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Title	Support for policy options to increase vaccination coverage in British Columbia, Canada: an electronic survey
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Reviewer 1	M. Angarone
Institution	Division of Infectious Disease, Northwestern University, Feinberg School of Medicine, Chicago, Ill.
General comments (author response in bold)	<p>I would like to thank Bettinger et al for allowing me to review their work regarding the assessment of peoples acceptance of vaccine policies in BC, Canada. The study has some interesting findings, including the overwhelming majority of respondents having a favorable view of vaccine and agreeing with vaccine policies. It is also interesting that few respondents supported punishment as a way to get people to comply with the policy.</p> <p>We thank Reviewer 1 for these compliments about our study.</p>
Reviewer 2	Lior Neshet
Institution	Division of Infectious Disease Institute, University of Texas Health Sciences Center, San Antonio, Tex.
General comments (author response in bold)	<p>This is an internet based convenience sample assessing the attitudes in the general population towards regulations of vaccines in school aged children. This is an important topic and it helps to shed light on the thought process and possibly suggest which action would be best in order to increase compliance with vaccines.</p> <p>I have a few reservations:</p> <ol style="list-style-type: none"> 1. The overall goal is to increase compliance with vaccinations through different policies, it is a pity that the authors did not address this issue more extensively in the discussion. <p>We have reworked the discussion section in order to fit the formatting requirements for CMAJ Open. Give the more restrictive word limits for this journal we have not been able to include an extensive discussion on this issue, but did try to address the reviewer’s comment a new second paragraph for our discussion.</p> <p>“This study is the first to examine the support for a variety of vaccination policy options and identify the contextual factors associated with this support in Canada. Public support is important for the success of vaccination policy, in order to minimize risks of unintended consequences due to population backlash, and public attitudes toward such policies can vary substantially depending on context. For example, while California’s recent revision of their school vaccination law (allowing only medical exemptions in public schools) appears to have been well-received by the majority, Italy has experienced substantial backlash to recent tightening of childhood vaccine policy (requiring more vaccines and imposing financial penalties).”</p> 2. There is another serious bias that was not addressed in the manuscript, since this was a convenience sample of people who fill out surveys online it does not sample many people who do not use the internet for such activities, people of

	<p>lower economic status who are less computer friendly and may also be against vaccinations and are under sampled in this cohort.</p> <p>We agree and thank the reviewer (and statistician) for highlighting this. We have reworked the limitations section of the discussion.</p> <p>“These findings need to be considered with respect to some limitations. First, our data are from a non-probability online panel. Using a volunteer sample may introduce selection bias, as those who participate may be different from non-participants. Also, an internet survey may under represent individuals of lower socio-economic status, who may have limited internet access, or lower computer literacy. Nevertheless, our sample was representative of the BC population by geography, gender, age and proportion of households with children. Further, the proportion in our survey who delayed or refused vaccines for their child was similar to population rates.”</p> <p>3. Table 3 is extremely busy, it can be simplified and shrunken down to a more easily comprehensible table with removal of many NS factors.</p> <p>Our original Table 3 showed results from 14 different multivariable models (one for each of the policies). It only included factors that were statistically significant in at least one of the models. However, we agree with the reviewer that it was a challenging table to read. Therefore we have divided the table into table 3a for information/services and requirement policies and table 3b for penalty and reward policies. This has allowed us to further simplify each of the tables and only retain those variables that remained statistically significant for the specific policies shown in each table.</p> <p>4. In conclusion, this is an important topic that may help influence policy makers.</p> <p>We thank Reviewer 2 for these constructive comments.</p>
Reviewer 3	Carolina Alfieri
Institution	Sainte-Justine Hospital, Research Centre, Montréal, Que.
General comments (author response in bold)	<p>The study by Bettinger et al investigated the public acceptability of a series of vaccine policy options in an effort to increase vaccine coverage rates so as to counter the decreasing trend in vaccine uptake. Incentive-driven recruitment of 1308 volunteer participants was performed by solicitation from a representative online database of British Columbia residents (oversampled for people living in households with children). Respondents were required to complete an online questionnaire that sought to survey attitudes towards 14 policy options regarding vaccination. Responses were analyzed using qualitative methods and robust Poisson regression analysis. Stratification by age, gender and other demographics was performed. Overall population findings were also presented for comparison.</p> <p>Specific comments:</p> <p>1. The study provides a meticulous analysis of the data gathered from the questionnaires. The results are in keeping with overall Canadian attitudes towards vaccination policies. Overall, the findings reveal that the vast majority of BC respondents (>80%) held favorable attitudes toward vaccination and support policies directed at improving information and services. Punitive policies were held in disfavor by the majority of respondents (>65%). This was evident among parent respondents and more generally. The authors state that their results are consistent with other studies performed elsewhere. Because there are in fact other studies on the topic, I suggest that the authors add a statement to the Discussion</p>

summarizing the uniqueness of their study.

We thank Reviewer 3 for these compliments on our paper and this helpful suggestion. We have added the following sentence to the second paragraph of the discussion (page 13):

“This study is the first to examine the support for a variety of vaccination policy options and identify the contextual factors associated with this support in Canada.”

2. It stands to reason that policies based on information provision would positively affect attitudes of hesitant parents towards vaccination and thus improve overall vaccine coverage. However, the manner in which educational information is delivered is also likely to impact vaccine coverage, as shown recently in a regional study performed in Québec’s Eastern Townships that tested the impact of “motivational interviewing” (PromoVaQ study, see Lemaitre T et al, Nov 2018). The manuscript’s Discussion section would be more complete if it included some reference to novel methods of information delivery.

We agree with Reviewer 3 that the manner in which education information is delivered is very important and have also followed with interest the work from Quebec. However, this topic is beyond the scope of our study. We do not evaluate the implementation or delivery of any of the policies we examine, but rather are measuring public and parental support and predictors for this support.

3. The authors surmise that any effort directed at improving vaccine coverage is unlikely to affect the attitudes of individuals who are outright adverse to vaccines. While I generally agree with this statement, I suggest that the authors speculate on the measurable impact of their positive policies (information/services and requirements). Specifically, if such policies are directed at the vaccine-hesitant group, it would be interesting to know what percentage of their respondents are “vaccine-hesitant” versus “vaccine-adverse”. In other words, it is important from a public health decision-maker perspective to gauge whether a campaign based on information provision is likely to lead to significant increases in vaccine coverage.

In terms of how many might be affected, we estimate that about 2-3% of parents in BC are ardent vaccine refusers, which means the remaining 15-20% of un- or underimmunized children have parents who are either vaccine hesitant or have access barriers to vaccination. Theoretically an effective information and service provision campaign could increase rates by as much as 15-20%. We have added the following sentence to the third paragraph of the discussion.

“In 2017, approximately 74% of two-year old children were up-to-date for all vaccines with just 2% completely unvaccinated, leaving 24% partially vaccinated (21). Implementation of a successful policy to improve vaccination would most likely focus on this 24%, providing information to those who are hesitant and services to those with access barriers.”