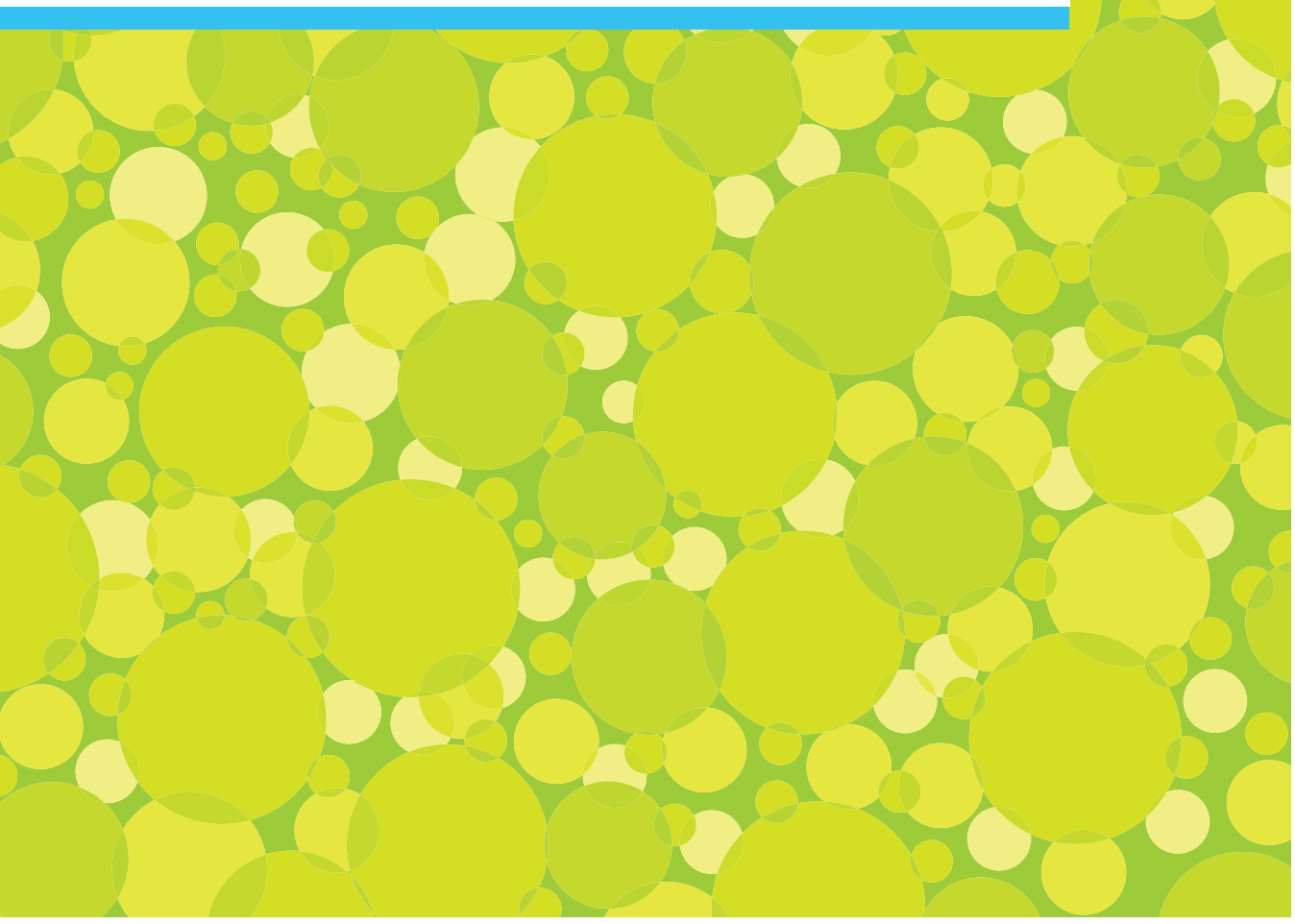
POLICYLAB

EVIDENCE TO ACTION BRIEF | SPRING 2017

ADDRESSING VACCINE HESITANCY

TO PROTECT CHILDREN & COMMUNITIES AGAINST PREVENTABLE DISEASES



Children's Hospital of Philadelphia℠
PolicyLab

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PRODUCED IN COLLABORATION WITH THE VACCINE EDUCATION CENTER

CONTENTS

EXECUTIVE SUMMARY

Vaccines have successfully eliminated or dramatically reduced the incidence of many infectious diseases in the United States. Routine immunization of all children born in one year can:[1]

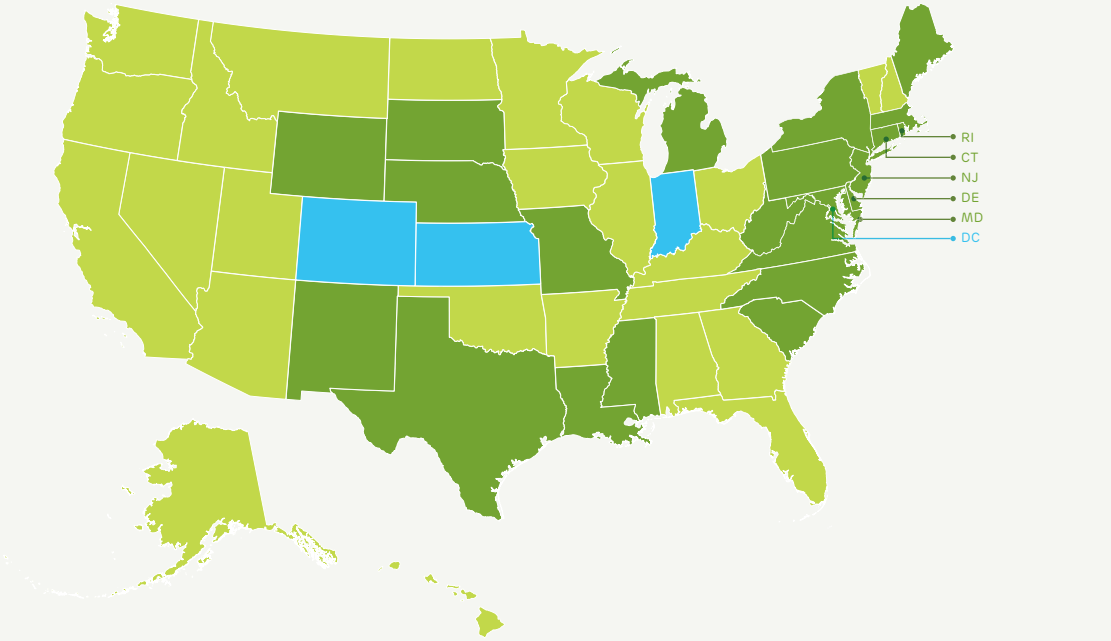
- Save 42,000 lives,
- Prevent 20 million cases of disease,
- Reduce direct health care costs by $13.5 billion and
- Save $68.8 billion in total societal costs.

Despite availability and routine recommendation of these vaccines, approximately **42,000 adults and 300 children in the United States still die each year from vaccine-preventable diseases.**[2] While ongoing vaccination programs help to keep these diseases at bay, some vaccine-preventable diseases have been re-emerging.

For instance, The Centers for Disease Control and Prevention (CDC) declared measles eliminated from the U.S. in 2000, but reported 667 cases in 27 states in 2014.[3] Although measles is no longer endemic to the U.S., it is still easily imported by travelers exposed in other countries and then quickly spread. Recent pertussis (whooping cough) rates also greatly exceed those that the U.S. maintained during the 1990s and early 2000s, rising from approximately 7,800 cases in 2000 to nearly 33,000 in 2014.[4] The CDC reported that most of these cases affected unvaccinated or undervaccinated children.[5] Children are considered undervaccinated if they are missing at least one vaccine by the appropriate age as recommended by the CDC's Advisory Committee on Immunization Practices (ACIP).[6,7]

Figure 1

ESTIMATED MMR VACCINATION COVERAGE AMONG CHILDREN ENROLLED IN KINDERGARTEN, 2015–2016



Source: Centers for Disease Control and Prevention. SchoolVaxView: 2015–16 School Year Vaccination Coverage Reports. October 2016.

A rise in **vaccine hesitancy**—a behavior influenced by lack of trust in the medical community, concerns about vaccine safety, efficacy, necessity or convenience and other issues related to vaccination—has contributed to undervaccination through parental decisions to delay or refuse vaccines for their children. A parent's decision not to vaccinate his or her child puts not only that child, but every person that child comes into contact with at increased risk of infection. As more parents choose not to vaccinate, overall vaccination rates decline. Lower rates of vaccination increase the risk of preventable disease outbreaks by compromising **herd immunity**, a safe vaccination rate that can significantly reduce the spread of infectious disease within a community.

Healthy People 2020—a national health promotion and disease prevention initiative of the U.S. Department of Health and Human Services (HHS)—established target vaccination rates for each vaccine-preventable disease that are necessary to achieve herd immunity and protect entire communities. Some childhood vaccines, such as measles, mumps and rubella (MMR), diphtheria, tetanus and pertussis (DTaP) and varicella (chicken pox), have a target vaccination rate of 95%, and many states and communities are failing to reach these goals.[8]

This PolicyLab *Evidence to Action* brief summarizes research findings around the causes and effects of vaccine hesitancy, and proposes policy changes that could lead to increased vaccination rates and greater protection for the current and future health of our children.

BACKGROUND

Vaccination programs have a long history of significantly reducing the prevalence of vaccine-preventable diseases. A vaccine successfully eradicated smallpox worldwide in 1977.[9] The U.S. declared the national elimination of polio and measles in 1979[10] and 2000[11], respectively. The prevalence of other preventable diseases, such as diphtheria and rubella, has reached such low levels that most Americans have never experienced or witnessed them.[12]

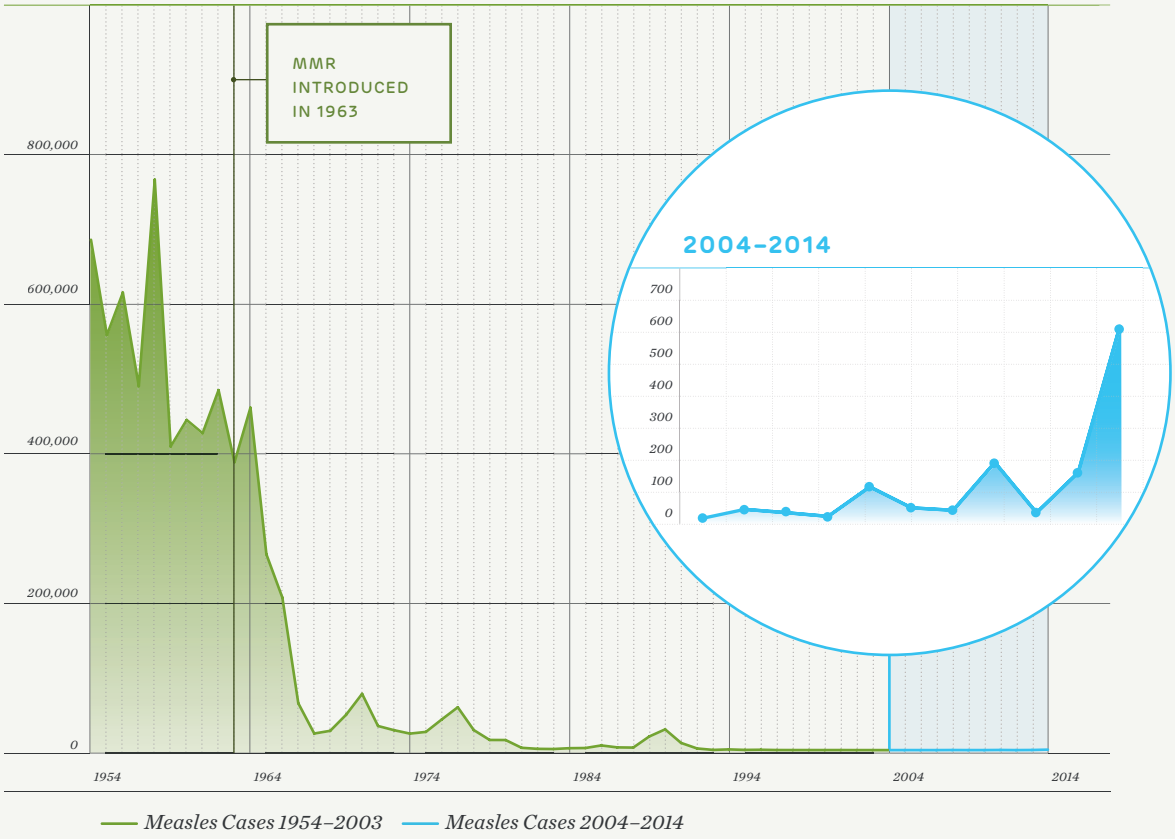
The shift toward intentional vaccine delay and refusal is directly associated with increased occurrence of preventable diseases for individuals and entire communities.

This success, however, requires sustained and sufficiently high vaccination rates. Unfortunately, a rising level of vaccine hesitancy has begun to threaten the herd immunity that makes the success of vaccination programs possible. A 2013 study of more than 300,000 U.S. children found that approximately 49% of children born between 2004 and 2008 were undervaccinated—or hadn't completed all recommended vaccinations by the recommended age—at some time prior to their second birthday, and one in eight of those children were undervaccinated because of parental choice to delay or refuse certain vaccines.[13]

The shift toward intentional vaccine delay and refusal is directly associated with increased occurrence of preventable diseases for individuals and entire communities. For instance,[14] although the U.S. declared measles eliminated in 2000 and it is no longer endemic in this country, the disease is extremely contagious and can be easily imported when individuals enter the U.S. after having been exposed in other countries. Since 2000, more than 1,500 measles cases have been reported, and 2014 saw the highest number of cases in two decades. That year, a high-profile measles outbreak that originated in a California Disney theme park was associated with 111 cases that spread to several states. Approximately half of those who contracted measles were known to be unvaccinated, the vaccination status of more than 40% of the others was unknown or undocumented and most were old enough to receive the vaccine but remained unvaccinated by parental choice.[12,14]

Figure 2

MEASLES INCIDENCE BEFORE AND AFTER MMR VACCINE INTRODUCTION: 1953–2014



Source: Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases, 13th Edition. *Appendix E-1: Reported Cases and Deaths from Vaccine Preventable Diseases, United States, 1950–2013; 2015.*

Local vaccination rates can vary greatly even within states that have high overall vaccination rates. In addition to individual risk of exposure from contact with an unvaccinated person, geographical clustering of intentionally unvaccinated children puts whole communities at increased risk by decreasing protective herd immunity for a specific region.[8] One way of measuring this shift is through the rise in the number of families choosing to receive vaccine exemptions rather than immunizing their children according to school immunization requirements. For instance, in 2010, public school vaccine exemption rates at the county level in Pennsylvania ranged from 0.1% to 5.5%. For all schools in Washington state that year, exemption rates ranged from 1.0% to 25.3%.[15] Research has shown that areas with clusters of vaccine exemptions, where many parents intentionally choose not to vaccinate their children, are significantly more likely to experience outbreaks of pertussis.[16]

PROBLEM

Public health entities such as the World Health Organization[17] and the National Vaccine Advisory Committee[18] have focused on better defining vaccine hesitancy to help inform interventions designed to address it. Based largely upon this body of work, we have identified three primary contributors to vaccine hesitancy and its ability to negatively impact children's and population health in the United States.

- Diminished Prioritization of Vaccination
- Lack of Confidence in Safety and Efficacy
- Inadequate State Policies

Diminished Prioritization of Vaccination

Vaccines are victims of their own success. Many parents today have never seen a case of measles, mumps, whooping cough or bacterial meningitis. Lack of first-hand experience with vaccine-preventable diseases can lower parents' perception of the likelihood and severity of infection, leading to the belief that vaccination is not necessary to protect children's health.[19] This can lead parents who may have no particular objections to vaccination to keep their children unvaccinated as a matter of convenience, particularly if they face any barriers to accessing vaccine services.

Delaying the earliest recommended vaccinations is risky because it can disrupt the entire vaccination schedule, leaving infants and young children unprotected from preventable illnesses for longer periods of time and when they are at highest risk for severe morbidity or even death from vaccine-preventable diseases. A 2009 study of newborns from a large urban setting found that children most at risk of late vaccine initiation are those whose mothers attend fewer prenatal care visits and who are younger, less educated and already have at least one other child.[20] These delays may not be driven by negative attitudes toward vaccines, but demonstrate that barriers to accessing vaccines combined with an underappreciation of the severity and prevalence of preventable diseases can keep children from being fully vaccinated on time.

Late vaccine initiation can also be due to a parent's deliberate decision to delay vaccination. The combination of diminished perception of risk with rising public concerns about vaccine safety can make delaying or refusing vaccination seem like a prudent decision for some parents trying to protect their children's health.[21] Instead, in some cases, delaying a vaccine beyond the recommended age may increase the risk of uncommon potential vaccine side effects. For instance, one study showed an increased risk of seizure associated with high fever after delayed receipt of a vaccine. More importantly, the decision to delay increases the amount of time a child is at risk of contracting a vaccine-preventable disease.[22,23]

Lack of Confidence in Safety and Efficacy

The success of vaccination programs at reducing the prevalence of preventable illness has lowered some parents' perception of the risks associated with those illnesses. When parents do not see the potential benefit of vaccination, any perceived safety concerns about a specific vaccine may seem like a greater risk than the infection itself. Such vaccine safety concerns are also fueled by a prominent anti-vaccination movement in the U.S., which instills a lack of confidence in important vaccine programs. This movement is dangerous largely because it is:

Based on misinformation.

Some of the more common arguments against vaccination include misleading and unsubstantiated claims about vaccine safety. These include claims that vaccines contain poisons, cause autoimmune or neurodevelopmental disorders or can overwhelm the immune system. A significant contributor to decreasing confidence in vaccines was a falsified and later discredited study in 1998 that incorrectly linked the MMR vaccine to autism. Although the journal retracted the article and the lead researcher lost his medical license and was found guilty of ethical, medical and scientific misconduct,[24] it created safety concerns for the public that have continued to resonate.

Multiple studies since this 1998 article have found no connection between vaccines and autism, and yet this same researcher created a documentary in 2016 that continues to assert this claim. Experts discredit the documentary as a deceptive conspiracy theory.[25,26] Unfortunately, the perpetuation of this myth can still further vaccine hesitancy and threaten the health of entire communities. For parents trying to understand a child's diagnosis of a condition like autism, false but compelling stories linked to vaccines can continue to influence their decisions.

Perpetuated in the media and online.

More than half of internet users report that their medical decisions are often influenced by internet searches.[27,28] This reliance on the internet, where information can be shared with no filter or review, makes it more likely that vaccination decisions are based on misleading information.[29] Anti-vaccination messaging occurs more on the internet than any other media outlet. Anti-vaccination websites often self-reference or include no reference at all, misrepresent truthful sources, use outdated or disproven information and rely on anecdotes that can be compelling.[30]

Anti-vaccine groups have also run TV public service announcements (PSAs) in localities where lawmakers have considered stronger vaccination requirements. These PSAs use messages that may be emotionally compelling, but that are typically based on unsubstantiated rhetoric rather than the evidence or recommendations from the medical community.

Vaccine laws are often politicized, and research has shown that when the media heavily covers such controversies around mandatory vaccination, public support for vaccine programs and trust in physicians can decrease. But when the vaccine-related coverage does not emphasize political conflict, it can potentially increase support for immunization programs.[31]

Difficult to reverse.

The scientific community has struggled to effectively communicate evidence that supports vaccine safety and efficacy in the face of anti-vaccine rhetoric. The primary emphasis of vaccine education has centered on dispelling myths about adverse effects, such as the inaccurate link to autism and other unfounded safety concerns. It is difficult, however, to eliminate the bias created by the original misinformation, especially when it is tied to a compelling story. In fact, the repetition of inaccurate information during attempts to refute it can have an unintended "backfire effect"—increasing familiarity with and perpetuating the myth,[29,32] further driving down vaccine acceptance. It is important to promote accurate information, but the challenge is doing so without inadvertently furthering the negative effects of the original false claims.

Inadequate State Vaccine Policies

Every state mandates that children receive vaccinations prior to enrolling in school. The U.S. Supreme Court has established the constitutionality of mandatory vaccination, including for school entry. The first case in 1905, *Jacobson v United States*, upheld a Massachusetts law requiring adults over age 21 to be immunized against smallpox in the interest of the public's health and safety. In 1922, *Zucht v King* upheld a local government mandate for vaccination as a prerequisite for attending public school. As a result, state and local municipalities can formulate their own immunization requirements, including the type of vaccines required, available exemptions and mechanisms used to enforce the requirements.[33]

Every state allows medical exemptions for children with a contraindication to vaccination, such as a compromised immune system or allergy to the vaccine.[34] Most states also allow nonmedical exemptions based on religious or personal beliefs. All but three states—West Virginia, Mississippi and California—offer religious exemptions. Personal belief exemptions are less common, but are available in 18 states.[35,36] In general, parents or guardians must provide documentation of a medical contraindication from a physician or get a nonmedical exemption in order for their unvaccinated child to attend school, but some states do not always enforce this rule. Additionally, the process and requirements to receive a religious or personal belief exemption vary greatly. For instance, some states simply require parents to print out an exemption form online, indicate their own reason for the exemption and submit it with no additional review. Others require parents to take additional steps such as having a health care provider sign their exemption form indicating that they received education about vaccines and understand the risks of not vaccinating.[37,38]

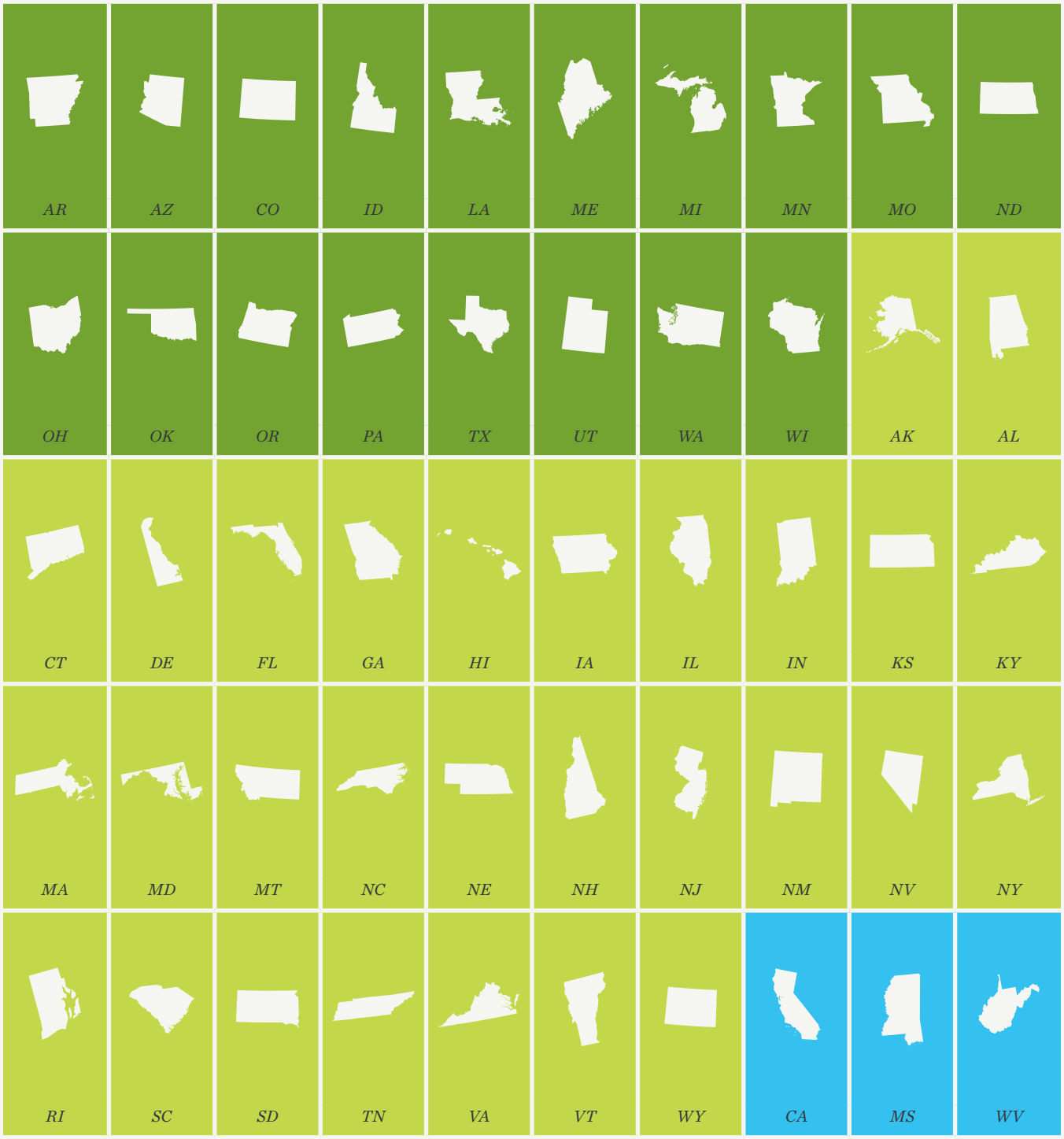
State exemption policies can significantly limit the reach of immunization programs. Evidence shows that the availability and ease of nonmedical exemptions increase exemption rates and decrease vaccination rates.[19] Lower vaccination rates subsequently increase the level of risk for outbreaks of preventable diseases. For instance, between 1986 and 2004, pertussis incidence in states that allowed personal belief exemption was more than twice as high as states that only allowed medical and religious exemptions. In that same time period, pertussis rates were also 41% higher in states that accept parent signatures as proof of their child's immunization compliance compared with states that required documentation of immunity.[39] Research from 2012 showed nonmedical exemption rates were 2.3 times higher in states with policies that make it easy to opt-out of immunization requirements.[40]

Vaccination rates also vary significantly by region within states. Even states with low overall exemption rates can have smaller geographic clusters where large numbers of individuals choose not to vaccinate, leading to a reduction in immunization rates below the herd immunity threshold. This type of spatial clustering increases the likelihood of disease outbreak within and beyond the immediate community.[15]

State exemption policies can significantly limit the reach of immunization programs. Evidence shows that the availability and ease of nonmedical exemptions increase exemption rates and decrease vaccination rates.

Figure 3

STATE NON-MEDICAL EXEMPTIONS FROM SCHOOL IMMUNIZATION REQUIREMENTS, 2016



**Washington, D.C. also allows Religious Exemptions.*

Source: National Conference of State Legislatures. States with Religious and Philosophical Exemptions from School Immunization Laws. January 21, 2016; Retrieved from http://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx.

WHAT WE CAN DO

PolicyLab researchers have developed a set of recommendations to address parents' hesitancy about vaccinations and strengthen state vaccine policies to optimize immunization rates.

- Improve Health Care Providers' Ability to Make Strong Vaccine Recommendations
- Strengthen and Enforce Vaccine Mandates for School Entry
- Improve Public Vaccine Education, Awareness and Access

Improve Health Care Providers' Ability to Make Strong Vaccine Recommendations

A provider's recommendation is one of the strongest predictors of a patient receiving a vaccine, and positive recommendations can significantly improve vaccination rates.[41,42] Providers have the opportunity to address parental concerns that lead to vaccine hesitancy and the dangers of refusing or delaying vaccination. They can respond to parents' complacency toward vaccines or fears regarding their safety and efficacy by presenting evidence-based information in a way that is easy to understand and that effectively addresses specific concerns. Providers should therefore remain up-to-date on the latest information about vaccine safety and best practices, as well as prevalent reasons for hesitancy, and be able to give a strong, effective recommendation.

Some strategies to increase positive provider influence on vaccination outcomes include the following:

Health care educators should place a stronger emphasis on training about vaccine safety, efficacy and communication at all levels of career development.

Opportunities to build these skills and expertise must be more readily available in both medical and nursing schools and through continuing medical and nursing education. All health care providers need to provide a consistent message.

Obstetricians should counsel mothers before giving birth about the importance of following the recommended vaccination schedule to make sure their infant will be fully protected.

Late initiation of immunizations makes children less likely to receive all vaccinations when they are recommended, and more likely to spend more time unprotected from potentially devastating, preventable diseases. Research shows that prenatal visits can positively impact health care outcomes such as on-time vaccinations. A 2009 study found that attending fewer than five prenatal visits is one of the greatest risk factors for infants starting vaccines late and for increasing the amount of time before the first vaccination. Early interventions during prenatal care may therefore be a key strategy to help prevent vaccine delays and underimmunization. Some methods to get more pregnant mothers to attend prenatal visits and accomplish these interventions include improved provider training and partnerships between obstetric practices and local maternal and child health services that promote vaccine education within prenatal care.[20]

Providers should aim to reduce or eliminate the number of patients on alternate vaccination schedules.

Pediatric offices should inform all patients that the office follows the CDC-recommended vaccine schedule and every parent is expected to have their children fully vaccinated on time. Providers can use the following strategies to manage relationships with parents who wish to refuse or delay vaccination:

- *Address vaccine hesitancy through motivational interviewing, during which providers actively elicit and acknowledge specific concerns from parents to foster open and honest dialogue.*
- *Keep up-to-date with developments in vaccine safety and recommended practices, as well as prominent concerns being raised by the public. See Figure 4 for a list of talking points to address some of the most common concerns about vaccine safety and efficacy.*
- *Request signed forms from parents who continue to refuse or delay vaccination, and record informed refusal in their child's medical records.*[46]
- *Reinforce the safety and efficacy of the vaccine schedule by personalizing its use. Share stories about the successes of vaccines and personal choices to immunize your own children or other family members.*
- *Maintain doctor–patient relationships with vaccine hesitant families to provide an opportunity to build trust and confidence in a provider's recommendation. However, if repeated attempts fail to convince parents to vaccinate their children, providers may consider dismissing families from the practice as an acceptable option. While additional studies are needed, anecdotal evidence indicates that some parents accept vaccines when faced with the choice of vaccination or dismissal. Additionally, providers face a dilemma when their unimmunized patients can potentially expose other patients to vaccine-preventable diseases.* *(CONT. →)*

Examples of Existing Vaccine Education Opportunities:

The University of Pennsylvania offers fourth-year medical students an intensive one-week course on vaccination. The course covers the science of vaccines, as well as legal, political and social issues related to vaccination, including how to effectively communicate with vaccine hesitant parents.[43]

The CDC offers continuing education opportunities on vaccination, including training on how to improve vaccination rates and increase the likelihood that parents will follow the recommended schedule for children. Available courses also include materials that health care educators can incorporate into existing medical school curricula.[44]

The American Academy of Pediatrics offers a free online course titled, "Challenging Cases: Vaccine Hesitancy," which provides strategies to discuss vaccination with hesitant parents.[45]

Figure 4

TALKING POINTS TO ADDRESS VACCINE HESITANT PARENTS

Vaccines are safe. They are tested in thousands of people before they are licensed and are monitored extensively after being made available to the public.	Infants experience the same amount of stress during each visit, whether they receive two or five shots at once. Therefore, spreading out the shots over more visits may be more stressful.	Spreading out vaccinations beyond the recommended schedule may be less safe and effective.	The recommended vaccine schedule ensures the best immune response and protection when a child is most at risk of infection.	Delaying vaccines increases the risk of contracting vaccine-preventable diseases and infecting others.

The American Academy of Pediatrics (AAP) supports the dismissal of a family that refuses to vaccinate, but asserts that it must be done in keeping with state laws, which typically include sufficient notice, continuing care for at least 30 days, ensuring that alternative providers are available and offering families information to help find another physician.[47]

These methods may help providers maintain constructive relationships with families in their care, and also successfully increase vaccine acceptance to ensure that their patients remain on the recommended vaccination schedule.

States should help to strengthen immunization information systems (IIS) by requiring all providers who administer vaccines to report doses for children, adolescents and adults.

Nearly all states currently operate IIS—electronic databases that record all immunization doses—but their regulation and actual utilization vary by state.[48] The Community Preventive Services Task Force, an independent panel of public health and prevention experts, recommends IIS due to strong evidence that they are successful in increasing vaccination rates and reducing vaccine preventable disease. For providers, IIS can help to determine patients' vaccination status and offer reminder and recall tools. For communities, these systems can guide public health responses to outbreaks, inform assessments of vaccination coverage to find gaps and disparities, and facilitate management and accountability of vaccination programs. Increasing participation in IIS among all providers will help to realize the full potential benefits of these systems.[49]

States should require third-party payers to provide adequate reimbursement to providers for the full cost of vaccination services.

Federal law requires that insurers cover recommended vaccinations at no cost to the patient, but providers are not always adequately reimbursed. States should require payers to reimburse providers for the costs of purchasing, storing and administering vaccinations to their patients. Furthermore, successfully recommending vaccinations to hesitant parents can involve lengthy conversations. The National Vaccine Advisory Committee recommends the development of billing codes to allow physicians to be compensated for counseling parents on the importance of getting vaccines for their children, even if the parents eventually choose not to vaccinate. The Committee's recommendations also suggest establishing pay-for-performance initiatives, which could be measured by achieving a minimum vaccine coverage goal and continuing to improve on vaccine coverage rates.[18] These measures could eliminate any financial disincentives facing providers and support their ability to make strong and consistent vaccine recommendations.

Strengthen and Enforce Vaccine Mandates for School Entry

Vaccine mandates for school entry can help to increase immunization rates, but they are only effective when they are meaningful and enforceable. Laws and regulations regarding vaccine requirements and exemptions are established at the state level. States should consider tailoring any of the following strategies to strengthen and build upon their existing mandates:

Pass legislation to eliminate nonmedical vaccine exemptions for entry to both public and private school.

The American Medical Association and AAP released policy recommendations in June 2015 and August 2016, respectively, encouraging state legislatures to eliminate all nonmedical exemptions.[50,51] Currently, only three states—California, Mississippi and West Virginia—do not allow any type of nonmedical exemption for school entry. Mississippi has one of the strongest and longest-standing vaccine policies in the country, in place since 1972, which has resulted in the highest vaccination and lowest exemption rates. In the 2014–2015 school year, more than 99.2% of kindergartners in Mississippi received the MMR, varicella (chicken pox) and DTaP (diphtheria, tetanus and pertussis) vaccines, compared to national averages around 94%. Only 17 Mississippi kindergartners, less than 0.1%, had a vaccine exemption, compared to the national average of 1.7%.[8] In 2015, California became the most recent state to remove religious and personal belief vaccine exemptions and require parents who refuse to immunize their children to utilize homeschooling.[36]

Use regulatory measures to make the exemption process more rigorous.

Stricter exemption rules that require parents to prove that they are making informed decisions based on legitimate medical contraindications or strong personal or religious conviction could deter parents who seek exemptions due to inconvenient access to immunization services or mild vaccine hesitancy. A 2015 study found that the additional step of requiring physician signatures or state health department approval for nonmedical exemption applications was associated with lowering exemption rates. These more effective exemption policies also correlated with lower incidence of pertussis.[52]

Some states require parents to receive education on the benefits of vaccines, be counseled by a physician on their decision to exempt their child or sign an affidavit stating their reasons for opting out before granting a nonmedical exemption.[52] For instance, in 2010, Washington had the highest vaccine exemption rate in the country at 6.2%. Most of those exemptions were nonmedical.[53] In 2011, the state was part of one of the largest measles outbreak in recent history, and in response, passed a tougher exemption law that requires proof that a physician counseled the parent on the risks and benefits of immunization. Religious and personal belief exemption rates decreased to 3.5% by the 2014–2015 school year.

Establish nonmedical vaccine exemption fees.

Parents who choose not to vaccinate their children for nonmedical reasons impose the additional risk of contracting a preventable disease not only on their child, but also on the entire community. The cost of this decision on society includes the increased risk for outbreaks, the economic costs associated with managing a potential outbreak and the administrative cost of processing and documenting the exemption. Imposing fees for each vaccine exemption shares the financial burden with those who are contributing to potential societal costs, in addition to serving as a financial disincentive for vaccine refusal. Revenue from such fees could contribute to vaccination-related efforts, including management of outbreaks and vaccine education.[54]

Parents who choose not to vaccinate their children for nonmedical reasons impose the additional risk of contracting a preventable disease not only on their child, but also on the entire community.

Example of a Public Awareness Campaign:

Every Child By Two (ECBT) is a nonprofit organization that uses a variety of public education campaigns to increase awareness of the importance of timely vaccination. Its messaging materials, which have included billboard campaigns, social media marketing, public education events and PSAs, are designed to direct viewers to credible vaccine information sources. ECBT's prominent Vaccinate Your Baby campaign, which utilized these communication tools, reinforced the safety of vaccines and highlighted the dangers of vaccine refusal and delay through personal stories. This campaign generated significant coverage from news outlets and acted as a strong counterargument to the anti-vaccine movement.[57]

Improve Public Vaccine Education, Awareness and Access

To combat the spread of misinformation and complacency that keep parents from having their children vaccinated, it is important to ensure that parents understand that the benefits of vaccination outweigh any perceived risk or inconvenience. The following strategies can be used to improve public knowledge of and access to recommended vaccines:

States and local health departments should invest in public awareness campaigns to promote the benefits of vaccination and risks of refusal and delay.

Parents choose not to vaccinate their children for a variety of reasons, ranging from deeply held personal objections to fears of potential harm to simply avoiding what they see as an unnecessary inconvenience. Health departments should research and implement the most effective communication strategies, making sure to target their messaging to reach each type of vaccine hesitant parent and address their specific needs and concerns. This effective use of social marketing practices can help to establish social norms about vaccines and increase their acceptability.[55]

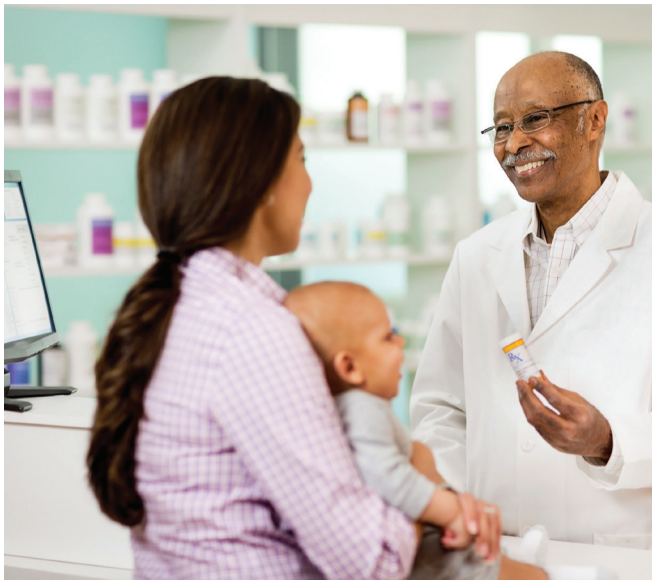
For instance, a 2014 study found that attempts to correct myths about vaccine safety risks were ineffective at changing parents' existing negative attitudes toward vaccination. Interventions that used an alternative narrative highlighting the health risks associated with not vaccinating children, such as a mother's account of her child contracting measles and photos of infected children, showed more promise in increasing vaccine acceptance.[56] The framing of messages used to combat false claims about vaccinations is a potential area for improvement to help increase vaccination rates, but much is left to be learned about how to successfully increase positive beliefs in the midst of growing anti-vaccine sentiment. We should partner with experts in health behavior and communication to establish best practices to target key beliefs that influence these important health care decisions.

Federal legislation should allow payers to offer lower-cost health insurance premiums based on vaccination status.

Federal law already allows premium differentials for a limited set of factors, such as rewarding individuals who abstain from or quit smoking with lower insurance premiums.[58] Legislators could add vaccination status to this list. The inclusion of this benefit can act as a financial incentive to follow recommended immunization schedules for parents with no serious concerns about vaccine safety and reinforce the safety and importance of vaccine programs for those who remain hesitant. Strong immunization information systems as recommended by the Community Preventive Services Task Force could support the implementation of this type of premium differential.

States should make vaccines more accessible to children by allowing school-based health clinics to administer them.

Offering vaccinations in the school setting is an opportunity to provide legitimate vaccine education and boost immunization rates by taking the vaccines directly to the children.[59] For instance, Rhode Island's Vaccinate Before You Graduate program provides middle and high school students with any recommended vaccine to ensure that every student is fully protected by the time they graduate. In the 2014–2015 school year, nearly 9,000 students were vaccinated through this program.[60]



Many parents interact with pharmacists on a more regular basis than with a primary health care provider. Allowing pharmacists to provide vaccines in a location that is often more convenient than a providers' office has been shown to increase immunization rates.

States should increase pharmacists' ability to recommend and administer vaccines to patients of all ages.

Many parents interact with pharmacists on a more regular basis than with a primary health care provider. It is important, therefore, that pharmacy schools train future pharmacists to counsel patients on vaccine decisions, including how to provide information about vaccine benefits and counter inaccurate statements about vaccine risks.[61] Additionally, allowing pharmacists to provide vaccines, such as the influenza vaccine, in a location that is often more convenient than a providers' office has been shown to increase immunization rates.[62]

As of July 2016, 48 states allow pharmacists to administer any type of vaccine. Some of these states, however, impose barriers to vaccination in pharmacies related to age, vaccine type and prescriptions. Additionally, 28 states and territories allow pharmacists to vaccinate children of any age, while some limit this option to particular types of childhood vaccines.[63]

Progress is already being made in some states to increase pharmacists' abilities to administer vaccines. For example, in 2015, Pennsylvania changed the age restriction from age 18 to allow children as young as nine to receive the flu vaccine in pharmacies.[64] Additionally, in March 2016, Idaho lowered its age limit from 12 to 6 to allow more children to receive all recommended vaccines in the pharmacy setting.[65] Similar state legislative efforts should be made across the country to improve access to vaccinations for difficult to reach populations. However, successful implementation of this approach calls for a strong immunization information system in order to maintain current records of an individual's immunization status when receiving vaccines from multiple providers.

CONCLUSION

Vaccines are one of the most important public health accomplishments in history. Unfortunately, we are beginning to see more outbreaks of preventable diseases as a result of inadequate vaccination rates due to vaccine hesitancy.

Misinformation, misguided fear and sometimes even simple complacency can lead parents to delay or refuse vaccinations for their children. State policies that make access to immunization services challenging or make it easy for parents to opt-out of vaccination programs foster vaccine hesitancy, can result in low community vaccination rates and increase the likelihood of disease outbreaks.

Stakeholders at all levels must take action to help reduce vaccine hesitancy, optimize access and increase vaccination rates to levels that will protect entire populations—including those who are too young or have another medical contraindication that prevents them from receiving vaccines.

WHAT STAKEHOLDERS CAN DO TO ENCOURAGE VACCINATION

Combining and scaling up these best practices can help ensure that current and future generations of children and adults will continue to see the benefits of vaccines.

Health care networks and educators can work to ensure providers have the training and support they need to make strong vaccine recommendations and adequately address the concerns of hesitant parents.

Providers can make use of available tools and training to understand major vaccine concerns, and prepare themselves for tough conversations.

Health plans and insurers can support provider efforts by adequately reimbursing for the entire cost of vaccination, including purchasing, storage, counseling and administration.

Federal legislators can work to encourage vaccination by allowing payers to use premium differentials within the parameters of the federal law that incentivize use of the recommended vaccine schedule.

States can enforce existing vaccine mandates, make it more difficult to obtain vaccine exemptions and allow vaccines to be given in more convenient locations such as pharmacies.

State and local health departments can help to address each cause of vaccine hesitancy through targeted public awareness and education campaigns.

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ACKNOWLEDGEMENTS

We would like to thank Paul Offit, Jason Schwartz and Michael Yudell for their editorial and content advice.

SUGGESTED CITATION

Nabet BB, Gable JL, Eder JP, Feemster KA. *Addressing Vaccine Hesitancy to Protect Children and Communities Against Preventable Diseases.* PolicyLab at Children's Hospital of Philadelphia; 2017. Retrieved from *http://bit.ly/E2A_AddressingVaccineHesitancy.*

RELATED POLICYLAB RESEARCH

PolicyLab at Children's Hospital of Philadelphia. Supporting Effective Immunization Policy: Identifying and Addressing Barriers to Timely Immunization. Retrieved from: *http://policylab.chop.edu/project/vaccine-policy.*

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PolicyLab *Evidence to Action* briefs highlight PolicyLab research and propose evidence-based local and national policy solutions to advance child health and well-being.

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Founded in 2008, PolicyLab is a Center of Emphasis within the CHOP Research Institute, one of the largest pediatric research institutes in the country. At PolicyLab, our experience caring for children and families informs our "evidence to action" approach to improving children's health.

The Vaccine Education Center was launched in October 2000 to provide accurate, comprehensive and up-to-date information about vaccines and the diseases they prevent.

The Center seeks to dispel some of the common misconceptions and misinformation surrounding vaccines. The goal of our team is to communicate the facts about each vaccine as well as how vaccines are made, how and why vaccines work, who recommends them, whether they are safe, whether they are still necessary, and when they should be given.

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