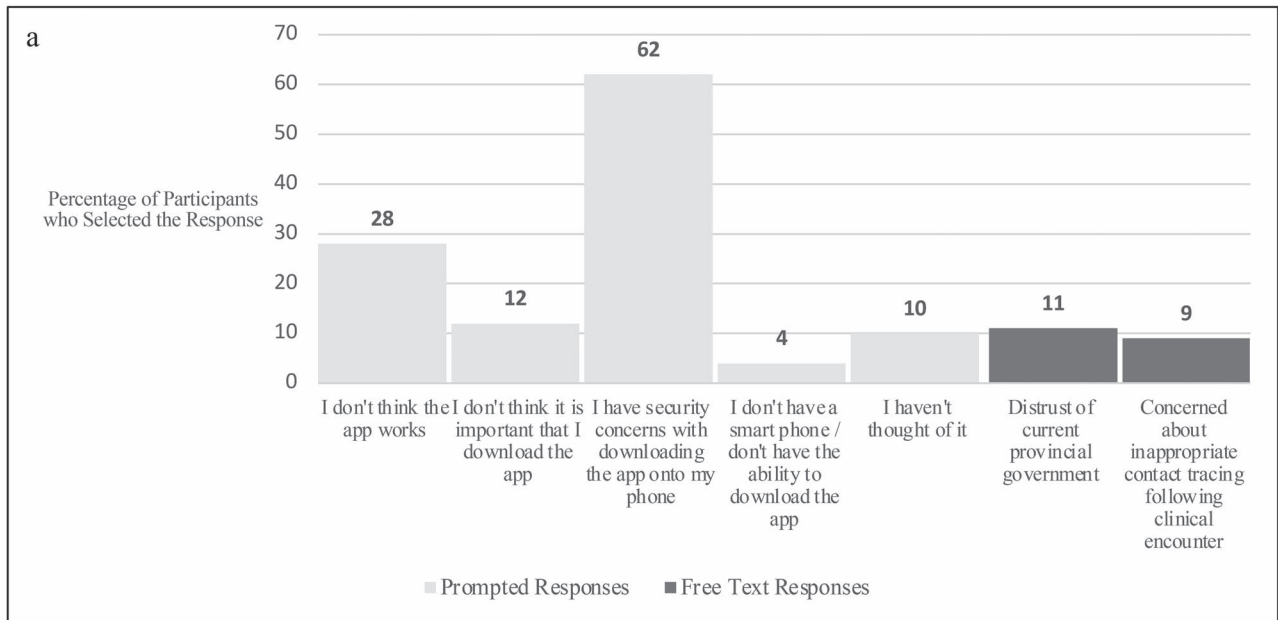
Responses to:
"If not, how likely are you to recommend the app to a friend or family member in the future?"



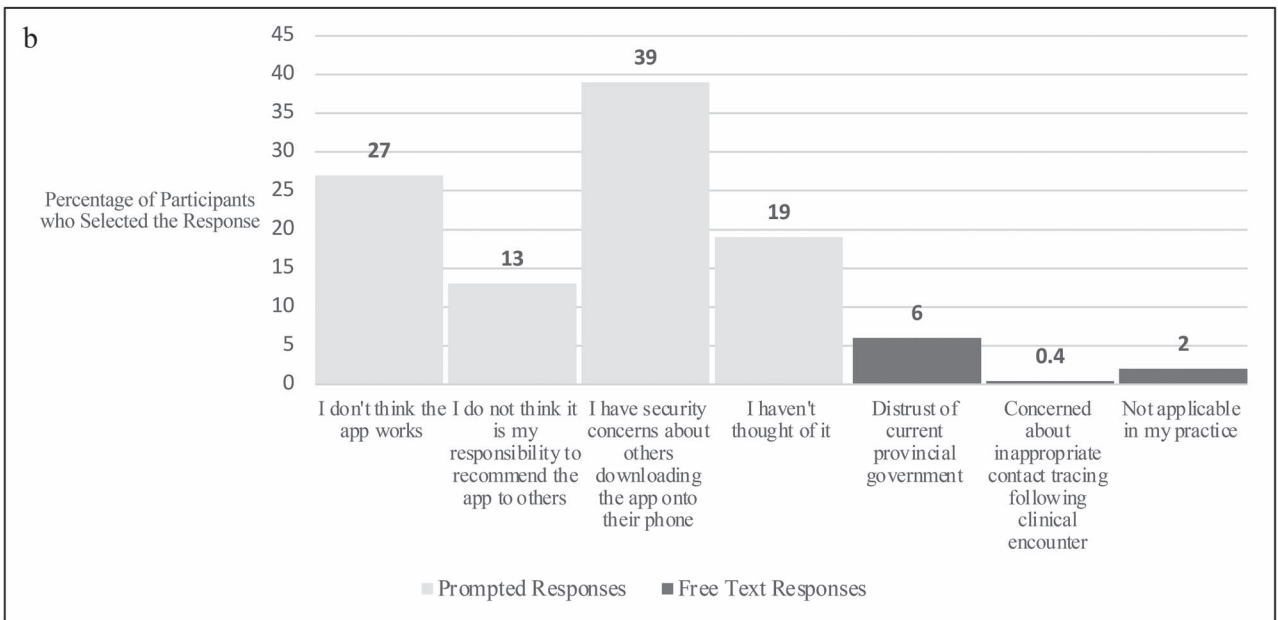
Responses to:
"If not, how likely are you to recommend the app in a clinical or professional context in the future?"

Fig. 1 Participant willingness to download and recommend the ABTraceTogether app, among participants who had previously heard about the app.

technology to recognize nearby devices running the app. More than 50% of participants correctly identified that downloaded information is only available to AHS staff, and that information is stored by the app for 21 days. Only a minority of participants (37%) were aware that information can only be downloaded off the app by the phone's user. The most commonly selected incorrect response was that the app can access GPS data (45%).



Responses to:
 "If you have not downloaded the app onto your own device, what are some reasons why? (Select all that apply)?"



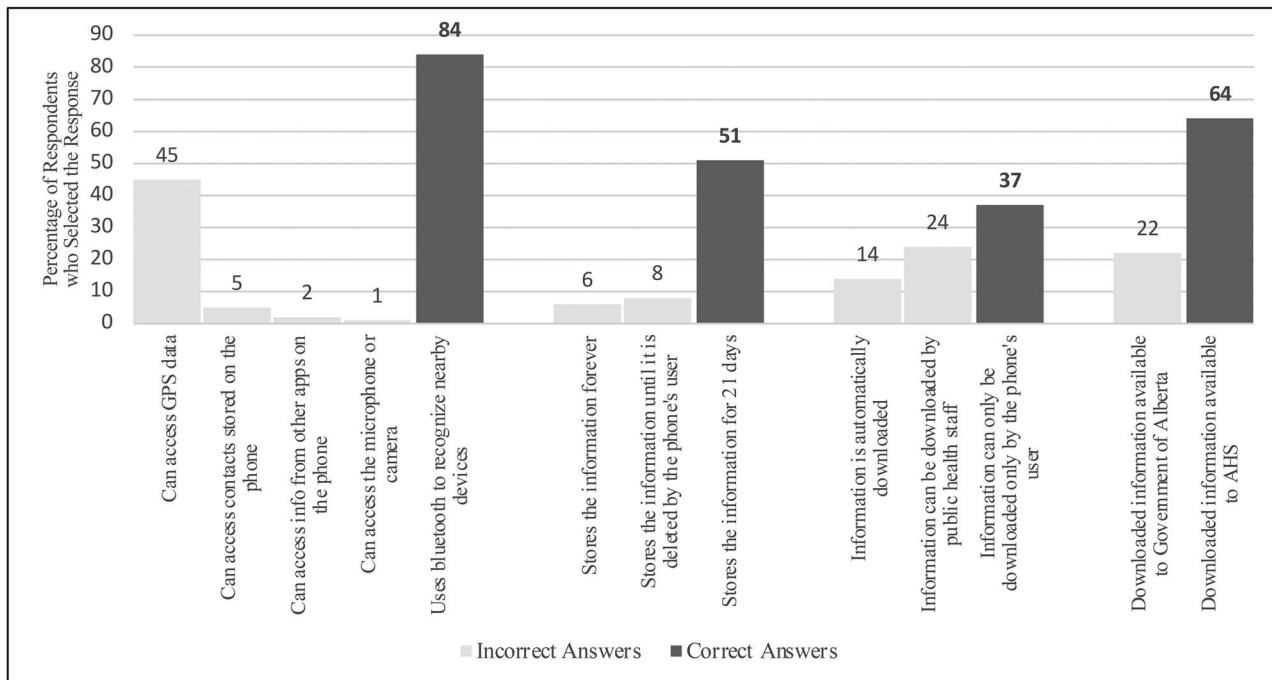
Responses to:
 "If you answered "No" to either question about recommending the app to others, what are some reasons why you have not recommended the app? (Select all that apply)?"

Fig. 2 Reasons why participants who were previously aware of the ABTraceTogether app did not download the app, or did not recommend the app to others.

Participants who did not previously know about the app

Responses from participants who did not previously know about the app prior to recruitment are summarized in Figure 4. Among these 11 participants, 3 (27%) reported

they were either 'extremely unlikely' or 'somewhat unlikely' to download the app in the future or recommend the app to a friend or family member. Four participants (36%) replied they were 'extremely unlikely' or 'somewhat unlikely' to recommend the app in a clinical or professional setting.



Responses to:

“Based off your understanding of the AB TraceTogether app, select all the statements below that you believe are correct.”

Fig. 3 Participants' understanding of how the ABTraceTogether app functions, among participants who had previously heard about the app.

Discussion

Main findings of this study

In our study, almost all (96%) participants surveyed were aware of the ABTraceTogether app. Only 27% of participants who knew about the app had recommended it in a professional or clinical setting. Participants who had not recommended the app to others were mostly unwilling to consider doing so in the future (Fig. 1). Our statistical analysis did not find any evidence of a significant association between age, gender, primary clinical zone or practice type and the likelihood that an individual would know about the app, download the app or recommend the app to others. This suggests that during future public health campaigns there may not be any benefit in developing messaging targeting specific demographic sub-groups of physicians. Physician-directed messaging may be most effective when addressed to the broader clinical community.

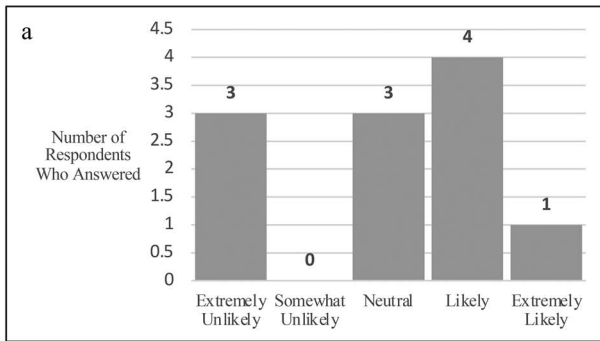
Among participants who had not recommended the app to others, 23% indicated that they did not think it was their responsibility to recommend the app, or they had not considered recommending the app (Fig. 2). This suggests that almost one-in-four clinicians in Alberta do not believe they have a professional obligation to promote a contact tracing effort during a global pandemic.

The most common reason reported for not downloading or recommending the app was security concerns about the app, followed by concerns that the app does not work. Participants demonstrated an overall accurate understanding of how the app functions, although 45% of participants believed that the app could access GPS data (Fig. 3). This suggests that physicians' belief in the effectiveness of a public health tool will strongly influence their willingness to use and promote the tool in their practice.

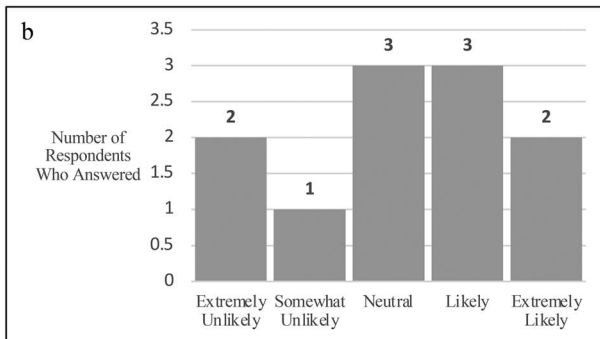
When asked why they would not download or recommend the app, the most common reason given by participants in addition to the prompted responses was ‘distrust of the current provincial government.’ This may be a reflection of the political disagreement between the Government of Alberta and the AMA, which escalated publicly in the months leading up to the release of the contact tracing app.¹⁴

What is already known on this topic

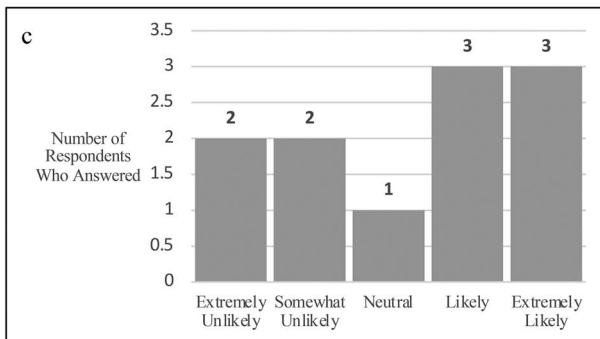
Contact tracing can be an effective method of controlling the spread of infectious diseases, and digital contact tracing effectively supplements traditional contact tracing methods.³ Previous research has observed higher participation rates by physicians in public health campaigns when physicians are



Responses to:
 "Based off the information above, how likely are you to download the app onto your own phone in the future?"



Responses to:
 "Based off the information above, how likely are you to recommend the app to a friend or family member in the future?"



Responses to:
 "Based off the information above, how likely are you to recommend the app in a clinical or professional context in the future?"

Fig. 4 Participant willingness to download and recommend the ABTraceTogether app, among participants who had not previously heard about the app.

engaged by the public health department 'early and often' and with physician specific materials.¹⁰

What this study adds

Our findings suggest that in the context of the SARS-CoV-2 pandemic, many physicians in Alberta are not participating in a digital contact tracing initiative and most physicians are

not promoting the digital contact tracing initiative within their clinical work. Almost one-in-four physicians do not recognize that they have a professional obligation to help engage the public in this public health campaign. Physicians also identified concerns about security or the effectiveness of the app as common reasons for not downloading or promoting the tool. These findings suggest future public health campaigns might benefit from targeted messaging for physicians that emphasize the responsibility physicians have to participate in public health efforts, and which inform physicians about the value of public health tools.

Our study also found that physicians will identify distrust in elected officials as a reason for not engaging in a public health campaign. The World Health Organization's Outbreak Communication Guideline states that building and maintaining trust is 'the overriding goal in outbreak communication' with the general public.¹⁵ This finding from our study suggests that trust may be an equally important factor in communication with health professionals and that event which impair trust in the government may impact the way in which physicians engage with public health campaigns.

Limitations of this study

The survey response rate of our full population survey was 2%. Our analysis shows the study participants were representative of the population in respect to age and practice type, but not in respect to gender or health zone. It is possible that a non-response bias influenced who participated in our study. Response bias may have influenced participants' answers, especially to questions about their future behavior. Our study was limited in its ability to explore participant motivation. The use of a list of suggested responses to questions about motivation may have influenced the participants' responses. Interviewing a subpopulation of study participants could have addressed this limitation of our study. The fitted models employed in this study may have been underpowered to assess the effect of the variables studied, due to response imbalance and the number of variables accounted for in the models, most notably in the first model.

Conclusion

The majority (96%) of physicians and medical students studied were aware of the ABTraceTogether app. Most clinicians, however, have not recommended the app in a professional or clinical setting. Clinicians are unwilling to promote public health tools that they believe are ineffective. Targeted communications that emphasize the importance of the clinician's role in public health promotion may increase physician participation in future campaigns.

Supplementary data

Supplementary data mentioned in the text are available to subscribers in *PUBMED* online.

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