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RESEARCH PAPER

Perspectives on state vaccine education mandate policy and implementation among public health department officials: a qualitative study

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ABSTRACT

In response to the increase in non-medical vaccine exemptions (NME), many states have adopted education mandates (EM), required vaccine education for parents requesting NMEs for their school-age children, but these EMs vary greatly in implementation. In order to learn about the administrative aspects of each state's EM, we interviewed fourteen health department officials from nine states with EMs. Interviews were conducted over the phone, transcribed by a professional transcription service, and double-coded using NVivo 12 by two members of the study staff. The coding resulted in 3698 comments overall, 98.5% inter-coder reliability, and a κ statistic of 0.691. We found no consistent format for content delivery, and methods used included in-person dialogs, web-based education, and video modules. Content of the education is not standardized, and education length ranges from 15 to 60 minutes. Four major themes about the EM policies emerged: (1) the use of EMs to eliminate "convenience exemptions;" (2) the importance of health department communication with health-care providers; (3) facilitators and barriers to implementation; and (4) the positive recommendation for other states to adopt EM policies. We concluded that current EM implementation varies greatly, but officials in states which have adopted EMs for parents requesting NMEs for school-entry vaccinations overwhelmingly recommend other states to adopt them as well. Key features of successful programs may include conversations with parents requesting NMEs and strong communication channels with health-care providers. Systematic tracking of vaccine status after exemption requests and education is necessary to quantitatively determine the effectiveness of EM programs.

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Introduction

Due to recent vaccine-preventable disease outbreaks in numerous American communities that have followed increasing non-medical exemption (NME) rates for school vaccination, many states have adopted regulations to create tighter restrictions for the request of a non-medical exemption.[1,2,3,4,5] The steps required to request a NME vary significantly by state.[5] States can require only a note or letter signed by a parent, a notarized form signed by a health-care provider or public health authority, or a mandatory online education module (Appendix A). The architecture of NMEs are important as the stringency of requirements for exemption requests have been associated with NME rates, with tougher NME requirements being associated with lower overall NME rates.[6] The newest form of response to NMEs is commonly known as an education mandate (EM), or education about the benefits and risks of vaccination that parents are required to receive before they can obtain an NME for their children.[1,7,8]

This change in policy comes as the consequence of rising vaccine hesitancy in the 21st century, despite the success and national appreciation of vaccines in the 19th and 20th centuries.[2,4,9] Vaccine hesitancy is defined as an attitude or behavior in which individuals may question, delay or refuse vaccines due to confidence, complacency or convenience despite the availability of vaccine services.[10] When hesitancy leads to delay or refusal, immunization rates and overall herd immunity within communities can decrease, resulting in vaccine-preventable disease outbreaks such as the 2017 Minnesota measles outbreak and the 2019 Washington state measles outbreak.[4,11,12,13,14] This is particularly highlighted by the fact that in just the first half of 2019, the United States has had the largest number of measles cases since the disease was declared "eliminated" in 2000, with a majority of cases affecting unvaccinated individuals.[15,16] To decrease the risk of outbreaks within a school setting and reduce vaccine administration disparities, individual states created vaccine requirements for school-entry.[1,5,7,16,17]

Education mandates as a vaccine policy tool first emerged in Alabama in 2009, and as of 2018, there are eleven states that have adopted some form of an education mandate: Alabama, Arizona, Arkansas, Delaware, Illinois, Michigan, New Mexico, Oregon, Rhode Island, Vermont, and Washington.[8] However, there is no required format for what must be included in these mandates (Appendix A). As such, there may be variation in not only the

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implementation but also the impact of educational mandates on immunization and NME rates.[18] Hence, it is important to understand the content, structure, and implementation of individual state's EM to better determine how such policies can effectively increase immunization rates and reduce NMEs. While implementation may vary, the general goal is to provide information to parents about the risks of declining vaccination for their children and address their concerns regarding said vaccinations. Receiving such information may change a parent's decision about pursuing a NME, and serve as a deterrent to exemption requests by way of administrative obstacles. It has been difficult to measure effectiveness or identify best practices that can be adopted by other states as there is currently a gap in the literature about the breadth, content, and effectiveness of these programs.

Our objective was to interview administrators at state and local health departments to gain insight into the administrative aspects of each state's education mandate.

Materials and methods

Study sample

We performed semi-structured interviews with 14 public health practitioners from state and local health departments in nine states where educational mandates have been implemented. Contact information for officials was ascertained from state and local health department websites, and participants were recruited via email, phone call, or both. All interviews were conducted via phone by trained study staff. Thirteen total interviews were conducted, with one interview having two officials answering each question. Each state provided at least one interview with a state health department representative, with additional interviews based on referrals to other individuals involved in the implementation of education mandates provided by the primary interviewee. Verbal consent for participation was obtained and recorded using an encrypted Research Electronic Data Capture (REDCap) database hosted at the Children's Hospital of Philadelphia (CHOP). The study protocol was reviewed and determined exempt by CHOP's Institutional Review Board.

Interview guide

Semi-structured interviews were conducted by two trained study staff using an interview guide developed with input from two qualitative research experts and piloted for clarity (Appendix B). Interview items were informed by a review of the literature regarding assessments of vaccine educational mandate programs and designed to elicit information about the design, content and procedural aspects of a state's education mandate.[1,19] Interview questions explored exemption requests, procedural aspects of education, vaccination and exemption rates, and recommendations for vaccine policy. Questions also aimed to capture the interviewee's perceptions of their state's educational mandate program, contact with health-care provider networks, and educational content provided through their state's programs.

Analysis

Interviews were performed from February 2018 to March 2018. All recorded interviews were transcribed by a professional transcription service, and each of the interviews was double-coded by two members of the study team using NVivo 12. The research team met regularly to iteratively develop the codebook and resolve discrepancies. Agreement between the coders were measured using the kappa (κ) statistic.[20] The coding resulted in 3698 comments overall, 98.5% inter-coder reliability, and a kappa statistic of 0.691.

Results

Fourteen officials were interviewed from nine states which all had education mandates as reflected by their state's legislation or policies (Appendix A), and the median length of the interview was 36 min. Seven participants had a medical or nursing degree with most participants representing state immunization departments as directors and program managers (Table 1). In addition to information about the structure and content of each educational mandate, four major themes about the EM policies emerged: (1) the use of EMs to eliminate "convenience exemptions;" (2) the importance of health department communication with health-care providers; (3) facilitators and barriers to implementation; and (4) the recommendation for other states to adopt EM policies.

Format of education

Based on information gathered in the interviews, there is no consistent format for content delivery (Table 2). Five states used

Table 1. Position and training of interview participants.

Position title	Education background
Division Director	Master of Public Health
School and Childcare Public Health Consultant	Associate Degree in Nursing and Bachelor of Science in Nursing
Immunization Division Director	Bachelor of Science in Health Services Administration
Immunization Program Supervisor	Bachelor of Science in Nursing
Chief (Office of Immunization)	Bachelor of Science in Community Health
Immunization Program Manager	Master of Science in Nursing Adult Nurse Practitioner, and Master of Public Health
Medical Director For Immunizations	M.D.
Immunization School Law Coordinator	Master of Public Health
School and Adolescent Services Coordinator	Bachelor of Arts and Social Work
State School Nurse Consultant	Master of Education in the Field of School Nursing and Master in Advanced Public Health Nursing
Medical Consultant	M.D.
Director of Immunization Program	Master of Public Administration
Immunization Services Manager	Bachelors in Organizational Management
Immunization Services Manager	Masters in Organizational Management, BSN, RN, Certification in School Nursing

Table 2. Educational mandate implementation details, by state.

State	Format	Delivery Location	Delivery Person	Time of Encounter	Contact with HCP
Alabama	Video Module Web Based with Written Handouts	State Health Department	Healthcare Provider	<30 minutes	A Lot
Arizona	Web Based Video Module	School Online	School Nurse	30–60 minutes	A lot
Arkansas	Web Based Written	Fax or Email	Health Department Official	Unsure	None
Delaware	Face to Face or Over the Phone Web Based with Written Handouts	School State Health Department via Telephone Online	Healthcare Provider School Nurse Health Department Official	<30 minutes	Little
Michigan	Face to Face	State or Local Health Department	School Nurse Health Department Official	less than 30 minutes, more than 60 minutes	A Lot
Rhode Island	Face to Face and Web Based with Written Handouts	School	School Nurse	Unsure	A Lot, but rarely about EM
Oregon	Face to Face and Web Based-Video Module with Written Handouts	Physician Office or Online	Healthcare Provider	Unknown	A Lot
Vermont	Written Handouts	School	School Nurse	Unsure	A Lot
Washington	Face to Face and/or Over the Phone	Physician Office or Over-the-Phone (rare)	Healthcare Provider	Unsure	A Lot

Table 3. State health department quotes about the format of EM delivery.

Educational delivery format	
"Okay. So the educational mandate is simply to provide them with a copy of the vaccine information statement for the vaccines they've requested the exemption for. Actually, they end up getting them all, but they need to read the one. That is the educational piece – that they are provided that and they have to state that they have read it and understand it." "A parent is – makes a 15-minute appointment at any of our clinic locations. And then they go through the same process as our other immunization clients that register when they come in. And then they are in a private room with a nurse. And any education provided is directed at the parents' questions. So the educational session is not a one-stop, one thing fits all."	"So when an individual is seeking a nonmedical exemption to attend school, our rules now require that they set up an appointment and go for the educational session at a local health department. And once the educational session is completed, then they will receive a certified immunization waiver that then can taken to the school." "Now we have a standardized procedure. If you are going to get a religious exemption, you have to listen to 13 minutes of me on a video, which is probably enough for most people to agree to be vaccinated after 13 minutes of me. But we have a standardized video. They have to view the video or sit in the room while the video plays, because some people don't like to view it. But they have to view the video and they have to sign a statement that basically they have received this information, and then they have to – it's basically like an informed refusal. And at that point, they receive their certificate of religious exemption. "
Education Delivery Location	
"So when an individual is seeking a nonmedical exemption to attend school, our rules now require that they set up an appointment and go for the educational session at a local health department. And once the educational session is completed, then they will receive a certified immunization waiver that then can taken to the school."	"So as I stated, all the information is available online. Basically a parent has to submit two pieces of documentation to a school. One is the certificate of immunization status form, so it's just the immunization form. There's a specific place where the parent signs if they're claiming an exemption. And then the second piece is called a vaccine education certificate, which the parent prints out after watching an online video, or they can get it from a healthcare practitioner."
Education Delivery Person	
"We're selling our education as a conversation. What we are promoting at the local health departments is that the nurse sits down, puts the person at ease a little bit, and then asks the individual what their concerns are about vaccines and has a conversation then with the individual about the concerns they may have with vaccines"	"So what we have asked is that when the school nurses provide this, because the parent has to initial four sections – that they understand the benefits and the risks of the vaccine, that they've – part of it is that they've read educational materials. And so, the majority – the school nurses have handed out information to the parents, but it's not consistent across the board. So when we've asked them what they're handing out, it's really a variety of things. "

face-to-face interaction, six used web-based education, and three used video modules for their education. Among respondents whose program used "in-person" or face-to-face interaction, immunization departments sought to create "a conversation between the provider and the parent about immunizations," tailoring it to the parents' specific concerns. For states who used web-based or video modules, the content was standardized across each state by the health department. One administrator stated, "Each of the modules is specific to that vaccine and that disease and talks about the benefits of the vaccine and what could happen if you don't get it." Some programs also used multiple education delivery formats to provide information to parents. For example, one administrator acknowledged "the vaccine education certification is either form a health-care practitioner or form watching the online video." This variation can be in the form of conversations with nurses, information pamphlets, and state-specific online modules (Table 2).

The location and medium of vaccine content delivery also varies greatly (Table 3). School nurses were cited as the most frequent delivery person for providing vaccine education.

Among programs which delivered their content in person, three programs utilized a state or local health department health-care representative, potentially a registered nurse, while in four states, information was delivered in a hospital or clinic by primary care providers using a variety of sources for content. Generally, conversations or face-to-face counseling took place with health-care practitioners such as nurses or primary care providers, but occasionally health educators who worked for health departments provided information. One official noted that "it was recognized that it would be a best practice or basically a good thing to do, and it would be a mechanism to be able to provide accurate information to the parents." Healthcare practitioners also used tools such as "a 13-minute video by a public health physician describing the benefits of vaccine and the disadvantages to not getting vaccinated. And they complete a form or sign a form that says the decision not to vaccinate, and on that form gives more educational information about reasons to vaccinate and making sure they understand all the implications of what they're about to sign their name to in request for their child." Only one respondent reported that educational content was provided solely via fax, email, or mail.

Among respondents who mentioned the time required to complete educational modules, the length of conversations or modules ranged from 15 to 60 min. As one administrator noted, the amount of time of each conversation was based on the idea that "the program wanted to make sure that the parents were at least well informed and had reliable information that could possibly help them make a decision on whether or not they decide to vaccinate their child." Length of time was often determined on a case-by-case basis since one official noted that they "tailor [their] education according to what the parent wants to discuss, although the requirement for the education is that we inform them about their risks of not vaccinating and the benefits of vaccinating. So we use our vaccine information statements as the primary tool. And then we'll branch out from there based on what the parent wants to talk about."

Beyond information about risks and benefits related to vaccination, the content of EM programs is often not standardized, nor is dissemination method. As one administrator acknowledged "we haven't detailed what needs to be included besides just that – benefits and risks." Some respondents detailed "The education is provided by nurses who work at the immunization program. A parent makes a 15-min appointment at the day of our clinic locations and then they go through the same process as our other immunization clients that register when they come in" while other administrators stated, "So right now, we don't really have a coordinated program for that." Immunization programs also gather information from multiple sources to create their content as one administrator detailed: "We use CHOP. We use the CDC information, the AAP. We had looked at the Institute of Medicine and the Immunization Action Coalition. Those were our primary references." States tended to share the same themes regarding vaccine information as shared by one administrator, "any education provided is directed at the parents' questions. We tailor our education according what the parent wants to discuss." This allows programs to be flexible in the information provided during the delivery of immunization education.

Perceptions of education mandate from interviewees

Convenience exemptions

One key theme that emerged was the impact of the education mandate policy on decreasing "convenience exemptions," or exemptions requested because parents found requesting exemptions easier than getting children up-to-date with immunization requirements before the start of school.[21] One interviewee noted that the education mandate "is helpful in … eliminating convenience exemptions, and for us it was moving from a process where a parent just signed a form which was much easier than tracking down your immunization record or taking your kid into an immunization appointment … just putting the requirements for claiming an exemption at the same level as the requirements for providing documentation of the immunization has been helpful."

Improved communication with health-care providers and nursing network

Many officials noted that implementation of educational mandate programs increased the state immunization program's frequency of communication with its health-care providers, who were often the ones receiving exemption requests and educating families. Communication was required to either raise awareness among primary care providers and school nurses about the education mandate or to provide information about the required modules (Table 4). One example of communication with health-care providers was a state-run nursing network, a state-run communication channel that shared best-practice methodology with nurses state-wide. Many administrators believed they had significant contact

Table 4. State health department quotes about contact with health-care providers.

"Constant contact. We have – in our Office of Immunization, we have a School and Adolescent Immunization Coordinator, and her role is the liaison between the schools and the immunization program. "	"And so, a lot of time the doctors' offices will have us come in at lunchtime or an hour before clinic starts. We also have a relationship where we've gone to a community college with their medical assistants, so we really do kind of function as the people to ask for immunization expertise."
"We actually have monthly calls with all of our local health department nurses, and always part of that is to talk about the waiver – or not every one of the, but it's always that usually a topic item that comes up that we discuss. So yeah, we have scheduled monthly calls with all of our immunization nurses at the local health departments."	"We then in our district offices, which are our local health offices, we have school liaisons that our public health nurses that go and meet with them regarding a range of public health issues and maybe providing some vaccine information. And then they have to complete the annual report. And so, they also have a person here that's our lead on the school reporting where they can call with different questions … Oh, and when you're a new school nurse, there's an orientation you have to go through. I think it's different modules online, and there's a specific module on immunizations."

with their health-care providers with few admitting "little to no contact" (Table 4). Contact also took the form of "monthly calls with all of our local health department nurses," online channels such as "with the list serve that we have, we send information back and forth all the time repeatedly," or even through administrative positions such as a "School and Adolescent Immunization Coordinator, and her role is the liaison between the schools and the immunization program." One administrator noted, "the partnership that we have with the providers, with the school nurses, with the Department of Health all delivering the same message, I think that's been really helpful for parents because we're all on the same page." This constant communication was recognized to be in the form of daily contact with school nurses as well as specific immunization-based education programming. These states spoke of their communication with different health-care provider networks positively as "a tremendous partner with us."

The respondents who did not report strong communication channels with providers alluded to a lack of knowledge at the health departments regarding the process by which health-care providers disseminated positive vaccine information to parents. As mentioned by one administrator, this meant they were unaware of the frequency by which their vaccine informational materials are used by nurses: "we don't really know if the school – we assume that the school nurses are probably still using it, but we don't follow up on it so much because it's a recommendation." Additionally, some states did not maintain consistent contact because "[they] have little coordination since a lot of this information has been on the books for a number of years." Thus, there was variation in the amount of contact with health-care providers and the information known about their processes of delivering education.

Facilitators and barriers to education

Administrators detailed multiple facilitators to the implementation of the educational mandate (Table 5). One administrator noted the importance of clear information statements: "What we did, was for each vaccine, there was an identification of what could happen if you don't get it, and it was spelled out on the form." Other administrators noted a state focus on strict enforcement through programs such as "annual exclusion day" which is "a deadline that actually occurs in February by which all students have either their immunization or exemption record updated with the school by that day." Conversely, states have multiple issues that arise when attempting to deliver the education to these parents (Table 5). One administrator stated the difficulty in the dissemination of vaccine information as, "we put a lot reliance on our school health personnel and our school administration to make this happen … and there are a lot of issues at that level – from the fact that not every school has an RN … and then the timeliness by our rules." Others have noted difficulty with parents: "we've heard from the schools that parents have frustration, with not wanting to go to the doctor to get it signed off that they had counseling education on the benefits and risks and so forth." Interviewees mentioned that issues are regularly being addressed by administrators to improve the effectiveness of their programs.

Beliefs about program effectiveness

Most interviewees overwhelmingly recommended the education mandate as a tool for other states to decrease non-medical exemption rates, even though the perceived effectiveness of the policy was generally mixed (Table 6). The two main reasons for this support were first, the importance of providing education about vaccines to parents, and second, the impact of eliminating convenience exemptions (Table 6). Only two interviews had concerns with their current education mandate policies stating that "unless there's some way to ensure that people are reviewing it and talking about it … we need to provide this education further upstream rather than when you're requesting an exemption." The most common policy change noted by multiple interviewees would "be to not allow personal or religious

Table 5. State health department quotes about facilitators and barriers.

Facilitators	
"We use our registry to notify individuals who are overdue for vaccines. We generate letters to parents at the state level, send those out to parents who may have kids that are overdue for vaccines. That seems to impact the number of people that return in for a vaccine"	"We're a universal state, so we provide vaccines for use in all children. And the doctor-the provider office only orders once through us, and insures pay part of it and BF pays part of it. So our access is excellent."
Barriers	
"People don't want to watch the 13-minute video. They feel like it takes too much of their time. So basically, they just don't want to spend the time. They want to come in, have us hand their certificate across the desk and leave, and we don't do that."	"I think the other challenge is the lens and the view with which those who are vaccine-hesitant or pro vacs choice look at it – it would be hard I think to satisfy their – what they feel should be in under risks and benefits."

Table 6. State health department quotes recommending education mandates.

"Yes, I would" "Because it – because we have seen a significant decrease in our waiver rates. And I think also even if we may not be impacting parents that are coming in for the education to change their mind, it's that seed of information that they can think about, that they can hear from my healthcare worker who is informed with good information about vaccines."	"I would. I think that it has been very helpful to give – to help give some parents some different information than maybe what they're just hearing in their own communities or searching on the website, but actually to get some medically-validated information."
"Again, the opportunity to change one or two persons' mind only means more kids are vaccinated. It also allows you to determine maybe if there's a common theme, like what the issue is. And also, I think it takes the educational burden off of where it shouldn't have been in the first place – in the schools. So that's kind of why I recommended it."	"Absolutely. I think if you do not have a standardized policy where people – first of all, they know what to expect. They know what to understand and what to expect going in and that this will not be a rubber stamp, and that you can't just go in and get a piece of paper and leave. I think an educational mandate is just necessary in every state."

exemptions" entirely. As a suggested change, one administrator who supported EMs stated that they "would actually like to have a little bit more spelled out about the educational component … So if it let us define – like gave the authority to the State Board of Health or Department of Health to define what that was to share with providers, I would like that." Another suggested change was: "there is no expiration date on the exemption certification, so … [it] might be helpful to go back to it and see … maybe there was a reason why [the parent] didn't want to do it at the time, but now they will."

Additionally, there were challenges to the use of the term 'education mandate.' Some officials were not familiar with the term "education mandate" even though their state did require education when parents request an exemption. This is evidenced by one administrator who started the interview mentioning "I don't know how we … play into this, because we don't have an educational mandate policy … And there could be a mandate written somewhere I'm just not aware of." Later in the interview, the same administrator said, "It's just that it was a long, long time ago that they actually put forth some recommendations and guidance to the school nurses about granting exemptions … " Other respondents did not like use of the term 'mandate' as illustrated by an administrator who said "I'm not a big advocate of the word mandate. I think sometimes when you're on the fence … and then someone tells you you have to do it, sometimes that just bristles you and you go to the other side."

Discussion

This qualitative study of health department officials from 14 states with education mandates revealed significant variation in the content and structure of educational mandates; however, interviewees overall positively endorsed such mandates as an effective policy tool to reduce NMEs. Respondents encouraged the adoption of education mandates by other states and underlined the importance of spreading positive and accurate vaccine information.

The format of education varied across the many states (Table 2), and there was no conclusive belief that a specific format of education is more significantly correlated with a reduced rate of exemptions. Rather, administrators were open to learning about what was working in other states while others developed an approach that worked best for their public health system. Notably, participants highlighted the importance of strengthened communication between health departments and health-care providers as well as an ability to tailor information to parents' concerns. Understanding what format different states find feasible and effective for communicating the importance of vaccination to parents will aid other states in determining best practices for EMs. However, some flexibility may be needed to allow for differences in immunization program structure, resources, and factors associated with hesitancy.

Vaccine education in the form of a conversation was a common strategy, and many administrators highlighted this approach as key to effectively disseminating the information. Conversations can be more responsive to parents' specific concerns and fill gaps that might exist in the fixed content provided through paper and video formats.[22] Integration of a conversation component to any education encounter, whether it be with a health department official or health-care provider, provides an opportunity to deliver tailored information.[22]

Additionally, administrators frequently viewed communication and partnership with health-care providers as important for increasing vaccine acceptance and specifically addressing parental concerns. Administrators who reported that they had strong communication channels with HCPs had more confidence in their EM program. On the other hand, administrators who believed they only had limited or inconsistent communication with HCPs seemed less confident in their program's effectiveness because officials were not able to confirm what content or in what format the vaccine information was being shared with parents. A clear and consistent communication channel between health departments and health-care providers about education mandates are likely to be an important contributor to their success.

Systematic program evaluation, including both implementation and outcomes associated with education mandates may help better identify key program features that are most impactful. Based upon participant responses, it appears that information on various program elements such as length and content of conversations with parents and vaccination, acceptability among parents, cost and, most importantly, subsequent vaccine acceptance from parents receiving the education is not consistently measured. States should develop metrics for tracking program effectiveness. Future studies can focus on establishing metrics and methods for their measurement.

Limitations

This study is the first qualitative perspective of education mandate programs for parents requesting NMEs across the country. One limitation of this study was the small sample size (N = 14) of health department officials, so this may not capture all attitudes toward education mandate programs across the U.S.; nevertheless, we did interview officials from nine (82%) out of the eleven states that currently have EM programs. We also achieved thematic saturation suggesting that we were able to identify the most salient themes from the health department official perspective related to education mandate programs. Since this was an exploratory study with health department officials, we do not have the perspective of health-care providers who may deliver required vaccine education in some states or of parents requesting these exemptions. Both of these perspectives would also provide important insights into EM program acceptability and effectiveness.

Conclusion

A growing number of states are considering changes to their exemption policies for school immunization requirements,[23] including the addition of required education for parents who are requesting nonmedical exemptions. Insights from states who currently have education mandate programs can help inform adoption and implementation. While program content and implementation vary, public health administrators in states with EM programs endorse this approach as an effective way to address vaccine hesitancy and reduce non-medical exemptions. Key features of successful programs may include

dialog-based education and consistent communication with health-care providers responsible for education delivery. Future work should focus on rigorous program evaluation to better inform vaccine policy development.

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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Appendix A. Education mandate policy type and content by state

State	Education mandate start	Source	Type	Education mandate content
Alabama	2009	Alabama Department of Health	Website	The parent or legal guardian must submit a written objection and receive education on the consequences of not immunizing their child.[24]
Arizona	2013	AZ Rev Stat § 15–873 (2016)	Legislation	The parent or guardian of the pupil submits a signed statement to the school administrator stating that the parent or guardian has received information about immunizations provided by the department of health services and understands the risks and benefits of immunizations and the potential risks of nonimmunization and that due to personal beliefs, the parent or guardian does not consent to the immunization of the pupil.[25]
Arkansas	2013	AR Code § 6–60-504 (2016)	Legislation	Completion of an educational component developed by the department that includes information on the risks and benefits of vaccination[26]
Delaware	2011	14 DE Code § 131 (2016)	Legislation	(We) acknowledge that (I) (we) have been given the opportunity to receive from the school district information regarding the medical benefits and risks in choosing whether to have the child participate in the immunization program, and if (I) (we) have not taken that opportunity, it is hereby waived.[27]
Illinois	2015	105 ILCS 5/27–8.1 (2016)	Legislation	The certificate must also be signed by the authorized examining health care provider responsible for the performance of the child's health examination confirming that the provider provided education to the parent or legal guardian on the benefits of immunization and the health risks to the student and to the community of the communicable diseases for which immunization is required in this State … Those receiving immunizations required under this Code shall be provided with the relevant vaccine information statements that are required to be disseminated by the federal National Childhood Vaccine Injury Act of 1986, which may contain information on circumstances when a vaccine should not be administered, prior to administering a vaccine.[28]
Michigan	2015	Michigan R 325.176 (2014)	Rule	Each nonmedical exemption filed at the child's school or group program of a child entering a program after December 31, 2014 shall be certified by the local health department that the individual received education on the risks of not receiving the vaccines being waived and the benefits of vaccination to the individual and the community.[29]
New Mexico	2013	New Mexico Department of Health	Form	I HAVE READ THE 'COMPULSORY IMMUNIZATION REGULATIONS' AND UNDERSTAND THE RISK OF NON-IMMUNIZATION FOR MY CHILD.[30]
Oregon	2014	OR Rev Stat § 433.267 (2015)	Legislation	(i) A signature from a health care practitioner verifying that the health care practitioner has reviewed with the parent information about the risks and benefits of immunization that is consistent with information published by the Centers for Disease Control and Prevention and the contents of the vaccine educational module approved by the authority pursuant to rules adopted under ORS 433.273; or (ii) A certificate verifying that the parent has completed a vaccine educational module approved by the authority pursuant to rules adopted under ORS 433.273.[31]
Rhode Island	2015	Rhode Island Department of Health	Form	I have received and read the educational materials explaining the disease(s) and vaccine (s) checked above and: I understand the benefits and the risks of the vaccine(s). I understand the risk of contracting the disease(s) that the vaccine(s) prevent. I understand the risk of transmitting the disease(s) to others. I understand that, if an outbreak of vaccine-preventable disease should occur, an exempt student will be excluded from school by the school administrative head for a period of time as determined by the Health Department based on a case-by-case analysis of public health risk.[32]
Vermont	2013	18 V.S.A. § 1122 (2016)	Legislation	(3) If the person or, in the case of a minor, the person's parent or guardian annually provides a signed statement to the school or child care facility on a form created by the Department that the person, parent, or guardian: (A) holds religious beliefs opposed to immunization; and (B) has reviewed evidence-based educational material provided by the Department regarding immunizations, including: (i) information about the risks of adverse reactions to immunization; (ii) information that failure to complete the required vaccination schedule increases risk to the person and others of contracting or carrying a vaccine-preventable infectious disease; and (iii) information that there are persons with special health needs attending schools and child care facilities who are unable to be vaccinated or who are at heightened risk of contracting a vaccine-preventable communicable disease and for whom such a disease could be life-threatening.[33]
Washington	2011	WA Rev Code § 28A.210.090 (2016)	Legislation	(2)(a) The form presented on or after July 22, 2011, must include a statement to be signed by a health care practitioner stating that he or she provided the signator with information about the benefits and risks of immunization to the child. The form may be signed by a health care practitioner at any time prior to the enrollment of the child in a school or licensed day care. Photocopies of the signed form or a letter from the health care practitioner referencing the child's name shall be accepted in lieu of the original form.

Appendix B. Questions included in the interview guide, by theme

Responding to parents who request NMEs

1. How many times per month would you say the health department receives a request for a nonmedical exemption?
2. What are the most common reasons for this request?
3. What are some difficulties your organization faces when trying to respond to parents requesting nonmedical exemptions?

Implementation of Mandated Education

1. To get us started, can you please provide a general description of your educational mandate program?
2. Who oversees creation of the educational programs that you deliver?
3. What information is provided regarding the risks and benefits of vaccines?
    a. Probe: Where do you get the information?
4. Can you describe how your organization delivers the education?
    a. Probe: Who delivers the education, location, and time usually spent?
    b. Probe: What formats do you use to deliver education – verbal (over the phone, face-to-face), written, graphics, web-based?
5. How long has this program been in effect?
    a. Have there been any major changes to the information provided, or format in which it is provided, since the start of this program?
        i. Probe: How have previous infectious disease outbreaks in your state or nationwide affected this education policy? Is there anything else affecting this policy?
6. What is the biggest challenge in the implementation of the educational mandate?
    a. How does your organization plan to address these challenges?
7. (For states in which health-care professionals are mandated to deliver education) I understand that your state uses health-care professionals as part of the education process. What is their role?
    a. What kind of contact do you have with the health-care professionals delivering vaccine education?
8. How do you work with other groups to deliver education?
    a. Can you describe other groups that you think should be responsible for delivering education?

State Vaccination and Exemption Rates

1. How do you think the educational mandate has affected vaccination and exemption rates in your state?
    a. How are exemption rates measured by your organization?
    b. What proportion of parents would you estimate change their mind about obtaining a nonmedical exemption after receiving this education?
    c. What are other outcomes that you track to measure the impact of the educational mandate?
    d. How has this data been used to modify your state's educational mandate? For example, have you changed the content of the educational materials?
2. In your opinion, how effective has the educational mandate been in influencing parents to have their child vaccinated?
    a. (If believed to be effective) Why?
    b. (If not believed to be effective) Why not? What policy changes or other factors have influenced these exemption rates? *Obtain names of laws or specific documents.*
    c. Probe: What seems to work well to increase vaccination rates (facilitator)? What is not working (barrier)?

Interviewee Beliefs about EM

1. Would you recommend an educational mandate for other states as a strategy to address requests for nonmedical exemptions?
    a. Why or why not?
2. What other activities, policy recommendations or other interventions, does your organization carry out to address exemption rates?
3. If you could change the mandate in any way, what would you change?
4. What other interventions or policies do you think would help address requests for nonmedical exemptions?