1-1-2021

Deliberation on Childhood Vaccination in Canada: Public Input on Ethical Trade-Offs in Vaccination Policy

Kieran C. O'Doherty
University of Guelph

Sara Crann
University of Guelph

Lucie Marisa Bucci
Canadian Public Health Association

Michael M. Burgess
The W. Maurice Young Centre for Applied Ethics

Apurv Chauhan
University of Guelph

See next page for additional authors

AJOB Empirical Bioethics

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/uabr21

Deliberation on Childhood Vaccination in Canada: Public Input on Ethical Trade-Offs in Vaccination Policy

Kieran C. O'Doherty, Sara Crann, Lucie Marisa Bucci, Michael M. Burgess, Apurv Chauhan, Maya J. Goldenberg, C. Meghan McMurtry, Jessica White & Donald J. Willison

To cite this article: Kieran C. O'Doherty, Sara Crann, Lucie Marisa Bucci, Michael M. Burgess, Apurv Chauhan, Maya J. Goldenberg, C. Meghan McMurtry, Jessica White & Donald J. Willison (2021) Deliberation on Childhood Vaccination in Canada: Public Input on Ethical Trade-Offs in Vaccination Policy, AJOB Empirical Bioethics, 12:4, 253-265, DOI: 10.1080/23294515.2021.1941416

To link to this article: https://doi.org/10.1080/23294515.2021.1941416

AJOB EMPIRICAL BIOETHICS
2021, VOL. 12, NO. 4, 253–265
https://doi.org/10.1080/23294515.2021.1941416

Deliberation on Childhood Vaccination in Canada: Public Input on Ethical Trade-Offs in Vaccination Policy

Kieran C. O'Doherty[a], Sara Crann[a], Lucie Marisa Bucci[b], Michael M. Burgess[c], Apurv Chauhan[a], Maya J. Goldenberg[d], C. Meghan McMurtry[e], Jessica White[a], and Donald J. Willison[f]

[a]Department of Psychology, University of Guelph, Guelph, Ontario, Canada; [b]Immunize Canada, c/o Canadian Public Health Association, Ottawa, Ontario, Canada; [c]W. Maurice Young Centre for Applied Ethics, The University of British Columbia, Vancouver, British Columbia, Canada; [d]Department of Philosophy, University of Guelph, Guelph, Ontario, Canada; [e]Department of Psychology, University of Guelph, Guelph and Pediatric Chronic Pain Program, McMaster Children's Hospital, Hamilton, Ontario, Canada; [f]Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, Ontario, Canada

ABSTRACT

Background: Policy decisions about childhood vaccination require consideration of multiple, sometimes conflicting, public health and ethical imperatives. Examples of these decisions are whether vaccination should be mandatory and, if so, whether to allow for non-medical exemptions. In this article we argue that these policy decisions go beyond typical public health mandates and therefore require democratic input.

Methods: We report on the design, implementation, and results of a deliberative public forum convened over four days in Ontario, Canada, on the topic of childhood vaccination.

Results: 25 participants completed all four days of deliberation and collectively developed 20 policy recommendations on issues relating to mandatory vaccinations and exemptions, communication about vaccines and vaccination, and AEFI (adverse events following immunization) compensation and reporting. Notable recommendations include unanimous support for mandatory childhood vaccination in Ontario, the need for broad educational communication about vaccination, and the development of a no-fault compensation scheme for AEFIs. There was persistent disagreement among deliberants about the form of exemptions from vaccination (conscience, religious beliefs) that should be permissible, as well as appropriate consequences if parents do not vaccinate their children.

Conclusions: We conclude that conducting deliberative democratic processes on topics that are polarizing and controversial is viable and should be further developed and implemented to support democratically legitimate and trustworthy policy about childhood vaccination.

KEYWORDS
Childhood vaccination; immunization; public deliberation; non-medical exemptions; vaccination policy; value trade-offs

Introduction

Policy about childhood vaccination requires consideration of multiple, sometimes conflicting, public health and ethical imperatives. The way in which policy decisions are reached in light of competing imperatives is in part a function of how competing values are traded off against each other. This is evident, for example, in differences across jurisdictions on key issues such as whether vaccination for certain conditions is required and what kind of incentives and disincentives for vaccination are applied. Similarly, in jurisdictions that require vaccinations, competing values need to be considered in policy decisions about whether non-medical exemptions are permitted and what the consequence are for non-vaccination in the absence of permitted exemptions.

Scholarly literature that deals with the topic of vaccination decisions has tended to focus on the notion of vaccine hesitancy, which has been defined as "delay in acceptance or refusal of vaccination despite availability of vaccination services." Moreover, "[v]accine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence."(MacDonald 2015, 4163) In that context, vaccine hesitancy is conceptualized as a public health risk in its own right (WHO 2019; Williamson and Glaab 2018) and the focus of research and practice is on individuals' decision to vaccinate (or not), and how those individuals who refuse vaccinations or are hesitant about vaccination can be persuaded to have

CONTACT Kieran C. O'Doherty odohertk@uoguelph.ca Department of Psychology, University of Guelph, 50 Stone Road East, Guelph, ON N1G 2W1, Canada.

Supplemental data for this article can be accessed on the publisher's website at https://doi.org/10.1080/23294515.2021.1941416.

themselves and their children vaccinated according to recommended schedules. Policy about vaccination, then, is seen as one element in achieving the goal of high vaccination uptake across a population.

The social and psychological factors that have been associated with vaccine hesitancy and refusal vary contextually, but include alternative conceptions of health; religious convictions against medical interventions; distrust of government agencies and the healthcare system; and needle fear (AAAS 2014; Taddio et al. 2012). Some commentators point to the lack of scientific evidence for positions against vaccination and respond, with differing levels of vehemence, with calls for combatting anti-vaccine advocates and removing anti-vaccine messaging and discourse from public forums (Caulfield, Marcon, and Murdoch 2017; Benecke and DeYoung 2019; Hotez 2020). These calls are in line with common public health strategies in which vaccine hesitancy is implicitly understood to be a result of insufficient or inaccurate information about vaccines and the diseases against which they are meant to protect (Brunk 2017). Goldenberg (2016, 2021) challenges the view that vaccine hesitancy and refusal are the result of misunderstanding or ignorance, but rather are associated with a lack of trust in the sources of information claiming benefits and safety of vaccination (see also May 2017; Williamson and Glaab 2018). The field of public health ethics, in particular, has been dedicated to identifying, clarifying, and specifying public health principles and frameworks that pertain to vaccine policy (Lantos, Jackson, and Harrison 2012; Opel and Diekema 2012). At the same time, a number of qualitative and theoretical studies go beyond viewing vaccine hesitancy as the sole problem to be addressed, and instead seek to develop richer understanding of people's views on vaccination and the social contexts in which vaccination decisions are made (e.g., Wiley et al. 2020).

Given that decisions about vaccination policy require balancing of competing imperatives, that multiple legitimate solutions are available (as evident from jurisdictional variation in policies), and that there is disagreement among citizens and experts within jurisdictions, it can be argued that societal decisions about vaccination are primarily a social policy, rather than a public health problem (O'Doherty, Smith, and McMurtry 2017).

Goldenberg (2021) and others therefore call for greater public participation in different aspects of policies relating to vaccination. To date the realization of these participatory goals has been limited. There are some examples of public engagement processes in which ethical and practical problems related to vaccination policy have been implemented. For instance, two studies conducted in South Australia convened citizen juries to solicit public input on the questions: "Under what circumstances should adolescent immunisation programs be delivered in schools?", "How can we best enhance the School Based Immunisation Program?" (Marshall et al. 2014), and "What criteria should we use to decide which vaccines for young people in Australia should receive public funding?" (Parrella et al. 2016). The authors of the studies note the value of incorporating the views of those most affected by particular policies in the development of those policies. They also note that such involvement is likely to lead to greater overall support of the policies. Another example is a public engagement activity conducted in the US in 2009 on H1N1 influenza vaccination policy and hosted by the CDC and the Department of Health Human Services and other local, state, and federal agency involvement (The Keystone Center 2009). The purpose of the engagement process was to gain public input to inform decisions relating to the H1N1 vaccination program, though the organizers also anticipated that the process would lead to increased support for policy decisions, empowerment of citizens to participate in other policy decisions, and greater public trust.

To summarize, public health ethics and qualitative approaches to understanding vaccination decisions point to the complexity of factors that need to be addressed to make good policy decisions about vaccination. Given that such policy decisions involve multiple (sometimes competing) values, that they affect all members of a society, and that they require individuals to trust public health interventions, it is necessary to commit to creating carefully designed conversational spaces of members of the public to learn about the issues, carefully consider them and weigh opposing perspectives, and provide their collective input to policy debates.

Public deliberation

Deliberative democracy is a political philosophy that posits that societal decisions should arise from the engagement of lay citizens in democratic processes. Such processes should involve the respectful exchange of reasons to justify collective decisions (Gutmann and Thompson 2004). Gutmann and Thompson (1997) argue that although it is inevitable that people have disagreements, it is possible for diverse members of a society to deliberate with mutual respect for each other toward the overall improvement of society. The

challenge is to develop mechanisms that allow diverse publics to reflect on a controversial topic and for diverse opinions and positions to be integrated into policy advice. Public deliberation is thus an instantiation of deliberative democratic principles and has been defined as "a form of public discussion that seeks collective solutions to challenging social problems" (Blacksher et al. 2012, 2). "Deliberation" refers to a specific kind of discussion that aims to produce informed collective opinions. These opinions should be based on interactions between participants in which there is an iterative exchange of talking and listening. Participants are provided with relevant information on the topic; they talk and listen to each other; they provide reasoning for their statements; and they are in principle willing to revise their opinions based on new information and the perspectives of co-deliberants (Chambers 2003; Blacksher et al. 2012; O'Doherty and Stroud 2019). Participants collectively weigh advanced positions, consider their likely consequences and, ultimately, work toward collective policy recommendations (Chambers 2003). During discussion, it is expected that individuals shift from expressing individual opinions to working toward collective positions that ideally accommodate a range of different individual perspectives. Although deliberants work toward collective positions, clearly articulated persistent disagreements are also valuable outcomes as this often allows for the development of deeper insights about underlying value conflicts.

The purpose of public deliberation is to enhance the democratic legitimacy of societal programs, actions, and decisions. This is achieved by creating formal spaces for dialogue in which contested issues are discussed, taking into account available evidence and diverse perspectives on the topic. When used as a social scientific method (see O'Doherty and Stroud 2019) public deliberation has several attributes that make it an attractive method to help address complex and controversial topics, in contrast to other social science methods, such as surveys, interviews, and focus groups. Public deliberation is particularly suited to facilitating dialogue when there are competing societal norms or values. There has been increasing attention to public deliberation as a method for addressing policy needs in relation to science and technology, in which there are value tradeoffs that need to be considered in associated policy (Burgess 2014; Guston 2014; Stilgoe, Lock, and Wilsdon 2014). Public deliberation in this context allows groups of lay citizens to come to collective positions that incorporate relevant scientific evidence as well as in-depth consideration of diverse societal perspectives relevant to making these value tradeoffs. Conducting public deliberation on vaccination is thus not intended in the first instance to convince individuals to vaccinate. Rather the aim is to create a mechanism for public input on contentious issues relating to vaccination, where this input is informed and sensitive to diverse societal values and perspectives. Williamson and Glaab (2018) point out that public deliberation on vaccination policy is in line with a wider deliberative turn in health and with WHO commitments to people having rights and duties to participate collectively and individually in debates on issues that have an impact on their health. Williamson and Glaab (2018), also point out, however, that deliberative approaches to vaccination are currently underdeveloped. The current study seeks to address the need for greater public dialogue and involvement in policy questions relating to childhood vaccination in Ontario, Canada. Our intent was to explore the value of conducting public deliberation on vaccination to enable reasoned debate, and lay the groundwork for a better informed public health approach to implementing childhood vaccination programs.

Methods

Participant selection

The aim of participant selection was to convene a diverse group of residents from Ontario. The process was guided by the theoretical concept of a mini-public (Goodin and Dryzek 2006). The group of deliberants needs to be sufficiently small to allow for meaningful in-person group conversations. This prohibits recruitment for statistical representativeness of the Ontario population (Longstaff and Burgess 2010). However, it is possible to select a small sample that is demographically stratified to maximize diversity. For the Ontario Vaccine Deliberation we aimed to recruit 25 participants to represent the diversity of residents in Ontario both in terms of demographics and opinions about childhood vaccination.

Invitation letters were sent to 5000 randomly selected households across Ontario obtained from a mailing list purchased from a private company (see Supplementary File 1). Destinations of letters were stratified across regions within Ontario to ensure representation from across the province. The letters contained information about the event and public deliberation in general, and explained that participants would have the opportunity to contribute to discussions about childhood vaccination and develop recommendations that would be conveyed to policy

makers. The letter invited respondents to express their interest in taking part in the deliberation process, though only one member per household was eligible to participate. Individuals over the age of 18 who were interested in participating were invited to complete a series of demographic questions (online or by phone) and a modified vaccine hesitancy scale (Opel et al. 2011). Responses to these letters of invitation constituted the pool from which participants were selected to participate. Participants were selected from this pool at random to be demographically stratified (across gender, education level, occupation) and represent diversity on perspectives on vaccination. Respondents who currently or previously worked in the medical field or alternative medicine were not invited to participate to avoid deliberation being "captured" by expert perspectives. Although experts were excluded from participation in the deliberation, experts were involved in providing information to the deliberants (see below) (MacLean and Burgess 2010). In addition, we sought to represent diversity of opinions on vaccination in the group of deliberants. Since the number of individuals opposed to vaccination is estimated to be 2-3% of the Canadian population (Dubé et al. 2016, 2018), we could not rely on random sampling from our pool to ensure diversity of opinion, and we applied a filter to ensure the presence of at least two deliberants opposed to vaccination. We over-recruited to 29 participants overall and over-recruited individuals opposed to vaccination to four to account for possible attrition and "no-shows".

83 respondents registered their interest in taking part in the deliberation. 29 participants were selected from the pool of interested individuals and invited to participate in the deliberation. 27 participants attended the first day of the deliberation, and 25 participants completed both weekends of the event (one participant became ill on the second day of deliberation and one had a family emergency). Participant demographics are presented in Table 1. Participants received $100 per day of attendance. This project was approved by the Research Ethics Board of the University of Guelph.

Table 1. Participant demographics from the Ontario Vaccine Deliberation.

Demographic	N
Sex	
Female	14
Male	11
Age	
18-24	2
25-34	2
35-49	6
50-64	8
65+	7
Marital Status	
Single	4
Separated/Divorced	2
Married/Common Law	19
Ethnicity (open-ended, self-identified)	
White/Caucasian/UK	15
Canadian	2
French-Canadian	1
Italian Canadian	1
Macedonian	1
Chinese Canadian	1
Asian-Canadian	1
Greek	1
Ukrainian-Canadian	1
Slavic	1
Parenthood Status	
Children aged 0-10	5
Children aged 11+	15
No children	5

Note: Participants were provided with a free-form response for ethnicity. In order to prevent mischaracterization of self-reported ethnicity, demographics have been reported as recorded by participants.

Information provision

Two weeks prior to the beginning of the event, participants were mailed an information booklet that was designed to provide accurate, unbiased information about public deliberation and childhood vaccination (https://osf.io/t54e2/), written by members of the research team. Because of the contentious nature of the topic, efforts were made to ensure that the information was balanced and nonpartizan. To achieve this, the booklet contained both technical information about vaccines and vaccination policy, as well as discussion about diverse societal positions on vaccination. Our presentation the information in the booklet followed Friedman's (2007) suggestion of framing issues "for deliberation" rather than framing them "to persuade." The booklet included information on the history of vaccination, controversies surrounding childhood vaccination, current vaccine requirements and exceptions for school-aged children in Ontario, reasons for vaccine hesitancy, and various perspectives on vaccination, including public health, complementary and alternative medicine, and scientific views. The booklet also included information on vaccine production and approval, Adverse Events Following Immunizations (AEFIs) and vaccine injury compensation. Participants were encouraged to read through the booklet, discuss the information with friends and family, and refer to the booklet for information throughout the process of the deliberation.

During the first day of the public deliberation, participants were provided with more information by expert speakers. To avoid a partisan framing of the deliberation, speakers were chosen to reflect diverse key societal positions and interests on childhood vaccination, as well as critical technical information. This

included speakers on the topic of public health; complementary and alternative medicine; vaccine testing and safety; parental perspectives; and philosophical and historical perspectives on vaccination (see supplementary materials for summaries of speaker presentations). Participants were also told that they could ask for additional information on the topic, and the research team would seek this information out and present it to the group on subsequent days.

Deliberation structure

The deliberation took place over four days (two non-contiguous weekends). The deliberation was structured through plenary (large group) and small group break-out sessions to maximize available speaking time for participants. Sessions were moderated by trained facilitators (one highly skilled academic facilitator hired for the deliberation moderated the large group discussions; co-investigators and grad students who were members of the research team moderated small groups). The deliberation was structured around five questions, each with several sub-questions. These questions guided the small and large group discussions over the four days. For each question participants first deliberated on the topic in depth within their small groups and then worked toward collective positions as a large group on specific issues that arose from the small group discussions. The deliberative discussion structure is illustrated in Figure 1. The schedule from the Ontario Vaccine Deliberation is detailed included in Supplementary File 2.

The first four questions were determined in advance of the deliberation by the research team. Participants had an opportunity to consider the questions as a group and suggest whether certain questions be changed or reworded to best capture the collective opinions of the deliberating group.

1. How should vaccine policy respect parents' responsibilities to their children while reducing risk to other people?
2. Should certain childhood vaccinations be required in Ontario?
3. How should information about vaccination and vaccination policy be communicated?
4. What are appropriate responses when an adverse event related to a vaccination is reported?

On the third day, participants were encouraged to develop questions that they felt had not been adequately addressed thus far in the deliberation. In line with previous deliberative events (e.g., RDX [O'Doherty et al. 2013]), this allowed participants to shape part of the deliberation questions and thus avoided the problem of the researchers missing important issues in the overall framing of the deliberation. Participants selected three additional questions for discussion:

1. What exactly do we mean when we say vaccination should be mandatory?
2. What restrictions on unvaccinated children are justified?
3. How should we provide parents with all of the relevant vaccine information?

Days two and three were focused on deliberating the deliberation questions as follows: discussing the issue, crafting statements that reflected collective positions, voting on each statement, and providing reasoning for each statement. More specifically, participants first discussed the issue(s) addressed in the question in their small groups of five to eight fellow participants (randomly selected). Following small group discussions, participants convened as a large group to further discuss the issues identified in the small group discussions and work toward collective positions of the group. The points of discussion were formulated into preliminary statements by the facilitator and the group worked together to edit the

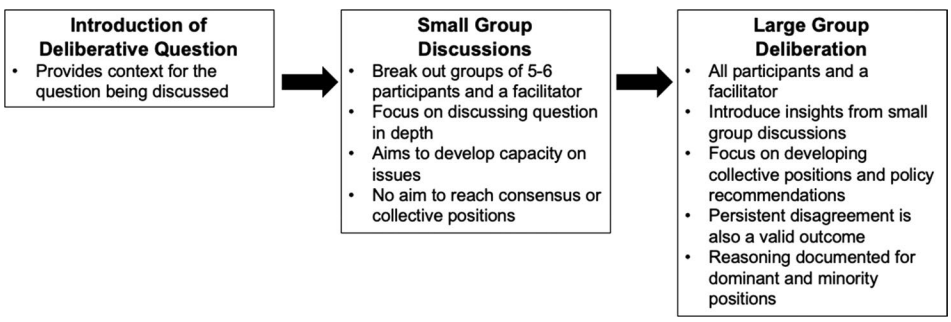

Figure 1. Deliberative discussion structure.

statement until it represented a collective position. Next, participants individually voted on the statement(s) by indicating they were either for or against the statement. Participants could also choose to abstain from voting for a particular statement. When reasoning was not implicit in the statement, participants were asked to provide reasoning for their position.

Day four was focused on summarizing the group's recommendations and engaging in a ratification process to ensure all recommendations were captured accurately. This final ratification vote captured and took into account participants' changing perspectives on childhood vaccination as a result of the deliberation process. The Ontario Vaccine Deliberation concluded with a panel of experts who work in research, practice, and policy related to childhood vaccinations. This panel allowed for the experts to hear the recommendations produced by the group and for discussion between the experts and the participants. After both the first and second weekend of the event, participants completed an event evaluation feedback form that asked participants about how they felt the goals of the event were met, whether they felt respected throughout the process, the success of the event, to rate different elements of the weekend, and if they had any recommendations for changes. An overview of the deliberative event structure is illustrated in Figure 2.

Deliberative outputs

The Ontario Vaccine Deliberation resulted in 20 recommendations (or deliberative outputs), that reflect the collective decision making of the deliberants. Deliberative outputs are explicit collective statements that arise from the deliberative process that convey a particular position or policy preference (O'Doherty 2013). Deliberative outputs can be differentiated from other results from deliberative processes that are the result of additional analysis, quantitative or qualitative (i.e., analytical outputs). For instance, conducting a thematic analysis on transcripts of the deliberation would yield interesting insights, but we do not report on such analyses here as we confine ourselves to reporting statements that were collectively and explicitly considered by deliberants themselves during the course of the deliberation. In line with expectations for engagement in a deliberative process, some participants changed their position about the issues being discussed throughout the four days of deliberation as they became aware of new information or were convinced by arguments made by their fellow participants. Collective positions were articulated when particular recommendations were voted on. There was an explicit opportunity for participants to change their individual position on a recommendation during the ratification phase of the deliberation, and a final opportunity to change their votes after the expert and policy panel on the last day of the deliberation. At that point, the collective positions were "locked in" and it is these deliberative outputs that are reported here. At no point did the organizers of the event or the facilitators of the discussions attempt to guide participants' recommendations in any particular direction.

Limitations

Based on previous public deliberation projects, we anticipated that our invitation to 5000 random households would yield 150-250 positive responses. Instead, we only received 89. At the same time a very large number of letters were returned to us by the postal service because they could not be delivered owing to an incorrect address or the person listed not residing at the address. While we anticipated some not deliverable letters owing to people changing their place of residence, we believe that the very high number of returned letters was a result of errors in the list of random households that was procured for the project

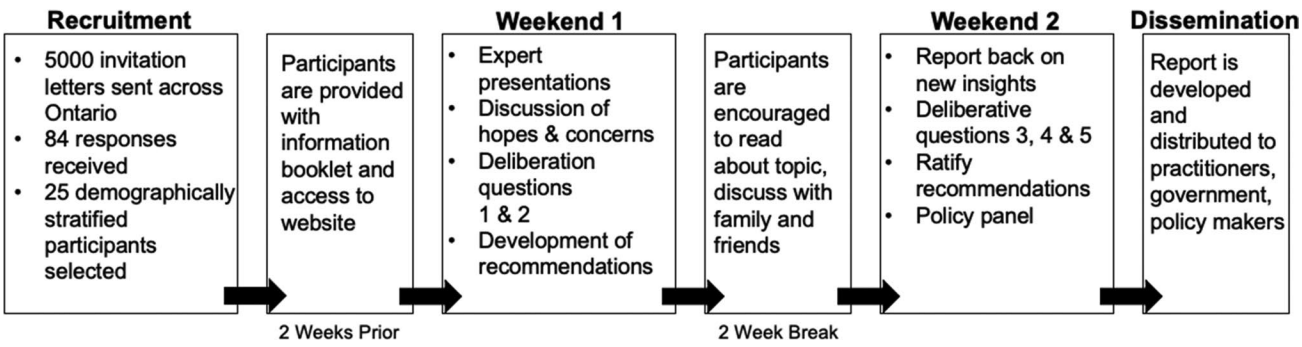

Figure 2. Overall structure of deliberative process.

from a private company. As a consequence, the diversity of the pool was not as high as we would have liked and, thus, the final sample was not as diverse as we would have liked. In particular, we did not have as many young participants and racialized participants as we would have liked. To address this problem, future studies can implement any of the following strategies: 1) increase the initial mail out to 10,000 households, 2) conduct additional recruitment targeted at groups known to be under-represented in deliberative processes.

Results

Below, we report all 20 deliberative outputs, organized thematically to facilitate interpretation. Each deliberative output is presented with reasoning given by participants at the time of the vote. Both the recommendation that was voted on and the key reasons that participants gave in support or against the recommendation were projected onto a screen during the deliberation to facilitate the collective and inter-subjective process of deliberating toward a civic minded policy solution. The reasons given by participants are reported below, with only minor grammatical and stylistic corrections. In some instances, the reasoning was implicit in the recommendation, and participants did not provide further reasons. In contrast to other forms of qualitative research, we do not present quotes, as we restrict ourselves here to reporting collective outputs of the deliberation, rather than individual responses. In instances where individual participants disagreed with recommendations, this is noted and individual reasons are provided (though, again, we report reasons that were publicly documented during the deliberation process, rather than extracting quotes from the transcript). Table 2 shows all final recommendations, reasons, and votes.

Discussion

Much public discourse on childhood vaccination is adversarial: pro-vaccine advocates lament the perceived ignorance of "anti-vaxxers" and individuals with concerns about vaccines accuse pharmaceutical companies of putting profits before people and misleading public health advocates and members of the public. This environment makes it difficult for Canadian parents to make informed decisions about vaccination with confidence that they are acting in the best interest of their children. An adversarial environment also makes it difficult for public health officials and policy makers to engage meaningfully and sincerely with the broader public about concerns relating to childhood vaccination.

The Ontario Vaccine Deliberation is distinctive in that it constituted a forum for members of the public to become informed about the issues, engage with each other and share diverse perspectives, and work toward collective conclusions. It is the only deliberative public engagement conducted on the topic of childhood vaccination to date in Canada. Although the Ontario Vaccine Deliberation does not have a formal mandate to influence policy, the recommendations it produced have strong democratic legitimacy as they represent the considered and informed reflections of a diverse group of Ontarians on issues relating to childhood vaccination.

In interpreting the outcomes of the Ontario Vaccine Deliberation, it is important to take into account several considerations. First, the recommendations of the forum are the outcome of several days of in-depth deliberation. These recommendations therefore represent the considered reflections of a diverse subset of the Ontario public; they are not a snapshot of the opinions of the general public on vaccination. Second, although forum participants were briefed about the current policies relating to childhood vaccination in Ontario, they were asked to deliberate about the issues from first principles, irrespective of the current policy context in Ontario. Third, although each deliberation question was approached with the goal of reaching consensus on a particular recommendation or position of the forum, a clear articulation of disagreement was also recognized as an important outcome. In particular, when disagreement on an issue persisted after sharing perspectives and considering issues from multiple points of view, this was seen to be valuable information that pointed to deeply held value differences in the broader Ontario public. Finally, vote counts need to be interpreted with care. The purpose of the voting was primarily as a tool for the facilitator to accurately gauge agreement and disagreement with collective propositions (Moore and O'Doherty 2014). After calling for a vote, the facilitator was able to identify individuals who disagreed or abstained and invite them to explain their position. This often led to refinement and reformulation of recommendations, and at other times helped articulate points of persistent disagreement. In some cases, abstentions and votes against a recommendation were based on modest differences (e.g., wording), with these participants still being in overall agreement with the direction of the recommendation. In the event evaluation form

Table 2. Ontario Vaccine Deliberation Recommendations.

Recommendation	For		Against		Abstain	
	Votes	Reasoning	Votes	Reasoning	Votes	Reasoning
Mandatory Vaccinations and Exemptions						
With certain exemptions, parents, legal guardians, and/or custodians have the responsibility to the health of the larger community through vaccinating all of their children.	24	• Parents should consider the effect of their child's vaccination on the health of the larger community	0	N/A	1	
Childhood vaccination must be mandatory for all children in Ontario, with some exemptions.	25	• The impact of diseases in the past without vaccination • We should follow government and public health requirement of vaccinations • The cons of vaccinating do not outweigh the pros	0	N/A	0	N/A
By mandatory, we mean that children who are not vaccinated and without valid exemptions shall be excluded from school and other organized activities.	17	• We have a responsibility to protect ourselves and society • Organized programs may require vaccination	4	• Exclusion is unfair to children • An outbreak is the only justification to exclude • Infringes on the Education Act, and the right to go to school	3	• Excluding children could impact their right to an education • Possible talents may go unrecognized
Exemptions for childhood vaccination are granted for medical reasons	25	(based on reasons given above)	0	N/A	0	N/A
Acceptable grounds for exemptions from childhood vaccination includes conscience or personal beliefs.	5	(based on reasons for supporting mandatory vaccination)	16	• Exemptions must be based on medicine and science	4	• Inadequate knowledge about conscience and personal beliefs
Conscience and religious beliefs are NOT acceptable exemptions from childhood vaccination.	16	• Exemptions must be based on medicine and science	5	(reformulation of previous statement to ensure clarity)	4	• Inadequate knowledge about conscience and personal beliefs
Exemptions from vaccinations are granted on religious grounds.	6	• Respect religions with concerns about vaccination • Canada, a diverse and tolerant country, can accommodate vaccine exemptions on religious grounds	11	• Keep religion out of societal decisions • Religion and science do not mix • We do not allow religious exemptions for acts such as drunk driving or texting and driving	8	• Inadequate knowledge about conscience and personal beliefs • Religious beliefs similar to personal beliefs • Should not tell people what to believe • "are" is not a recommendation
Parents or legal guardians should not be subject to incarceration if they choose not to vaccinate their children.	21	• Incentives could be used instead • Incarceration hurts families • The consequences should fit the act; not vaccinating should not be associated with jail • Need to have graduated consequences before jail.	4	• It would be up to the courts to decide appropriate penalties • Jail is for noncompliance with the law • Jail could be one of several possible consequences	0	N/A
Parents who do not have their children vaccinated, nor receive an exemption, shall face graduated consequences (e.g., warnings, mandatory education, and fines).	18	• If you break the law, there should be consequences • Policymakers should choose the consequences • There should be consequences if your actions affect somebody else	6	• Good persuasion of parents would mean no need for consequences • Warnings alone will not be effective • Exclusion from school and organized activities sufficient • High cost of other consequences • Homeschooling is sufficient disincentive	1	• Concern about the strength of the wording of the recommendation • Recommendations should focus on encouraging uptake and not developing consequences
Communication about Vaccines and Vaccinations						
Ontario should provide a method of communicating publicly available information about childhood vaccination through multiple channels.	25	• Use attractive, non-coercive pamphlets when health card renewed • Clear and simple information to reach multiple education levels	0	N/A	0	N/A

Table 2. Continued

Recommendation	For		Against		Abstain	
	Votes	Reasoning	Votes	Reasoning	Votes	Reasoning
Information about childhood vaccination should be provided to parents during pregnancy and after the birth of their child.	25	• Provide information before the birth of the child because post-birth is stressful • Enable parents to decide early	0	N/A	0	N/A
Information about vaccination should be included throughout the school curriculum.	25	• Children tell their parents what is happening at school, educating both groups	0	N/A	0	N/A
Information provided should be scientific and unbiased, addressing the risks, benefits, and concerns of childhood vaccination	24	• Important to include the risks of vaccination in information provision, people are more likely to trust information that presents all angles	0	N/A	1	• The information should also include detailed data and analysis about how particular risks were calculated
Information about vaccine safety and effectiveness that comes from multiple peer-reviewed scientific studies is better than information from other sources.	23		1	• Other information, such as personal experiences, can be just as valuable	1	• Personal experiences, tradition and religious beliefs can be more powerful information
Public Health needs to think outside the box in communicating pro-vaccination messages and focus on social media, multi-media, advertising in public spaces, advertising in health professional offices, and other relevant educational outlets.	24	• Public Health should utilize social media and other easily accessible venues of information provision used by Vaccine-hesitant groups • Brochures and websites are not sufficiently effective	0	N/A	1	
AEFI Compensation and Reporting						
Serious *life-altering* adverse events from vaccination leading to diminished capacity should be compensated.	23	• Hard for participants to define, but could be further developed by policy makers	1	• "Serious" covers every form of adverse event	1	
A fund should be established with contributions from both the pharmaceutical industry and the government to compensate individuals who experience an adverse event following immunization (AEFI).	25		0	N/A	0	N/A
All AEFIs must be reported to the Public Health Unit by the medical professional to whom the incident was reported.	24	• It is important that Public Health receives all reports of AEFI's • Doctors may not report AEFI's they believed are not serious	1	• Parents should also be able to report incidents to Public Health	0	N/A
There must be follow-up by a health professional with a copy of the report sent to the parent following the report of an AEFI.	17	• Parents need to know that AEFI's are being reported and documented • Could be something as simple as an email that report was received • Ensuring a follow-up was sent to the parent, could protect against concerns in the greater public that AEFI's were not being taken seriously	5	• The healthcare system is already strained and following up may take a lot of work on the part of the doctor • The patient could go back to the doctor if they had more concerns • AEFI's are generally serious, so the reporting to the parent would already be in place	3	• Follow-up is an ambiguous term, and the deliverable should be identified • Not all AEFI's require follow-up, only those reported to a doctor
There should be a national strategy for reporting and data collection relating to vaccination uptake, exemptions, and AEFIs. The provinces and territories should be incentivized to share all relevant data.	24 (1 participant left early)		0	N/A	0	N/A

completed after weekend one, all participants indicated that they felt they were respected in both the large and small group environments and were able to express their positions freely.

The deliberative forum unanimously supported making childhood vaccination mandatory. This conclusion is particularly important in light of the fact that participants were chosen to reflect a diversity of opinions on vaccines, and participants explicitly considered promotional materials against childhood vaccination. Deliberants who had doubts about vaccines became convinced over the course of the deliberation of the soundness of public health advice for vaccination, as reflected most notably in the votes for Recommendation 2 (*Childhood vaccination must be mandatory for all children in Ontario, with some exemptions.* Supported by all 25 participants). However, there was persistent disagreement on the issue of what kinds of exemptions should be permitted. In particular, deliberants were divided on the issue of whether personal beliefs or religious convictions should be considered valid grounds for granting exemptions from vaccination. Most deliberants concluded that religious beliefs or personal beliefs should not be accepted as grounds for exemptions. However, a small number of deliberants who themselves would not make use of such exemptions felt strongly that such allowances should be made in Canadian society. We believe that this is an indicator of the success of the deliberation in that participants argued for positions that transcended their direct personal interests on the matter. We also feel that this is an important aspect of the conclusions of this public forum that should continue to be acknowledged in vaccination policy in Ontario: in spite of unanimous recognition of the health benefits of childhood vaccination, and in spite of recognition of the importance of high vaccination rates, a significant proportion of the forum maintained the position that individuals must have the right to exemptions based on religious and/or personal beliefs.

Deliberants recognized the challenges associated with the term "mandatory" in the context of requiring parents to show proof of immunization for their children. In general, it was assumed that vaccination status would need to be ascertained in connection with a child's entry into the school system. Beyond that, deliberants recognized the difficulties associated with enforcing adherence to mandatory vaccination requirements. There was long discussion about what precisely was meant by mandatory. In particular, there was much discussion about what the consequences should be for children who are not vaccinated without valid exemptions and for their parents. A majority of deliberants concluded that children who are not vaccinated and do not have valid exemptions should be excluded from school and organized activities. There was persistent disagreement on this point, however, as several deliberants expressed that this violated children's rights to education and exclusion should only be considered in cases of an outbreak. With regard to parents who do not have their children vaccinated nor have a valid exemption, a majority of deliberants concluded that they should face a series of graduated consequences, such as warnings, mandatory education, and fines. Although a minority of participants considered the option of incarceration of parents refusing to vaccinate their children for certain diseases, a strong majority rejected incarceration as a penalty based on reasoning that this would lead to greater harms for the child.

On the topic of communication about vaccination, deliberants advocated for broad educational programs and comprehensive communication strategies. In discussing the kind of information that should be communicated about vaccination, deliberants overwhelmingly emphasized reliance on peer-reviewed sources, preferably based on multiple studies. An important minority position in this context pertained to the role of personal experience. Over the course of the deliberation, some participants related experiences involving health care providers brushing off concerns about adverse effects from vaccination. This was of particular concern when an individual had experienced severe symptoms following a vaccination (irrespective of whether the vaccine had indeed caused the symptoms).

Finally, deliberants considered the provision of no-fault compensation schemes for adverse events following immunization. There was strong agreement that there should be a compensation scheme either at the provincial or national level. There was unanimous agreement that such a compensation scheme should be funded through a combination of public and private funds (from pharmaceutical companies deriving profits from vaccines).

The forum recognized the importance of tracking AEFIs for purposes of ensuring vaccine safety. Accordingly, there was strong agreement on the need for reporting of AEFIs to public health units for the purpose of tracking adverse events. Only one deliberant disagreed with Recommendation 17 (*All AEFIs must be reported to the Public Health Unit by the medical professional to whom the incident was reported*) based on the recognition that some health professionals may not report or even recognize particular AEFIs. This deliberant emphasized that parents should also be able to report AEFIs directly.

Conclusion

On the whole, the conclusions of participants in the Ontario Vaccine Deliberation reflect a position that strongly supports childhood vaccination. This position relied on trust of the scientific practices underlying the technology and the public health institutions responsible for vaccination programs. This outcome should please public health professionals working in the field of childhood vaccination as it can be understood as a democratic endorsement of strong vaccination programs and measures to ensure high uptake. However, some caution is advised in acting on this advice. In line with principles of deliberation, participants changed their views over the course of the deliberation. This was not a consequence of attempts to guide participants in any particular direction; rather, it was a consequence of the internal dynamics of the deliberative forum and deliberants working toward achieving common ground on the issues. This means that members of the broader public, who have not participated in such a process, will not automatically share the conclusions reached by this forum. In particular, individuals who do not accept prevalent scientific findings relating to the relative safety and efficacy of vaccines will likely not endorse or accept the conclusions reached by this public forum.

Throughout the course of the deliberation and, in particular, over the second weekend, we, the organizers, saw in participants' statements and discussions a relatively high degree of trust in scientific and public health institutions in Ontario, which we also see to be implicit in the conclusions of the forum, which are strongly supportive of vaccination programs in Ontario. We believe that this is in part due to the deliberative process itself. Participants came to understand the rationale of vaccination and the efforts and mechanisms in place to ensure the safety of vaccines much more deeply than they would have if they had just been exposed to the information in a passive way. Media discourse and scientific studies (Mills et al. 2011) suggest that some segments of the population have very little trust in communication about vaccines from official sources. Irrespective of whether trust is high or low in a particular community, top-down one-way communication from experts to the broader public about vaccines may appear paternalistic to some and thus risks eroding this trust. Instead, trust could be fostered by public health officials engaging with publics in dialogue more meaningfully, recognizing the importance of dialogue in making good individual and collective decisions. We believe that this was achieved on a small scale in this deliberative public engagement event. Participants had a chance on the first day of the event not only to hear from experts on a range of issues relating to vaccination, but to ask questions and engage in conversation both collectively and individually during lunch and coffee breaks. Beyond that, participants were empowered to bring a range of perspectives to the discussion and in developing recommendations about vaccine policy in Ontario. Although it is not feasible for all Ontarians to engage in this kind of process, we believe that the outcomes of the Ontario Vaccine Deliberation demonstrate the principles of respectful and informed dialogue that can be used to de-escalate the polarized and adversarial positions currently characterizing discussions about childhood vaccination.

Acknowledgments

We are grateful to members of the Discourse, Science, Publics research group at the University of Guelph for their help in implementing the Ontario Vaccine Deliberation. We would like to thank Natasha Crowcroft and Timothy Caulfield for assistance in the conception of the project. Thank you to the expert speakers and members of the policy panel who came to engage with us at the deliberation. We are grateful to Heather Douglas and the Balsillie School of International Affairs for providing a venue for the Ontario Vaccine Deliberation. Thanks to the editor and three anonymous reviewers for valuable comments on an earlier version of this article. And finally, a warm and heartfelt thank you to the participants in the Ontario Vaccine Deliberation, who tackled the topic with sincerity, an open mind, and a will to develop solutions that take into account the diversity of opinions around them, even if they disagreed with them.

Conflict of interest statement

The authors have no conflicts of interest to declare.

Research ethics oversight

This study received clearance from the University of Guelph Research Ethics Board (REB number 17-06-003).

Funding

This project was funded by the Canadian Institutes of Health Research (FRN: 149074) and the Ontario Ministry of Research and Innovation (ER14-10-056).

References

American Academy of Arts & Sciences. 2014. Public trust in vaccines: Defining a research agenda. American Academy of Arts & Sciences, Cambridge.

Benecke, O., and S. E. DeYoung. 2019. Anti-vaccine decision-making and measles resurgence in the United States. *Global Pediatric Health* 6:2333794X19862949. doi: 10.1177/2333794X19862949.

Blacksher, E., A. Diebel, P. Forest, S. Dorr Goold, and J. Abelson. 2012. What is public deliberation?*Hastings Center Report* 42 (2):14–6. doi: 10.1002/hast.26.

Brunk, C. G. 2017. The role of risk perception in vaccine hesitancy and the challenge of communication. In *Public health in the age of anxiety: Religious and cultural roots of vaccine hesitancy in Canada*, ed. M. Guay, P. Bramadat, R. Roy, and J. A. Bettinger, 80–110. Toronto: University of Toronto Press.

Burgess, M. M. 2014. From 'trust us' to participatory governance: Deliberative publics and science policy. *Public Understanding of Science (Bristol, England)* 23 (1):48–52. doi: 10.1177/0963662512472160.

Caulfield, T., A. R. Marcon, and B. Murdoch. 2017. Injecting doubt: Responding to the naturopathic anti-vaccination rhetoric. *Journal of Law and the Biosciences* 4 (2):229–1. doi: 10.1093/jlb/lsx017.

Chambers, S. 2003. Deliberative democratic theory. *Annual Reviews of Political Science* 6:307–26. doi: 10.1146/annurev.polisci.6.121901.085538.

Dubé, E., J. A. Bettinger, W. A. Fisher, M. Naus, S. M. Mahmud, and T. Hilderman. 2016. Vaccine acceptance, hesitancy and refusal in Canada: Challenges and potential approaches. *Canada Communicable Disease Report = Releve Des Maladies Transmissibles au Canada* 42 (12):246–51. doi: 10.14745/ccdr.v42i12a02.

Dubé, E., D. Gagnon, M. Ouakki, J. A. Bettinger, H. O. Witteman, S. MacDonald, W. Fisher, V. Saini, and D. Greyson. 2018. Measuring vaccine acceptance among Canadian parents: A survey of the Canadian Immunization Research Network. *Vaccine* 36 (4):545–52. doi: 10.1016/j.vaccine.2017.12.005.

Friedman, W. 2007. Reframing "Framing". https://www.publicagenda.org/wp-content/uploads/2020/05/Reframing-Framing.pdf

Goldenberg, M. 2016. Public misunderstanding of science? Reframing the problem of vaccine hesitancy. *Perspectives on Science* 24 (5):552–81. doi: 10.1162/POSC_a_00223.

Goldenberg, M. 2021. *Vaccine hesitancy: Public trust, expertise, and the war on science*. Pittsburgh: University of Pittsburgh Press.

Goodin, R. E., and J. S. Dryzek. 2006. Deliberative impacts: The macro-political uptake of mini-publics. *Politics & Society* 34 (2):219–44. doi: 10.1177/0032329206288152.

Guston, D. 2014. Building the capacity for public engagement with science in the United States. *Public Understanding of Science (Bristol, England)* 23 (1):53–9. doi: 10.1177/0963662513476403.

Gutmann, A., and D. Thompson. 1997. Deliberating about bioethics. The *Hastings Center Report* 27 (3):38–41. doi: 10.2307/3528667.

Gutmann, A., and D. Thompson. 2004. *Why deliberative democracy?* Princeton, NJ: Princeton University Press.

Hotez, P. J. 2020. Combating antiscience: Are we preparing for the 2020s?*PLOS Biology* 18 (3):e3000683–6. doi: 10.1371/journal.pbio.3000683.

Lantos, J. D., M. A. Jackson, and C. J. Harrison. 2012. Why we should eliminate personal belief exemptions to vaccine mandates. *Journal of Health Politics, Policy and Law* 37 (1):131–40. doi: 10.1215/03616878-1496038.

Longstaff, H., and M. M. Burgess. 2010. Recruiting for representation in public deliberation on the ethics of biobanks. *Public Understanding of Science* 19 (2):212–24. doi: 10.1177/0963662508097626.

MacDonald, N. E. 2015. Vaccine hesitancy: Definition, scope and determinants. *Vaccine* 33 (34):4161–4. doi: 10.1016/j.vaccine.2015.04.036.

MacLean, S., and M. M. Burgess. 2010. In the public interest: Assessing expert and stakeholder influence in public deliberation about biobanks. *Public Understanding of Science (Bristol, England)* 19 (4):486–96. doi: 10.1177/0963662509335410.

Marshall, H. S., C. Proeve, J. Collins, R. Tooher, M. O'Keefe, T. Burgess, S. R. Skinner, M. Watson, H. Ashmeade, and A. Braunack-Mayer. 2014. Eliciting youth and adult recommendations through citizens' juries to improve school based adolescent immunisation programs. *Vaccine* 32 (21):2434–40. doi: 10.1016/j.vaccine.2014.02.098.

May, T. 2017. The importance of trust in the vaccine safety enterprise. *The American Journal of Bioethics: AJOB* 17 (4):48–50. doi: 10.1080/15265161.2017.1287226.

Mills, E., A. R. Jadad, C. Ross, and K. Wilson. 2011. Systematic review of qualitative studies exploring parental beliefs and attitudes toward childhood vaccination identifies common barriers to vaccination. *Pediatrics* 127 (1):1081–88. doi: 10.1016/j.jclinepi.2005.09.002.

Moore, A., and K. O'Doherty. 2014. Deliberative voting: Clarifying consent in a consensus process. *Journal of Political Philosophy* 22 (3):302–19. doi: 10.1111/jopp.12028.

O'Doherty, K. C. 2013. Synthesising the outputs of deliberation: Extracting meaningful results from a public forum. *Journal of Public Deliberation* 9 (1):1–16. https://www.publicdeliberation.net/jpd/vol9/iss1/art8/.

O'Doherty, K. C., M. K. MacKenzie, D. Badulescu, and M. M. Burgess. 2013. Explosives, genomics, and the environment: Conducting public deliberation on topics of complex science and social controversy. *Sage Open* 3 (1):215824401347895. doi: 10.1177/2158244013478951.

O'Doherty, K. C., C. Smith, and M. McMurtry. 2017. Vaccine hesitancy: Ethical considerations from multiple perspectives. In *Public health in the age of anxiety: Religious and cultural roots of vaccine hesitancy in Canada*, ed. M. Guay, P. Bramadat, R. Roy, and J. A. Bettinger, 80–110. Toronto: University of Toronto Press.

O'Doherty, K. C., and K. Stroud. 2019. Public deliberation and social psychology: Integrating theories of participation with social psychological research and practice. In *The SAGE handbook of applied social psychology*, ed. K. C. O'Doherty and Darrin Hodgetts, 419–41. London: Sage.

Opel, D. J., and D. S. Diekema. 2012. Finding the proper balance between freedom and justice: Why we should not eliminate personal belief exemptions to vaccine mandates. *Journal of Health Politics, Policy and Law* 37 (1):141–7. doi: 10.1215/03616878-1496047.

Opel, D. J., R. Mangione-Smith, J. A. Taylor, C. Korfiatis, C. Wiese, S. Catz, and D. P. Martin. 2011. Development of a survey to identify vaccine-hesitant parents: The Parent Attitudes about Childhood vaccines survey. *Human Vaccines* 7 (4):419–25. doi: 10.4161/hv.7.4.14120.

Parrella, A., A. Braunack-Mayer, J. Collins, M. Clarke, R. Tooher, J. Ratcliffe, and H. Marshall. 2016. Prioritizing government funding of adolescent vaccinations: Recommendations from young people on a citizens' jury. *Vaccine* 34 (31):3592–7. doi: 10.1016/j.vaccine.2016.05.019.

Stilgoe, J., S. J. Lock, and J. Wilsdon. 2014. Why should we promote public engagement with science?*Public Understanding of Science (Bristol, England)* 23 (1):4–15. doi: 10.1177/0963662513518154.

Taddio, A., M. Ipp, S. Thivakaran, A. Jamal, C. Parikh, S. Smart, J. Sovran, D. Stephens, and J. Katz. 2012. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. *Vaccine* 30 (32):4807–12. doi: 10.1016/j.vaccine.2012.05.011.

The Keystone Center. 2009. The Public Engagement Project on the H1N1 Pandemic Influenza Vaccination Program. https://www.keystone.org/wp-content/uploads/2015/08/093009-H1N1-Pandemic-Influenza-Vaccination-Prog-Engagement-Report.pdf

Wiley, K. E., J. Leask, K. Attwell, C. Helps, C. Degeling, P. Ward, and S. M. Carter. 2020. Parenting and the vaccine refusal process: A new explanation of the relationship between lifestyle and vaccination trajectories. *Social Science & Medicine (1982)* 263:113259. doi: 10.1016/j.socscimed.2020.113259.

Williamson, L., and H. Glaab. 2018. Addressing vaccine hesitancy requires an ethically consistent health strategy. *BMC Medical Ethics* 19 (1):84. doi: 10.1186/s12910-018-0322-1.

World Health Organization. 2019. Ten threats to global health in 2019. https://www.who.int/emergencies/ten-threats-to-global-health-in-2019