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A MEASURE OF CARE: Texans Champion the Value of Immunizations

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IMPACT FUND



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We wish to acknowledge the incredibly generous support of St. David's Foundation. Without their enthusiastic support, this project would not be possible. We are very grateful for their investment in the health of Texans.



LETTER FROM THE LEADERSHIP

Greetings from The Immunization Partnership,

Welcome to our fourth biennial publication regarding the state of immunizations in Texas, sponsored by the St. David's Foundation. The Immunization Partnership is excited to present to you this publication, which represents feedback and insights from stakeholders across the state. TIP is immensely proud to provide this guidance to policymakers so that stakeholders can have a voice in guiding the development of laws and policies that impact immunization rates and prevent diseases in our state.

Texas has come a long way in strengthening immunization laws over the past decade, including adding middle school vaccination requirements and protecting college students from meningitis. But there have been setbacks as well. The rate of non-medical exemptions continues to climb at an alarming rate. We have had outbreaks of once rare disease such as measles and pertussis, and our immunization registry is still burdened by obsolete policies. Stakeholders on the ground grapple with these issues every day as they work to keep Texas a healthy and prosperous state.

Vaccines have been a victim of their own success. When immunization rates are high, these once devastating diseases are kept at bay. Our work and that of thousands of healthcare workers, public health officials, and community organizations across the state results in an invisible kind of success.

This publication is meant to shed light on that invisible work and to guide policymakers as they determine the best way to protect the health of Texans. Without high rates of immunization, our communities — and perhaps even our own family members — are at risk. Vaccines are the safest and most effective way of preventing deaths and disabilities from many diseases that caused panic just a few generations ago. We cannot afford skepticism or complacency about this very important issue.

On behalf of the Board of Directors and staff of The Immunization Partnership, I would like to express our sincere appreciation to our donors, stakeholders, and individuals who made this publication possible. The Immunization Partnership is honored and humbled by the immense support and enthusiasm shown by the community. Texas has demonstrated a truly inspirational dedication to our common cause: preventing what's preventable. Thank you for the work that you do each day to create a healthy community. Working together, we can realize our vision of a community free from vaccine-preventable diseases.

Warm regards,



Anna C. Dragsbaek, J.D.

President and CEO

The Immunization Partnership

ABOUT US

The Immunization Partnership

The mission of The Immunization Partnership (TIP) is to eradicate vaccine-preventable diseases by educating the community, advocating evidence-based public policy, and promoting immunization best practices. Our vision is a community free from vaccine-preventable diseases. All of our projects and programs are developed in concert with achieving the organization's mission. To achieve and sustain high immunization rates, TIP has three focus areas: education, advocacy, and the support of immunization best practices. Together, these three areas address both the root causes of low immunization rates and the far-reaching policy issues that impact immunization rates in Texas. For more information, please visit www.immunizeUSA.org.

St. David's Foundation

St. David's Foundation invests in a healthy community through funding, hard work, and initiatives to better care for the underserved and uninsured. As a joint owner of St. David's HealthCare, the Foundation achieves its goals by investing proceeds from the hospitals back into the Central Texas community. From its beginnings in 1924, St. David's HealthCare has now grown to include seven hospitals, four surgery centers, four urgent care clinics, and three free-standing emergency departments reaching from Georgetown to Kyle. Each year the Foundation gives millions directly to the community through grants in six key areas to numerous agencies, local safety net clinics, and the highly acclaimed St. David's Dental Program.

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SUMMARY OF RECOMMENDATIONS

In 2014, The Immunization Partnership engaged Texas immunization stakeholders in state-wide meetings and a web-based survey, the purpose of which was to empower participants to effectively advocate for positive policy change. Other objectives included discussing immunization topics on the national and state front and identifying immunization challenges. A total of 193 Texans participated in the meetings, and 179 completed the survey. The stakeholder meetings and survey will culminate in the 2014 Texas Immunization Summit in San Antonio, Texas.

Stakeholder discussions and survey responses reinforced the need to pursue the following recommendations:

1. Promote strategies that reduce pertussis (whooping cough) incidence and protect mothers and infants.
2. Enhance the state immunization registry, ImmTrac, with specific features related to consent, retention of immunization records, and data exchange.
3. Reduce the number of exemptions that are claimed due to reasons of conscience through education and advocacy initiatives.
4. Increase immunization coverage rates among adults by improving vaccine access and affordability.
5. Continue to support efforts that protect college students against bacterial meningitis.
6. Improve uptake of human papilomavirus vaccine (HPV) among adolescents and young adults through education and the implementation of immunization best practices.
7. Increase awareness, research, and surveillance of tropical and emerging diseases.

BACKGROUND AND PURPOSE

Immunization Rates in Texas

Vaccines protect. Vaccines prevent. Vaccines save. These are the facts according to a new report from the Centers for Disease Control and Prevention (CDC). Vaccines given to infants and young children over the past two decades will prevent 322 million illnesses, 21 million hospitalizations, and 732,000 deaths over the course of their lifetime.¹ Vaccines also will have saved \$295 billion in direct costs, such as medical expenses, and a total of more than \$1.3 trillion in societal costs over that time.²

Across the United States (U.S.), states are making incredible advances in protecting their communities from devastating and often debilitating diseases. Texas, for instance, has seen a steady increase in adolescent vaccination rates for the past several years. In 2013, the combined Td/Tdap (tetanus-diphtheria/tetanus-diphtheria-pertussis) vaccination rate was 90.3% (compared to the U.S. rate of 89.1%). The coverage rate for Tdap alone was 86.1% (compared to the U.S. rate of 86.0%), and MCV4 (four-strain meningococcal conjugate vaccine) was 87.6% (compared to the U.S. rate of 77.8%). Over the past decade, the number of cases of Hepatitis A and B in Texas has decreased significantly. In 1998, 3,537 cases of Hepatitis A were reported as opposed to 109 cases in 2013.³ Likewise, 1,960 cases of Hepatitis B were reported in 1998 as compared to 142 cases in 2013.⁴ Texas' varicella ("chickenpox") incidence dropped dramatically in 1999 and has continued to decline. In 2013, there were just 1,874 cases of the once ubiquitous disease in the entire state.⁵

Sustaining success, however, is difficult, particularly in the wake of recent public health reports. Open a newspaper, and the challenges facing immunization advocates might seem bleak. National childhood immunization rates, historically on the rise (40.7% in 2009, 58.6% in 2010, 72.7% in 2011) for 2-year old children vaccinated with the 4:3:1:3:3:1:4 routine series (4 DTaP, 3 IPV, 1 MMR, 3 Hib, 3 Hep B, 1 Varicella, 4 PCV), dropped almost eight percentage points to 64.8%.⁶ Healthy People 2020 goals that were previously achieved for many immunization coverage levels were missed, with the exception of polio (>3 doses). The total number of exemptions claimed for reasons of conscience has increased by more than 16 fold in Texas over the past ten years.⁷

Vaccine-preventable diseases continue to threaten the health of Texans. Last year, Texas reached a 50-year high for pertussis incidence with almost 4,000 cases reported. Measles is also making a comeback—in 2013, the Texas Department of State Health Services (DSHS) reported 27 cases, 21 of which were linked to a largely unvaccinated community in Tarrant County. In 2011, Texas reported 1,130 new cervical cancer diagnoses and 357 cervical cancer deaths.⁸

Constant vigilance is required to protect the gains that have been made, and to prevent further drops in immunization coverage. With a unified vision, public, private, and community groups can promote positive immunization policies and prevent what's preventable.

Legislative Reforms (2013)

In 2013, the work of The Immunization Partnership and its collaborative partners contributed to the successful passage of the legislation listed below. These new laws will increase immunization coverage, promote awareness, and help reduce vaccine-preventable diseases in Texas.

- SB 62, by Senator Jane Nelson (R – Flower Mound), Revisions to the Meningitis Requirement for College Students: Lowers the maximum age of students subject to the meningitis requirement from age 30 to age 22, to align with current CDC recommendations. In addition, only DSHS may grant exemptions to students, either through a paper affidavit form available to all students or via a web-based portal (available to public junior college students only). Current information on the requirement may be found at www.collegevaccinerequirements.com.
- SB 63, by Senator Jane Nelson (R – Flower Mound), Protecting the Health of Teen Parents and Their Children: Expands categories of individuals who can consent to immunizations to include pregnant teens and minors with children. Law applies to vaccines recommended for administration before seven years of age only.
- SB 64, by Senator Jane Nelson (R – Flower Mound), Vaccination Policies for Licensed Child Care Providers: Requires licensed child care facilities to develop and implement immunization policies for their employees, to help protect the children in their care from vaccine-preventable diseases.
- HB 1204, by Representative Tan Parker (R – Flower Mound), Influenza Awareness Day: Designates October 1st as Influenza Awareness Day in the State of Texas, with the intent to recognize and prevent the spread of influenza by increasing the public's knowledge of the risks associated with the infection.

Stakeholder Meetings

Between April and June 2014, The Immunization Partnership hosted four stakeholder meetings in Austin, Houston, Fort Worth, and Dallas. A total of 193 people participated in the meetings (Figure 1). The objectives of the meetings were to: 1) review immunization topics on the national and state front, 2) discuss immunization challenges and priorities in communities across the state, and 3) share information with participants about how to be an effective immunization advocate.

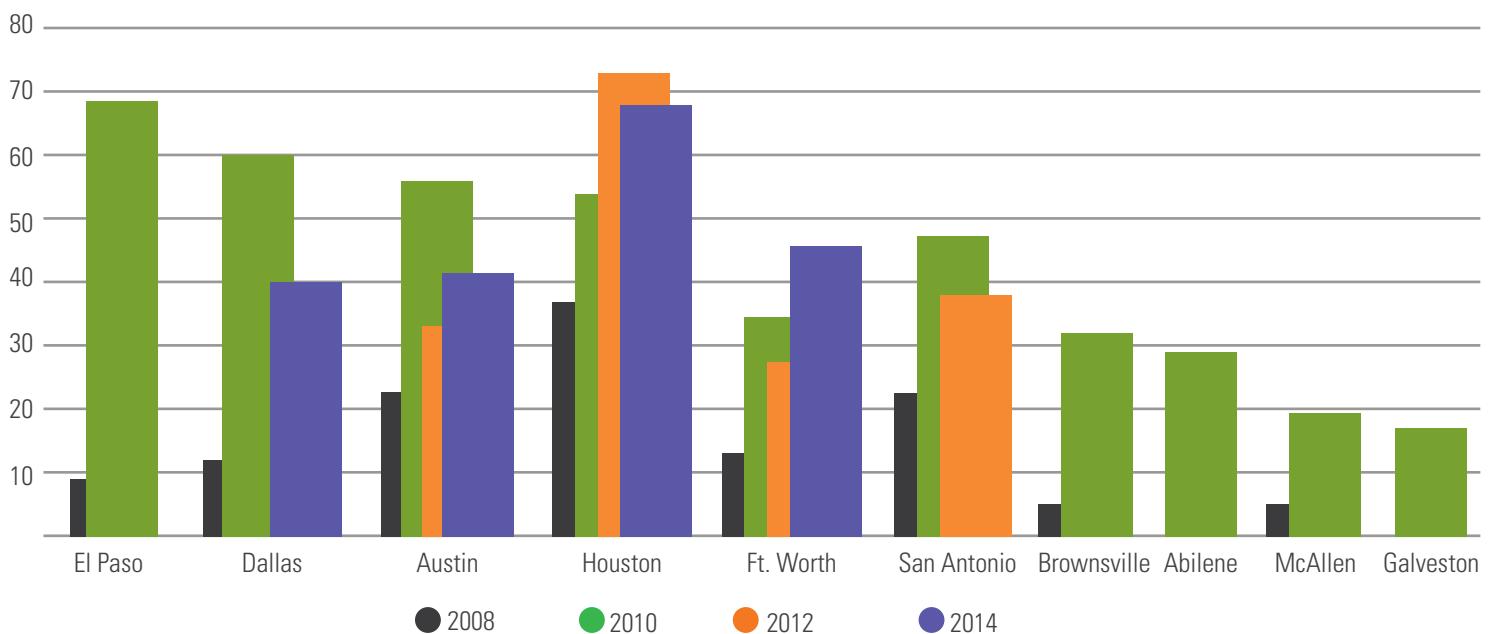
Figure 1. Number of Participants, Immunization Stakeholder Meetings, Texas, 2014	
Houston	68
Fort Worth	45
Austin	40
Dallas	40
Total	193

Meeting participants included parents, students, researchers, healthcare providers, state agency personnel, and representatives from pharmacies, foundations, medical associations, health clinics, pharmaceutical companies, state legislative offices, school districts, and non-profit organizations. Since 2008, TIP has hosted 26 stakeholder meetings in ten cities and engaged almost 900 participants (Figures 2 and 3).

Figure 2. Location of Immunization Stakeholder Meetings, 2008 - 2014



Figure 3. Total Number of Participants by City, Immunization Stakeholder Meetings, 2008 - 2014



The feedback from the 2014 meetings was overwhelmingly positive. Virtually all of the participants believed that the meetings increased their understanding of several key topics and provided them with important resources (Figure 4).

Figure 4. Percentage of Stakeholders who "Agreed" or "Strongly Agreed" with Statement, Immunization Stakeholder Meetings, Texas, 2014	
The issues discussed during the meeting were key issues of importance.	100%
During the town hall, I was given the opportunity to raise questions and voice concerns.	100%
The issues raised during the meeting were thoroughly addressed.	98%
The meeting increased my understanding of the political environment, as it pertains to immunizations.	97%
The meeting increased my understanding of how I can be personally involved in advocacy efforts.	96%
The meeting increased my understanding of national and state policy issues.	95%
The meeting increased my access to resources (e.g. immunization and vaccine information).	90%
The meeting increased my professional network of contacts.	87%

Web-Based Survey

The Immunization Partnership administered a web-based survey to stakeholders in June 2014, the purpose of which was to learn about local concerns related to the provision of vaccines and gather guidance on best practices for immunization policies and practices.

A total of 179 immunization stakeholders completed the survey. Respondents represented more than 31 cities and towns across Texas. Of respondents, 34% attended at least one of the stakeholder meetings. Fifty-five percent (55%) of respondents reported working in healthcare settings. Respondents included healthcare providers, state agency personnel, local public health authorities, and representatives from hospitals, foundations, medical associations, universities and colleges, pharmacies, school districts, vaccine manufacturers, and non-profit organizations.

The survey addressed key topics including the following: barriers to increasing adult immunization rates, meningitis and human papillomavirus vaccines, emerging tropical diseases, meningococcal vaccine for college students, level of support for potential legislation, and the documentation of immunizations. The survey also asked respondents for suggestions on how to increase immunization rates in Texas.

IMMUNIZATION PRIORITIES

I. Protect Mothers and Infants: Increase Efforts to Control Pertussis

Background

Pertussis, also known as whooping cough, is a highly contagious respiratory infection that can cause uncontrollable coughing and difficulty breathing. Pertussis is a serious illness for children, adolescents, and adults, but may be life-threatening for newborns and young babies. Many infants who get whooping cough are infected by parents, older siblings, or other caregivers who might not know they have the disease. Fifty percent (50%) of infants under one year of age who contract pertussis are hospitalized due to the infection.⁹

Disease Incidence

Before the pertussis vaccine became available, 200,000 children were infected each year in the U.S. and 9,000 died as a result of the infection.¹⁰ Despite the availability of a vaccine, pertussis still remains endemic and epidemic peaks occur every three to five years in the U.S.¹¹ In 2013, Texas reported the highest number of pertussis cases it has had in over 50 years.¹² There were 3,985 reported cases, an 80% increase over the previous year's 2,218 cases.¹³ There were five deaths due to the disease.¹⁴ Like many states, a high incidence of pertussis continues to be reported in 2014, with 1,633 cases and two deaths reported in Texas as of September 3, 2014.¹⁵

Factors contributing to the rise in the reported number of cases—even within highly vaccinated populations—include waning immunity in adolescents and adults from pertussis-containing vaccines as well as enhanced disease detection and reporting due to improved surveillance.¹⁶ Under-vaccinated communities might also contribute to outbreaks of disease in Texas communities. Research studies demonstrate a link between clusters of unvaccinated individuals—specifically those with non-medical immunization exemptions—and outbreaks of pertussis.¹⁷ One study found that young children who were missing three of the four recommended doses of a pertussis-containing vaccine were 18 times more likely to receive pertussis diagnoses than fully vaccinated children. Those missing all four doses were 28 times more likely.¹⁸

Immunization Strategies

Vaccination against pertussis is a cost-effective and often cost-saving measure^{19, 20, 21} that can help prevent the hospitalization of infants due to pertussis, especially when the mother is vaccinated during pregnancy. However, national data show that less than a third of women were vaccinated against pertussis before or during pregnancy^{22, 23}. The CDC Advisory Committee on Immunization Practices (ACIP) recommends a dose of the Tdap vaccine for women during pregnancy, regardless of previous vaccination. The committee also recommends the vaccine for expectant fathers, family members, individuals who will be in close contact with infants, and adults aged 65 years and older.²⁴ Figures show that among adults over age 19 years, only 14% were up-to-date on their Tdap vaccination.²⁵ The “cocooning” strategy—vaccinating all close

contacts to protect infants from disease—is also recommended by the CDC.²⁶ In over half of cases, caregivers are the source of disease transmission.^{27, 28, 29}

Legislation in Texas

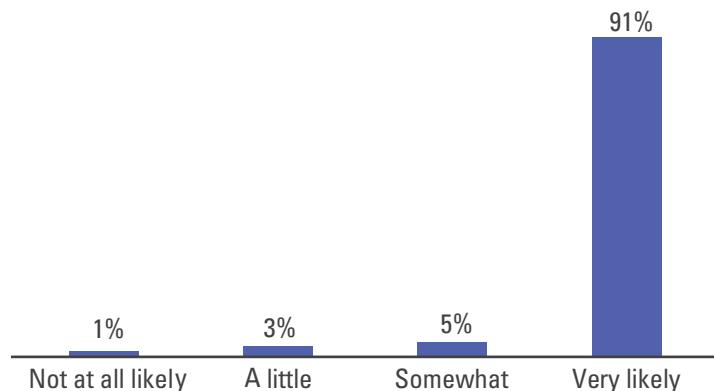
In 2011, the Texas legislature passed HB 3336, which requires a hospital, birthing center, physician, or midwife that provides prenatal or postpartum care to distribute information on pertussis and the availability of the Tdap vaccine to protect against the disease. This measure increases awareness among new parents about the dangers of pertussis and the actions they can take to help protect their infants.

What Stakeholders Say

Stakeholders throughout Texas raised concerns about the efficacy of pertussis vaccines. A longitudinal study from 2013 showed that children who received the full DTaP series still showed an increased risk for contracting pertussis over time, which was likely associated with waning immunity.³⁰ The CDC is also studying the Tdap vaccine, as data suggest that there is a decrease in its effectiveness over time.³¹

Stakeholders observed that many adults have not had a booster dose of Tdap. A pediatrician at a Houston-area hospital reported that as of late last year, only a third of pregnant women had received their influenza and Tdap vaccination at the time they were admitted for delivery.³² When our survey respondents were asked if they were likely to support a measure that required pregnant women to receive information about pertussis and influenza during their third trimester, 91% stated that they were “very likely” to do so (Figure 5).

Figure 5. How likely would you be to support a measure that requires pregnant women in their third trimester of pregnancy to receive information about pertussis and influenza?



Recommendations

1. Educate stakeholders about the efficacy of the Tdap vaccine, waning immunity, and needed improvements to acellular pertussis vaccine technology. Waning vaccine

immunity is a primary concern among stakeholders and the public health community. Studies suggest that immunity wanes over time and individuals become vulnerable to contracting and spreading pertussis. Such concerns warrant the need to educate the public about these topics and advocate for improvements using recent vaccine research.

2. Provide information about pertussis during the third trimester of pregnancy to parents and caregivers, including where to access the Tdap vaccine. Mothers serve as a critical source of immunity and health for their infants. In Texas, information on pertussis is included in the packet of information that is provided to postpartum mothers. However, this approach may not maximize efforts to prevent illness. A recent study of postpartum women conducted at a county hospital in Houston showed that postpartum immunization and “cocooning” strategies did not reduce cases of pertussis in infants younger than 6 months. The authors recommended a renewed focus on immunizing women during pregnancy, in addition to an emphasis on “cocooning.”³³ Tdap vaccination during pregnancy could prevent more cases and deaths due to pertussis at a lower cost than postpartum vaccination.³⁴ Moreover, studies show that mothers who receive a healthcare provider recommendation for Tdap have a positive attitude toward vaccinating against pertussis during pregnancy³⁵ and that family members/caregivers are open to getting vaccinated during healthcare visits.³⁶ Education about pertussis must be accompanied by information about where to access the vaccine, particularly for patients whose providers do not offer the vaccine in-house. A model for delivery might require collaboration with pharmacies to ensure that vaccinations are available to expectant parents and caregivers, that their doses are documented in the immunization registry, and that they are referred back to their primary care provider for further follow-up.

3. Implement the use of post-exposure antimicrobial prophylaxis (PEP) on a targeted basis. A representative from the Texas Pediatric Society suggested that DSHS implement procedures regarding the use of PEP to prevent pertussis disease. PEP involves the administration of antibiotics to an individual who has been in close contact with an infected person, in order to halt the spread of infection. The transmission rate from an infected individual to a close contact (someone who has had face-to-face exposure within three feet of a symptomatic patient) might be as high as 80-100%.³⁷ Although broad-scale use of PEP among contacts might not be an effective use of public health resources,³⁸ the CDC recommends targeted post-exposure antibiotic use to persons at high risk of developing severe pertussis and to persons who will have close contact with such individuals.³⁹

II. Cut the Red Tape and Increase Efficiency of the Texas Immunization Registry, ImmTrac

Background

Immunization Information Systems (IIS) are confidential, computerized, population-based systems that collect and consolidate vaccination data from providers and can be used in designing and sustaining effective immunization strategies.⁴⁰ IIS are recommended as a best practice model by the Community Preventive Services Task Force because of their proven effectiveness to improve vaccination coverage and their capabilities to support effective interventions such as reminder and recall systems, determine client vaccination status, guide public health responses to outbreaks of disease, inform vaccination coverage assessments, and facilitate vaccine management.⁴¹

All 50 states employ IIS, though the maturity and functionality of the systems vary. On the whole, providers of immunizations in Texas use ImmTrac, the immunization registry developed by DSHS. Some counties use locally based IIS, including San Antonio and Tarrant County. Providers also use TWICES (Texas-Wide Integrated Client Encounter System), which maintains immunization history for children served by public and private clinics.

ImmTrac Participation

As of 2014, ImmTrac contains over 120 million immunization records and is being actively used at 10,000 sites.⁴² According to the 2012 IIS annual report (IISAR) data, approximately 88% of Texas children under 6 years of age are participating in ImmTrac—an increase over participation rates of 83% in 2010.⁴³ Although rates are increasing steadily, challenges remain to meet the Healthy People 2020 goal of 95% of children under 6 years of age whose immunization records are in a fully operational, population-based IIS.⁴⁴ Studies affirm that maximal child participation and complete records are needed to fully realize the benefits of IIS, which include reminder and recall messages, vaccination coverage reports, and support for disease outbreak response.⁴⁵ Developing and promoting these tools to providers can encourage provider utilization and, in turn, increase child participation.⁴⁶

ImmTrac Replacement

To increase participation in the registry and improve the quality of immunization data in the system, DSHS has begun a replacement project to modernize ImmTrac. Using the WIR (Wisconsin Immunization Registry) platform, DSHS will shift the existing paradigm and augment the registry's functionality. Unlike the current model whereby clinicians unidirectionally report immunization data to DSHS, the new paradigm will allow for bidirectional data exchange and expanded inventory and ordering functions. Additional developments will include

enhanced reminder and recall capabilities, more detailed immunization history and forecasting, better reporting options, improved provider access to data and greater usability for school users. ImmTrac will also be combined with the Electronic Vaccine Inventory System (EVIS) to streamline registry and inventory functionality. It is anticipated that the ImmTrac replacement project will be launched in the spring of 2015.

Interoperability

DSHS also continues its efforts to encourage interoperability between ImmTrac and electronic health records (EHR). As a result of the implementation of the federal Health Information Technology for Economic and Clinical Health (HITECH) Act, which provides financial incentives to providers who make “meaningful use” of EHR, the demand for EHR has risen dramatically in Texas. As more immunization providers use these technologies, they face the challenge of dual data entry into both ImmTrac and their own EHR. Through a grant awarded by the CDC, DSHS has reduced the burden of duplicate entry and supported practices in achieving “meaningful use” by configuring ImmTrac to accept batch files of HL7 formatted messages from providers (HL7 is the national level data standard for the exchange of health information) and increasing the number of EHR-IIS electronic interfaces available.

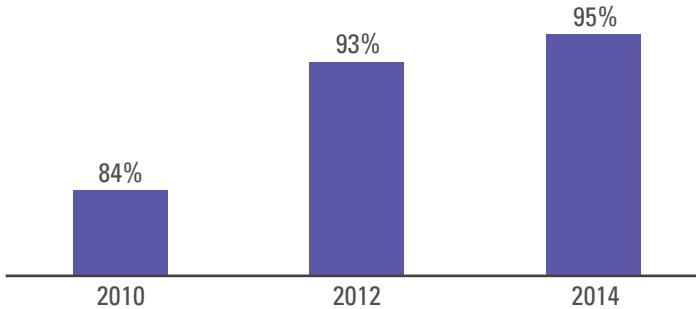
Obtaining Consent

Although several enhancements to ImmTrac have been implemented, some challenges remain. A primary barrier affecting the use of ImmTrac is the manner in which patient consent is obtained. Texas is only one of two states that uses an “opt-in” process, which requires an individual’s consent for their immunization records to be included in the registry. The overwhelming majority of states use an “opt-out” process, meaning that an individual’s immunization information is automatically included in the registry unless they request that it be excluded. Studies show that, when approached, 95% of people choose to “opt-in” to the system.⁴⁷ In Texas, however, consent must be gathered and verified on all individuals, which is an expensive process. The annual costs of the current “opt-in” system are more than \$1.3 million, as compared to \$100,714 for a proposed “opt-out” system. Each child in an “opt-out” system costs 29 cents, approximately one-tenth of the current “opt-in” cost of \$2.24 per child to consent all newborns and children in clinical settings.⁴⁸

What Stakeholders Say

For the previous four years, the majority of survey participants consistently believed that the current “opt-in” consent process hinders the ability of healthcare providers to access immunization information and thus provide quality care (Figure 6). They also feel it impedes the accuracy, completeness, and robustness of the immunization registry.

Figure 6. Percentage of survey respondents who believe that the current “opt-in” process in Texas contributes to the inability of healthcare providers to access information, 2010-2014



Modifying the current consent process from an “opt-in” to an “opt-out” system encourages retention of more records and reduces costs. It also protects Texans by supporting disease outbreak response. In the case of an outbreak, public health officials can use a robust immunization registry to efficiently assess immunization coverage, identify pockets of under-vaccinated populations, and further prevent the spread of disease. Without accurate and timely information, it is difficult to quickly pinpoint the causes of transmission, to immunize those at risk, and to contain the outbreak.

“School nurses, pediatric nurses, family providers are unaware that ‘lifetime’ isn’t really ‘lifetime’. We need a better consent process.”

Several stakeholders also voiced concern about young adults having to re-consent for their records to be maintained in the immunization registry. According to Texas law, records in ImmTrac are purged when an individual turns 18 years of age, unless consent is obtained within one year for the information to remain in the registry. Essentially, this creates a dual consent process for children: children must indirectly consent once when they are minors through parental consent, and once again when they reach 18 to keep their immunization history in the registry. There are many instances after a person’s 19th birthday in which immunizations are required, including entry into college, the military, and healthcare professions. In Texas, for example, students must show proof of vaccination against meningococcal disease prior to college entry. Stakeholders indicated that it is difficult for students to meet college enrollment requirements if they do not have access to their immunization records. Participants also felt that there is a lack of awareness on the part of both providers and patients about the re-consent process. Many individuals felt that schools could play a key role in educating young adults about the need to retain immunization records and how to navigate the system.

“Outreach for 18-year olds is sparse and ineffective.”

The survey also asked respondents whose organizations currently use a local IIS or EHR system to describe any challenges they faced when exchanging data with ImmTrac. Many of the respondents said they do not experience any problems. Others expressed difficulty with coding, transferring data or re-entering data that does not transmit or has been deleted, navigating frequent outages, and accessing timely data due to slow updates in ImmTrac. Regarding enhancements, respondents would like to see features that allow communication

about vaccines, such as texts, prompts, and vaccine appointment reminders. Stakeholders continue to voice a need for bidirectional data exchange, an enhancement that will be implemented through the ImmTrac replacement project.

Finally, stakeholders felt there is a lack of knowledge about ImmTrac among providers. Although ImmTrac is a lifespan registry, it is not up-to-date and records are incomplete because it is not being fully utilized. Some participants believed that ImmTrac is being underutilized because providers lack incentives to participate. Others suggested implementing systems changes that incentivize or penalize providers based upon their registry usage.

Recommendations

- 1. Cut the red tape, reduce costs, and protect Texans by modifying the current consent process from an “opt-in” to an “opt-out” system.** An opt-out system will reduce the burden of paperwork for provider offices, encourage increased use of the registry by providers and patients, and help ImmTrac become a more viable public health tool for disease response and event management.
- 2. Enhance the state’s ability to monitor adult immunization by extending the time that records are maintained in ImmTrac.** At the age of 18 years, young adults must re-consent to have their information retained in ImmTrac. If consent is not obtained, the data are purged. The loss of these records might interfere with physicians’ abilities to provide quality care to Texas adults. Better tracking and retention of adult immunizations through the registry will allow providers to more comprehensively assess immunization coverage and prevent transmission of vaccine-preventable diseases.
- 3. Empower young adults to consent to record retention in ImmTrac prior to turning 19 years of age.** Stakeholders voiced concerns about the narrow window of time (one year) in which minors must re-consent to have their information retained in ImmTrac. To address this challenge, some suggested working with high school principals and school advisory committees to build awareness about ImmTrac and encourage high school seniors to either signup or complete the ImmTrac adult consent form, once they turn 18 years of age. One stakeholder also suggested incorporating immunization records onto high school transcripts so that students have access to their immunization history after graduation.
- 4. Invest in technological advancements that support greater interoperability between ImmTrac and other health technology.** Although advances have been made to exchange data between local IIS or EHR systems and ImmTrac, challenges still remain. Interfaces must be enhanced to allow for more efficient data transfers and updates. Furthermore, the scope of ImmTrac must be expanded to allow integration with other public health data sources and encourage interstate data exchange.

5. Encourage DSHS to devise a plan that includes widespread education and training for providers about ImmTrac and the enhancements that will be implemented as a result of the replacement project. Education and training on how ImmTrac is being enhanced to support immunization practices and delivery can help providers understand its benefits and promote registry usage. Potential educational mediums could include webinars, toolkits, and frequently asked questions tip sheets.

III. Stem the Rising Tide of Exemptions Claimed Due to Reasons of Conscience

Background

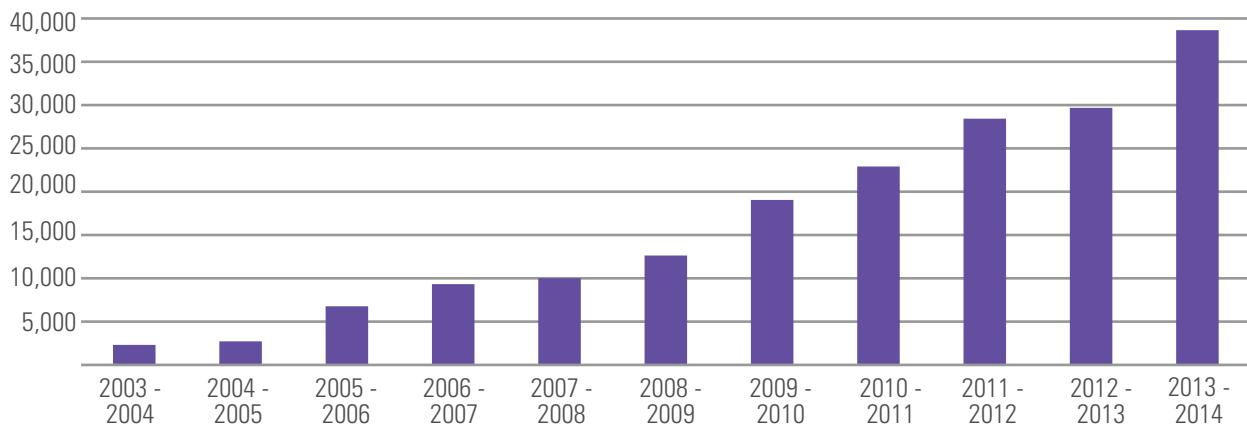
Since 2004, Texas has seen a significant rise in the number of parents choosing not to vaccinate their children due to reasons of conscience, also known as personal belief exemptions. This trend is mirrored in communities nationwide^{49, 50} where high rates of non-medical exemptions are being driven by fear, misinformation, and other factors, including religious, political, and philosophical beliefs.⁵¹ Vaccine exemptions have contributed, in part, to a resurgence of vaccine-preventable diseases that had once been almost eliminated throughout the state.

Exemption Data for Texas

Texas is one of 20 states that allow philosophical or personal belief exemptions⁵² and one of 48 that allow religious exemptions.⁵³ All states permit medical exemptions. DSHS monitors the number of exemptions through its annual assessment of vaccination coverage, as reported by schools statewide.⁵⁴ Currently, DSHS is not permitted to retain information on students seeking exemptions, with the exception of the zip code provided on exemption affidavit requests. As a result, only limited data are available on the rates of exemption in Texas schools, contributing to a lack of awareness about the public health impact of exemptions.

Of the schools responding to the 2013-14 annual assessment, 38,647 students were reported having filed a conscientious exemption. This number of exemptions is over 16 times greater than the figure reported in 2003-2004, when only 2,314 students filed exemptions (Figure 7).⁵⁵ Although the most recent reported exemption rate represents only 0.76% of enrolled students,⁵⁶ this figure might mask the clustering of unvaccinated children at the local level.

Figure 7. K-12th Grade Students With Personal Belief Exemptions, Texas, 2003-2014



Public Health Impact of Exemptions

Data show that reported exemptions tend to cluster geographically within schools and communities, creating pockets of vulnerability among under-vaccinated individuals.^{57, 58} Clusters of exemptions pose a risk to the entire community, and higher rates of diseases in California and Washington have been linked to such clusters.^{59, 60, 61} Moreover, unvaccinated individuals are at heightened risk of disease. A study conducted by the CDC's Respiratory Diseases Branch found that children were 62 times more likely to get measles and 16 times more likely to contract whooping cough if their parents chose not to have them vaccinated.⁶²

Immunization Perceptions

Parental perceptions and attitudes play a key role in the rates of vaccine exemption. Research indicates that most parents are confident in the safety of vaccines and intend to fully vaccinate their children, but have some questions or concerns regarding pain, side effects, and the number of vaccines being administered in one visit.⁶³ A national study reports that up to a quarter of parents choose to delay vaccines, while eight percent refuse vaccines entirely.⁶⁴ Although parents get vaccine information from many sources, a national survey shows that 90% of parents cited their child's doctor as one of the three most important sources of vaccine information.⁶⁵ Educational models demonstrate that consistent, credible messages are helpful in reducing vaccine hesitancy, and educational materials that utilize personal stories and disease information are also well received.⁶⁶

Current Trends in Exemption Legislation

Recent outbreaks of disease, increased public awareness about vaccination, and the role of elected officials with health credentials has contributed to legislative successes that limit the availability of vaccine exemption options.⁶⁷ Within recent years, Washington, California,

and Oregon all passed legislation that require individuals to consult a healthcare provider prior to qualifying for an exemption, with the goal of reducing the number of personal belief exemptions being claimed. A recent review of vaccination policies and rates of exemption showed that states with easy exemption processes had higher exemption rates than states where the processes were more difficult. Assessments of difficulty were based on factors including the type of form required to seek an exemption, how the form was obtained, and whether notarization of the form was required.⁶⁸

The Association of Immunization Managers (AIM) supports measures being enacted by state legislatures to strengthen vaccine exemption processes, decrease exemptions of convenience, and consequently reduce risk of disease transmission. AIM recommends that states without personal or religious belief exemptions (only Mississippi and West Virginia) should not allow them, and states with personal belief and religious exemption options should enhance regulations to ensure that parents are educated about vaccines and acknowledge the risks associated with not vaccinating their children.⁶⁹ Specific measures recommended by AIM include improved education, provider signatures, annual renewal of exemption forms, and tracking of exemption rates.

What Stakeholders Say

Stakeholders in Texas expressed interest in ensuring that parents are educated about vaccines and how immunizations protect the health of their children and the community. Stakeholders questioned how to better manage parents' fears, including the misconception that vaccines might be linked to autism.

The current exemption process in Texas requires individuals to request and submit a signed affidavit when claiming an exemption from required vaccines. Among stakeholders surveyed, 77% agreed that the process for getting an exemption in Texas is too easy (Figure 8). More than half of stakeholders also note that some individuals seek exemptions because getting an exemption might be more convenient (54%) or cheaper (57%) than getting the vaccination itself (Figure 8).

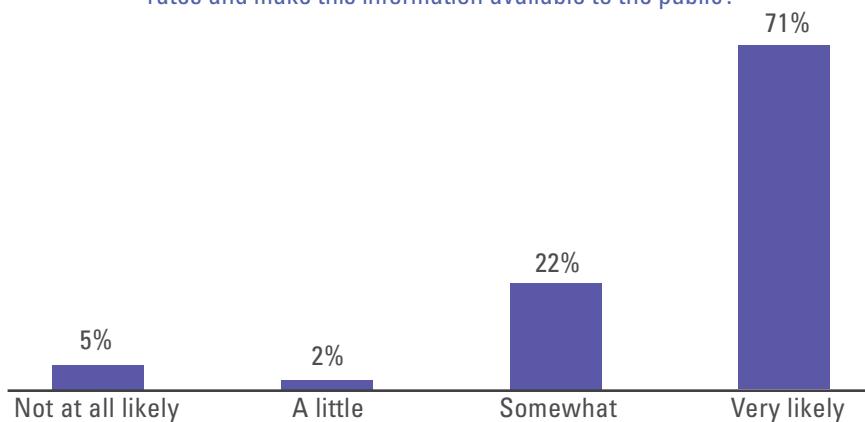
Figure 8. Percentage of Survey Respondents who "Agreed" or "Strongly Agreed" with Statement, 2014	
The process for getting an exemption for reasons of conscience is too easy in Texas.	77%
Many people in Texas get exemptions for reasons of conscience because getting this type of exemption is cheaper than getting a vaccination.	57%
Many people in Texas get exemptions for reasons of conscience because getting this type of exemption is easier and more convenient than getting a vaccination.	54%

Stakeholders indicated strong support (82%) for policies that require individuals to consult with a health professional about the risks and benefits of immunization before being able to complete the exemption process—a practice recommended by the Pediatric Infectious Disease Society⁷⁰ (Figure 9). Furthermore, 85% of respondents either “agreed” or “strongly agreed” with a policy that requires individuals to read or watch an online summary on the risks and benefits of immunization before claiming an exemption (Figure 9).

Figure 9. Percentage of Survey Respondents who “Agreed” or “Strongly Agreed” with the Following Vaccine-Related Proposals Related to Exemption, 2014	
People who want exemptions for reasons of conscience should be required to show written verification that they have consulted with a doctor or other health professional about the risks and benefits of immunization before being able to complete the exemption process.	82%
People who want exemptions for reasons of conscience should be required to read or watch an online summary about the risks and benefits of immunization before being able to go forward with the exemption process.	85%

Finally, 93% of stakeholders reported that they were “somewhat” or “very likely” to support a measure that required DSHS to better track exemption rates and make the information publicly available (Figure 10). Such data would inform parents about the risks posed to their children by low immunization rates.

Figure 10. How likely would you be to support a measure that requires DSHS to better track exemption rates and make this information available to the public?



Recommendations

1. Implement educational efforts to inform parents about the risks associated with not vaccinating and to dispel common myths and misperceptions about vaccines. Stakeholders suggest that there are a number of opportunities to educate parents on a community level including connecting via social media, working with community partners like grocery

stores, training peer-to-peer immunization advocates, and targeting outreach to specific vaccine-hesitant populations. Other suggestions are highlighted below.

Stakeholder Suggestions for Approaching and Improving Vaccine Education

- Use personal stories/storytelling as a tool for communication
- Refer to medical community as a source of information
- Identify key spokespersons to promote vaccination in the media and medical community
- Focus on benefits of vaccination to the community, including protecting young children and the immunosuppressed
- Use disease outbreaks as an opportunity to educate about risks of exemptions and under-vaccination

2. Enhance processes for seeking exemptions due to reason of conscience. Common approaches for strengthening vaccine exemption policies include requiring individuals seeking exemptions to be counseled by a healthcare professional on the risks and benefits of immunization and obtaining the signature of a healthcare provider. Such policies would ensure that parents and individuals better understand the reasons for vaccinating and the potential risk posed to the community by opting out of a vaccine. It could also contribute to a reduction in the number of exemptions being sought for reasons of convenience, not conviction.

3. Improve data collection and monitoring of vaccine exemptions. More comprehensive data on vaccine exemptions could help local immunization advocates better understand where pockets of need exist and develop policies and interventions that increase coverage in high-risk areas. One recommendation is to require DSHS to conduct an annual study on vaccine exemptions and outbreaks of vaccine-preventable diseases. Stakeholders also recommended that DSHS pursue more detailed tracking of exemption rates and make these data publicly accessible. Information available to the public might include the percentage of students up-to-date on vaccinations and with personal belief exemptions in a given school, school district, or region.

IV. Vaccinate Across the Lifespan: Improve Immunization Uptake among Adults

Background

Each year, thousands of adults suffer from diseases that could be prevented by vaccines.

Some diseases, like pertussis and influenza, are easily transmitted by infected adults to infants who are too young to be vaccinated. Fortunately, we have the technology—vaccines—to avoid deaths and illnesses from these diseases. However, vaccines are not being used as effectively as possible among adults to prevent infection.

Adult Immunization Coverage Rates

According to the most recent CDC National Health Interview Survey, coverage rates for adult vaccinations remain well below the Healthy People 2020 goals. Modest increases occurred in tetanus toxoid (55.1% in 2012; 54.4% in 2011, adults 19-64 years) and herpes zoster vaccination (20.1% in 2012; 15.8% in 2011, adults > 60 years).⁷¹ However, adult vaccination coverage for other vaccines did not improve. For instance, coverage for pneumococcal vaccine has not improved over the last three years (59.9% in 2012; 62.3% in 2011; 59.7% in 2010, adults > 65 years).⁷² In 2012, Hepatitis B vaccination coverage among adults 19-64 years of age was 35.3%, similar to the estimate for 2011 (36%).⁷³ Data on Tdap vaccination were collected for the first time in 2012—among adults aged 19 years and older, overall coverage was 14.2%.⁷⁴ According to the CDC's Behavioral Risk Factor Surveillance System, influenza vaccination coverage among adults 18 years and older has hovered around 40% since the 2009-2010 season.

Factors that Contribute to Low Immunization Coverage

Why do adults fall short of receiving the recommended immunizations? Numerous studies aim to address this question. The most common reasons include lack of physician recommendation, mistaken assumptions (e.g., healthy people do not need immunizations), lack of coordinated care (adults see many providers), prioritization of acute and chronic illnesses over preventive services, limited access to vaccines due to providers not stocking them or stocking only a subset of vaccines, complex private and public payment processes for vaccines, reimbursement issues, Medicaid and Medicare coverage limits, out-of-pocket expenses, and lack of insurance.^{75, 76}

Physicians also cited practice-based barriers to immunizing adults, such as the lack of an effective reminder system and underutilized immunization registries.⁷⁷ A recent study published in the Annals of Internal Medicine revealed that physicians (internists and family physicians surveyed) do not regularly look up patients' vaccination status during every visit, instead only do so the first time they see a new patient or when a patient comes for an annual check-up. This can result in missed opportunities to give vaccinations or repeated vaccinations (administering vaccinations that have already been given). In addition, most physicians only ask patients if they have received certain vaccines instead of asking about all recommended vaccines for adults.

Lack of insurance is a significant barrier to adults receiving vaccinations in Texas. A recent study by The Commonwealth Fund reported that, prior to the implementation of the Affordable Care Act (ACA), more than 30% of adults in Texas were uninsured.⁷⁸ Texas also ranked among the worst in the nation for affordability and access to high-quality care. The study went on to report that insured individuals are far more likely to have a usual source of care and to receive recommended preventive care, including immunizations, which can reduce the risk of serious illness and death. In Texas, less than two-thirds of adults (63%) have a usual source of care. Furthermore, compared to other states, Texas has a higher percentage of adults who forego care because of cost (between 24% and 26%).⁷⁹

Impact of the Affordable Care Act

The Affordable Care Act increases access to healthcare for millions of adults and reduces the burden of cost significantly. Specifically, the ACA requires health insurers and group health plans to expand coverage for dependents up to age 26 years and to cover all ACIP-recommended vaccines at no cost-sharing. The law also establishes exchanges to aid in the purchase of health insurance, increases federal funding for adult vaccines, implements evidence-based demonstration programs, expands access via Community Health Centers, and authorizes states to purchase adult vaccines with state funds at CDC-negotiated rates.⁸⁰ The Commonwealth Fund recently reported a drop in the national uninsured rate for adults aged 19 to 64 years after the ACA's first enrollment period, from 20% (July–September 2013) to 15% (April–June 2014). An estimated 9.5 million fewer adults are uninsured nationwide.⁸¹

Because Texas is not participating in the ACA's Medicaid expansion, many adults with income below 100% poverty will remain uninsured. Approximately one million low-income Texans (working-age, U.S. citizens) will fall into a coverage gap because they are ineligible for both Medicaid and a federal insurance subsidy.⁸² Continued funding for safety nets is critically important for this population. DSHS' Immunization Branch maintains the Adult Safety Net (ASN) program, which makes publicly-purchased vaccines available to uninsured adults greater than 19 years of age at participating ASN sites. Currently, the vaccines offered through the ASN Program include the following: Hepatitis A/Hepatitis B, MMR (measles-mumps-rubella), Td/Tdap, Pneumococcal, and HPV. Due to fiscal constraints, the ASN program has been modified multiple times and several vaccines have been removed from the formulary.

What Stakeholders Say

According to our stakeholders, adults often do not get vaccinated due to lack of awareness.

They are not well-informed about the need to vaccinate or which vaccines are recommended by the ACIP. Others are unaware that vaccines are covered under the ACA or on a limited basis by Medicare. Monitoring and tracking adult immunizations is also an issue. Although ImmTrac is a lifespan registry, many adults have not consented to have their information included in the system, making it difficult for adults to know which vaccines they have received or need to get (see Section II for more information).

Cost and access continue to be prevailing barriers. Many adults forego vaccination due to competing priorities and finances, such as basic necessities and living expenses. Others do not have the financial resources to cover the co-payments, out-of-pocket expenses, or deductible costs associated with care. One stakeholder highlighted refugee patients as an unimmunized community, subject to cost and access issues. Other stakeholders raised concerns about seniors and those living on fixed incomes.

Providers do not always stock vaccines due to storage or cost constraints, resulting in access challenges for adults. Many stakeholders fear the potential public health impact of non-vaccination. For instance, some participants expressed concern about new or expectant fathers not being able to easily access the Tdap vaccine, and the potential risk of them contracting and transmitting pertussis to vulnerable infants. Another stakeholder voiced, "Not only are the adults at risk, so are their families."

Recent cuts to the ASN program have had great impact on vaccine access and availability, particularly for the uninsured and individuals who need vaccinations to attend college. Survey respondents were asked, "If you had to choose one vaccine currently unavailable through the ASN program to be reinstated, which one would it be?" Over 40% of survey respondents chose the meningococcal vaccine, a current requirement for college students. Several stakeholders indicated that cost is a barrier to those who have to self-pay for the vaccine to enroll in college. Providers have been disheartened by turning away students looking to receive the vaccine through the ASN program. Some expressed concern that students who cannot afford the vaccine might have to forego college enrollment, thus impacting their future career options and ability to command higher incomes. Many suggested requiring the second dose of the meningococcal vaccine at 16 years, while students are in high school and eligible for the Vaccines for Children (VFC) Program.

According to our stakeholders, senior adults also present at clinics and provider offices requesting the herpes zoster vaccine, which protects against shingles. Several cited cost as a reason that seniors forego this vaccine. Although covered by Medicare Part D (prescription drug

"Many seniors are on fixed incomes, and if it comes to paying \$25 for a vaccine or buying \$25 worth of groceries, the groceries will win every time..."

"Medical providers will not carry the vaccines because of cost, reimbursement, and proper storage and handling of the vaccines. This leaves our communities vulnerable to vaccine-preventable diseases."

"Due to MCV4 being taken off the safety net list, many college students trying to better themselves will have to pay the private cost in our health department—which is currently \$115.00. How does a young mom cover that big expense? That is gas and food money for her family. Last year, I saw six clients that could not cover that fee, and they were not able to start the current semester. No telling how many came to the clinic and left."

"So many seniors have expressed a desire to receive the shingles vaccine, but either do not have the means to get it or their doctor will not carry it in their office. Their insurance will not allow them to get the vaccine outside of the doctor's office, which forces the senior to pay out of pocket at a clinic."

"Lack of funds for the expensive vaccines such as zoster, in particular, leaves patients in a quandary as to how to obtain the vaccine along with access issues."

coverage), many seniors cannot afford the plan's deductible or co-payments. Furthermore, not all seniors are enrolled in Part D, so must resort to paying out of pocket for the vaccine, which can cost about \$200. Finally, stakeholders indicate that many providers do not stock the vaccine due to cost, making it difficult for seniors to locate the vaccine outside of their local pharmacies.

Stakeholders also expressed interest in seeing influenza added to the ASN program's formulary. Like other vaccines, cost was cited as the primary barrier. Some suggested waiving the administrative fee for the influenza vaccine, in order to improve uptake and iterate the importance of annual vaccination. A representative from a local health department was discouraged by adults getting the influenza vaccine for their children but foregoing it for themselves.

A few respondents voiced concerns about insured individuals abusing local health department programs and accessing resources not intended for them. One stakeholder commented, "Many Americans have become great shoppers with regard to healthcare costs and if saving on their co-pays is an option, they will take advantage of it." These participants suggested that DSHS require individuals to show proof of income in order to be eligible for services.

Recommendations

1. Improve access to all ACIP-recommended vaccines through the DSHS Adult Safety Net (ASN) Program. As noted, lack of insurance coverage is one of the main reasons that adults forego vaccination. Furthermore, research suggests that financial barriers reduce vaccination rates among uninsured and underinsured adults.⁸³ The ASN program helps the vulnerable uninsured population by providing access to needed immunization services. It also reduces out-of-pocket expenses for adults who neither qualify for Medicaid nor reduced costs on a private insurance plan. However, not all vaccines are included in the ASN program, and many adults remain susceptible to disease. DSHS should expand the ASN program vaccine formulary to include all ACIP-recommended vaccines. If funds are limited, stakeholders prioritized vaccines in the following order: meningococcal, influenza, and herpes zoster vaccine.

2. Enhance office vaccination systems that encourage adult immunization and reduce missed opportunities to vaccinate. The National Vaccine Advisory Committee recommends that a wide variety of systems changes be implemented to improve adult vaccination, including routine assessments of patients' immunization status.⁸⁴ Other strategies include using reminders for providers (e.g. prompts in electronic health records), using stand-

ing order protocols for office staff, and implementing tools that remind patients about needed vaccines (e.g. e-mail, auto dialer, mail, posters, and/or video). Authorities also recommend instituting provider assessment and feedback programs (AFIX: Assessment, Feedback, Incentive, Exchange) that track immunization progress and motivate office system change.

3. Encourage providers to share a strong but sensitive recommendation for vaccines.

One of the most important predictors of vaccination receipt among adults is a healthcare provider's recommendation and offer of vaccine during the same visit.⁸⁵ The National Vaccine Advisory Committee recommends that providers be equipped to educate patients in a culturally competent manner, using language and resources that are easy to understand. Resources should include information about the risks and benefits of immunization, including valid contraindications and adverse events. Providers should educate patients about all ACIP-recommended vaccines and strongly encourage vaccination on multiple occasions. If providers are unable to vaccinate during the clinical encounter, information should be provided on where to access the vaccines. Other recommended communication methods included the use of social media and public service announcements.

4. Implement efforts to vaccinate adults in non-traditional medical or health settings, at work sites, or in the community. To expand vaccine availability, stakeholders encouraged medical specialists (such as obstetrical and gynecological physicians), pharmacists, and community vaccinators to administer vaccines. They also suggested that immunization providers collaborate with agencies that serve high-risk adult patients, including clinics that treat sexually transmitted infections, drug treatment centers, homeless shelters, and violence prevention programs. Furthermore, they recommended partnering with immunization coalitions, insurance plans, churches, employers, and parent-teacher associations to host immunization clinics and/or increase awareness.

Some encouraged pediatricians to take an active role in promoting adult immunization. For instance, pediatricians can ensure that they and their staff have received appropriate immunizations as recommended by the ACIP.⁸⁶ They should also routinely encourage parents and caregivers of patients to follow-up with their own physician or other immunization providers (pharmacists, local health departments, etc.) for an assessment of immunization needs and to receive recommended vaccines.⁸⁷

5. Encourage providers to document vaccines received by adult patients in ImmTrac or local IIS. Adults often receive immunizations from multiple providers at multiple locations, leading to fragmented immunization histories, wasted vaccines, and under- or over-vaccination. IIS help healthcare providers keep track of adult immunizations. They also save money by

ensuring that individuals get only the vaccines they need. Providers who use EHR and enter patient immunization information into IIS might also qualify for financial incentives under the federal HITECH Act.

V. Support Continued Efforts to Protect Students Against Bacterial Meningitis

Background

Bacterial meningitis is a potentially fatal disease that can result in serious complications and disabilities, and kills approximately 1 in 8 individuals who become infected.⁸⁸ Newborns, adolescents, young adults, and older adults are at increased risk of the disease, as well as those with weakened immune systems or who live in certain settings, including college dormitories.⁸⁹

Disease Incidence

Between 2002 and 2012, approximately 717 cases of bacterial (meningococcal) meningitis were reported in Texas.⁹⁰ About 50 cases of meningitis are reported in the state annually, and 12.5% of these cases have resulted in death since 2007.⁹¹ The highest percentage of cases were reported among individuals aged 60 and older (16.6%), 20 to 29 (16.3%), and less than one year of age (13.8%).⁹²

Currently, the ACIP recommends a primary dose of the meningococcal vaccine (MCV4) at 11 or 12 years of age, followed by a booster dose at age 16 years.⁹³ The incidence of meningitis disease peaks between 16 and 21 years, and the immunization schedule is designed to protect young adults during this high-risk period, including the college years.⁹⁴ In 2013, 88% of 13-17 year olds in Texas were vaccinated against meningitis,⁹⁵ a 22 percentage-point increase from 2010 and ten percentage points higher than the national vaccination rate.⁹⁶

Immunization Requirement for College Students

To address the risk of meningitis among young adults, the Texas Legislature successfully passed several pieces of legislation regarding meningococcal vaccination among college students. In 2009, Texas became the first state to require all college students living on campus to show proof of meningococcal vaccination prior to enrollment. Two events—the CDC's updated recommendation for a meningitis booster dose at 16 years of age and the death of a Texas A&M student living off campus—led to the expansion of the law in 2011, to include all entering students up to age 30 living both on and off campus. In 2013, the law was revised to require vaccination of students up to 22 years of age only, aligning with CDC recommendations for high-risk age groups (Figure 11).

Figure 11. Meningitis Vaccine Requirement: Legislative History

Figure 11. Meningitis Vaccine Requirement: Legislative History	
2009	<i>Jamie Schanbaum Act (HB 4189)</i> Required all first-time college students living on campus to show proof of meningococcal vaccination
2011	<i>Jamie Schanbaum & Nicolis Williams Act (SB 1107)</i> Required all entering students attending a college or university who were under the age of 30 to show proof of meningococcal vaccination
2013	<i>Revisions to the Meningitis Requirement (SB 62)</i> Aligns the law with CDC recommendations and requires only students younger than age 22 to show proof of meningococcal vaccination

The Immunization Partnership has worked closely with stakeholders across the state to support the implementation of these laws. TIP facilitated regular conference calls to discuss implementation successes and challenges with representatives from DSHS, the Texas Higher Education Coordinating Board (THECB), universities and community colleges, and parent advocates. Conversations addressed multiple questions and concerns about the availability and cost of the vaccine, compliance by transfer and short-term students, and processes and procedures for schools implementing the requirement.

Exemption Process

In the most recent legislation, modifications were made to the process for seeking an exemption to the meningococcal vaccination requirement. Following passage of the 2011 law, two processes were available to students seeking an exemption for reasons of conscience. The first process, directed by DSHS, required students to electronically request an affidavit form, review materials regarding the risks and benefits of immunization, and return the signed and notarized affidavit to DSHS. The second process, implemented by the THECB, introduced a downloadable form available to new students who were age 18 years of age or older and not living in on-campus housing.

The availability of two exemption processes created confusion and might have encouraged students to seek exemptions for reasons of cost or convenience. Immunization advocates worked with stakeholders and state agencies to propose revisions to the process, with the intent of safeguarding the procedures for claiming exemptions, streamlining exemption requests through DSHS only, and ensuring that mechanisms were in place to monitor and capture vaccine exemption data for disease prevention purposes. In 2013, the exemption process was restructured to reduce confusion and ease compliance. The DSHS affidavit process was preserved and is required for four-year college students. Only public junior college students are permitted to use an online portal to process their exemption. The online portal includes an educational

component and allows students to print and sign a form to be submitted to their educational institution.

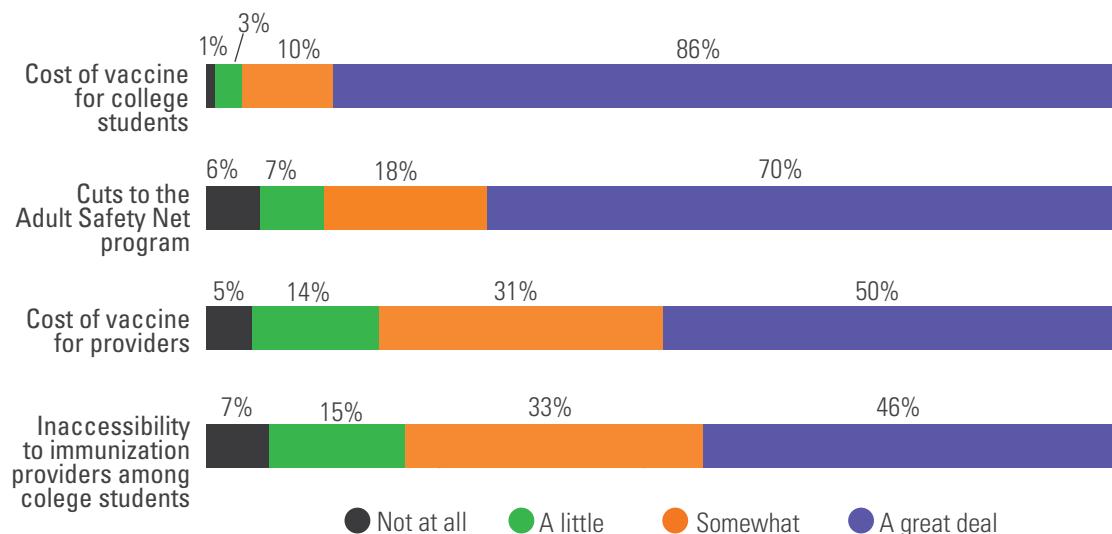
Recent Outbreaks and Other Serogroups

Recent outbreaks of meningitis have increased awareness about the risk of the disease for college students. The MCV4 vaccine covers four serogroups: A, C, Y, and W-135. Eight cases at Princeton University in March 2013⁹⁷ and four cases at the University of California, Santa Barbara in November 2013⁹⁸ were caused by serogroup B, a strain for which a vaccine is not currently licensed in the U.S. Roughly 10,000 students at each institution received a serogroup B meningococcal vaccine that is licensed for use in Europe, Canada, and Australia, as an Investigational New Drug application in partnership with the Food and Drug Administration and local health departments.

What Stakeholders Say

Feedback from stakeholders indicates that the implementation of the meningococcal vaccination requirement has been largely successful. Since the original law's passage, institutions report a decrease in the number of exemption requests and the successful utilization of the new online portal for public junior college students. Input and engagement from institutions of higher education around the state have been integral to the success of the immunization requirement. However, challenges still exist for college students (Figure 12). The most significant barriers reported by survey respondents are cost of the vaccine for college students and cuts to the Adult Safety Net Program (see Section IV for more information).

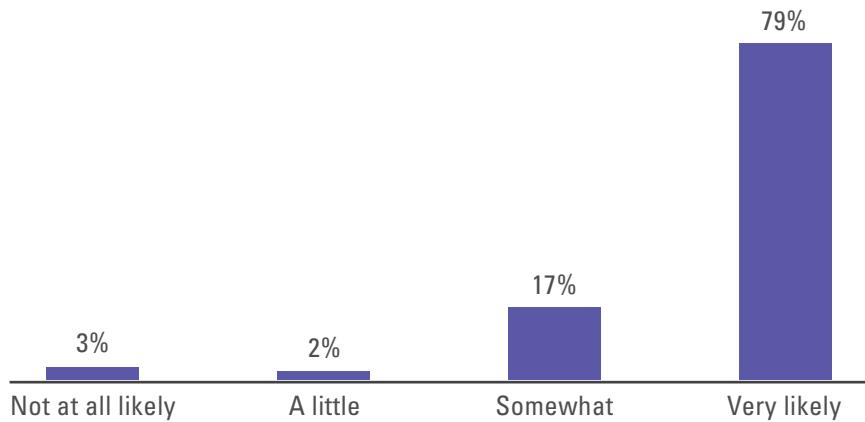
Figure 12. Extent to Which Following Issues Make It More Challenging for College Students to Get their Meningococcal Vaccination, 2014



for improved education and awareness among students, parents, and administrators about the vaccine requirement for incoming college students. Other stakeholders suggested that while many are aware of the requirement, students and parents don't fully comprehend the dangers of meningitis and the efficacy of the vaccine. Stakeholders also reflected on other barriers that prevent young adults from receiving timely immunizations. Young adults typically do not seek routine medical care, providers may not stock the vaccine, and the requirement may be perceived as a hassle (see Section IV for more information).

As previously noted, the CDC recommends a booster dose of the meningococcal vaccine for 16-year-olds. Requiring this booster dose for school entry in Texas would better align state policy with CDC recommendations, and 16-year-olds who get the booster would not have to be re-immunized before entering college. The survey asked, "If the booster dose were proposed as a requirement in Texas for 11th grade students, how likely would you be to support such a measure?" Seventy-nine percent (79%) said "very likely." Only five percent (5%) of respondents expressed little or no support (Figure 13).

Figure 13. How likely would you be to support a measure that requires a booster dose of the meningococcal vaccine for 11th grade students in Texas?



Four-year college students who choose an exemption must request an affidavit form from DSHS. The form must then be notarized and returned to the educational institution. Community college students can get an exemption by accessing a DSHS web-based portal and downloading an online form. When asked if community college students should be required to go through the DSHS affidavit exemption process, 81% agreed (Figure 14).

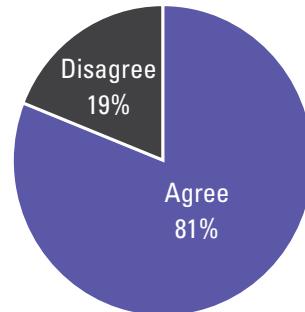
"Advance preparation is needed, as early as the 9th grade. A list of what is required to attend college should be compiled, and it needs to include the meningitis vaccine."

"Parents believe that their 18-21 year old children are healthy and don't need any vaccines."

"There is a lack of trust and misconceptions about vaccines in general. People listen more to their friends than to their doctors."

Figure 14. Percentage of Respondents Who “Agree” that Community College Students Should Be Required to Go Through the DSHS Affidavit Exemption Process, 2014

“We need commercials and other resources showing how important the vaccine is for preventing meningitis.”



“Bring the vaccine to them! Set up in dorms, classroom buildings, etc. Don’t make them take time out of their day.”

Recommendations

- 1. Educate students and parents about bacterial meningitis and the vaccine requirement.** Schools and healthcare providers can use THECB and DSHS-developed web resources to educate young adults and their parents about the vaccine requirement and the disease (www.collegevaccinerequirements.com). Vaccine communication should highlight how bacterial meningitis is transmitted, why college students are high risk, the dangerous consequences that can result from the disease, and the importance of vaccination prior to college.
- 2. Implement “Vaccinate Before You Graduate” campaigns.** Stakeholders suggested working with schools to educate high school students about the need for vaccination and to implement vaccine clinics. Educational messages could also be promoted to both parents and students via social media, school websites, e-mail distribution lists, and public service announcements.
- 3. Improve coverage and ease compliance by requiring that 11th grade students receive a booster dose of meningococcal vaccine.** Requiring that 11th grade students receive a booster dose of the meningitis vaccine would align state policy with CDC recommendations and promote compliance among college students. Young adults who can show documentation of a booster dose meet the college vaccine requirement. This change would also allow eligible, uninsured students to access free or low-cost vaccines under the VFC program.

VI. Reduce the Risk of Cancers Associated with HPV Infection

Background

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States.⁹⁹ There are over 100 strains of HPV, more than 40 of which can cause cancer. Overall, HPV is related to almost 100% of cervical cancer cases.¹⁰⁰ While cervical cancer is the main concern of HPV, the disease is also known to cause oral, anal, vulvar, vaginal, and penile cancers, as well as genital warts,¹⁰¹ and is estimated to be responsible for 5% of all cancers worldwide.¹⁰²

HPV infection in the U.S. is widespread; there are more than 14 million new infections annually, and it is estimated that 50% of sexually active men and women will get HPV at some point in their lives.¹⁰³ In the U.S., it is estimated that over 12,000 new cases and more than 4,000 deaths from cervical cancer will occur in 2014.¹⁰⁴

The vaccine that protects young people against HPV was originally recommended for girls and young women in 2006, but was subsequently expanded to boys and young men in 2011. Two vaccines that protect against HPV infection are currently available in the U.S. Both the quadrivalent (HPV4) and bivalent (HPV2) vaccines protect against HPV types 16 and 18, which cause 70% of cervical cancers; HPV4 also protects against HPV types 6 and 11, which cause 90% of genital warts.¹⁰⁵ The ACIP recommends that the HPV vaccine be given at age 11 or 12 years, coinciding with other adolescent vaccinations. Studies show that the HPV vaccination reduces infections in teens by half, and that the vaccine effectiveness of just one dose is 82%.¹⁰⁶

HPV Vaccination Coverage

After remaining stagnant for one year, HPV vaccination coverage for adolescent girls who received at least a single dose of HPV vaccine increased slightly at the national level from 53.8% (2012) to 57.3% (2013).¹⁰⁷ Among adolescent boys, coverage rates increased from 20.8% (2012) to 34.6% (2013). Nationally, 37.6% of adolescent girls and 13.9% of boys received all three doses of the series (compared to 33.4% and 6.8% in 2012, respectively). According to the National Immunization Survey-Teen (NIS-Teen), coverage rates for Texas are comparable to the national level. Fifty-six percent (56.2%) of adolescent girls and 34.1% of adolescent boys received at least a single dose of the vaccine. Approximately 39% of adolescent girls and 15% of adolescent boys received all 3 doses of the series.¹⁰⁸

In the U.S., HPV is one of the most commonly refused vaccines.¹⁰⁹ The 2013 NIS-Teen asked

"My best line is... 'If I give it to my kids, I will give it to yours.' It never fails."

parents who did not intend to vaccinate their adolescent teens in the next 12 months the main reason why their teens would remain unvaccinated. The top responses from parents of girls and boys were the same and included the following: lack of knowledge about the vaccine or the disease, belief that the vaccine was not needed, and lack of health care provider recommendation.¹¹⁰

Role of Providers

Providers are a key source of information and have a strong influence on parents' decision to vaccinate. Regardless, missed opportunities to receive the HPV vaccine are common. The 2013 NIS-Teen evaluated missed opportunities among a cohort of girls who were born in 2000. Had the girls been administered a dose of HPV vaccine during health visits when they received another vaccine, coverage rates with at least one dose of HPV vaccine would have reached 91.3%.¹¹¹ Providers must remain vigilant. In order to reduce vaccine-preventable disease infections and cancers caused by HPV, public health experts suggest that clinicians use every opportunity to recommend HPV vaccines and address parental concerns.

What Stakeholders Say

Stakeholders confirmed that public awareness of HPV is low. Many survey respondents encouraged providers to take the time to thoroughly educate parents about HPV and to address questions. Stakeholders suggested nurturing patient-provider interactions by presenting comprehensive health information in multiple mediums, offering greater face-to-face time, engaging in truthful discussions that include both parent and child, and allowing parents to make their own decisions without the pressure to vaccinate. Several individuals also suggested that providers use their own experiences as models for vaccination.

Numerous suggestions were offered regarding how information can be presented to parents and patients. Several recommended providing literature and fact sheets about HPV disease, the vaccine and how it works, and the risks and benefits of immunization. Respondents also emphasized the need for direct communication about disease transmission and the importance of vaccinating prior to the first sexual encounter. Many found visuals and graphics of HPV, venereal warts, and tumors to be effective in encouraging parents to vaccinate their adolescent children. One stakeholder uses the names of celebrities who have been diagnosed with cancer caused by HPV to educate youth.

Another stakeholder emphasized the need to maintain a positive message when promoting the vaccine. She stressed the importance of involving teens in the decision-making process and empowering them to take responsibility for their health and future.

"I think graphic examples of HPV in individuals are persuasive along with an emphasis on the provider's part to educate patients on why receiving the HPV vaccine is so important."

"I reinforce the fact that this vaccine is not about promoting or condoning sex, rather it's about protecting their child, and who wouldn't want to protect their child?"

An obstetrical and gynecological physician (Ob/Gyn) suggested promoting HPV vaccine as a means of preventing pre-term birth. He explained that cervical dysplasia, a precancerous condition in which abnormal cells grow on the surface lining of the cervix, is commonly associated with HPV. In order to determine treatment options and rule out cancer, women often undergo a cone biopsy, where the doctor removes a cone-shaped piece of tissue for lab examination. This procedure can result in incompetent cervix problems, a need for cerclages (or cervical stitches used for the treatment of cervical incompetence), and in some cases, pre-term birth. According to the physician, "HPV is the ROOT CAUSE!"

Participants offered several strategies to promote vaccination. Immunization providers suggested taking advantage of all vaccination opportunities specifically at routine well-teen visits, during sports physicals, and when testing for sexually transmitted infections. Some promote HPV as part of the adolescent platform when administering vaccines required for 7th grade. Others suggested using computer alerts when patients present for medical issues, creating a question on the patient's health history questionnaire, or adding a field to the nurse triage checklist.

To combat any concerns about cost or access, providers clarify that the vaccine is covered under the VFC and ASN programs, for uninsured children and adults. Some clinics are waiving the administration fee or offering the vaccine free of charge through grant seed funding. One stakeholder suggested modifying existing legislation so that pregnant minors and minors with children can consent to receive the HPV vaccine.

Recommendations

1. Use a multi-pronged educational approach to increase awareness among parents about the risks associated with HPV and to promote vaccination. Educational initiatives about the disease, how it is transmitted, and why vaccination is recommended are necessary to change immunization beliefs about HPV. A novel communication strategy is to reframe the message around HPV to be more gender-neutral and present the HPV vaccine as an "anticancer vaccine" that protects against cervical, anal, head and neck, and penile cancers. Visuals and graphics can be effective tools to educate patients about HPV and its effects and to motivate patients to vaccinate. Community-based efforts have also proven to be effective. Schools, clinics, health fairs, and juvenile detention facilities were highlighted as potential opportunities for education and vaccination clinics. Parent presentations at community events and clinics, and "lunch and learn" sessions with guest speakers were also suggested. Educational efforts should include information about how to access the vaccine for free or at reduced cost through the VFC and ASN programs.

"Every family that comes into my clinic and has adolescent teens receives education regarding the HPV vaccine. I go over the VIS [Vaccine Information Statement] and even if they choose not to vaccinate, I give them the VIS to look over and reconsider."

"We try to include HPV in the set of vaccines due at age 11-12 years, going into 7th grade. We tell them that the first three vaccines (Tdap, MCV4, and varicella) are required and that this is the age when adolescents start the HPV series. If they turn it down, we still give them information about HPV to carry home and consider and to come back when ready."

- 2. Encourage providers to communicate a strong, clear, and culturally sensitive HPV vaccination recommendation.** Research indicates that providers give weaker recommendations for HPV vaccination as compared to other adolescent vaccinations.¹¹² Because providers greatly influence parents' decisions to vaccinate their children, providers must increase the consistency and strength of HPV vaccination recommendations.¹¹³ At the same time, the need for culturally sensitive resources and discussions with patients and parents is critical. Providers should take the time to validate parental concerns and respond in a respectful, sensitive manner when questions are raised about the vaccine.
- 3. Reduce missed opportunities to vaccinate adolescents against HPV.** Systems changes that providers use to promote other routine adolescent and adult vaccinations can also be implemented for HPV vaccine (see Section IV for more information). Strategies include patient reminder and recall systems, use of IIS to assess vaccination status, coverage assessment and feedback to clinicians, reminders/prompts through electronic health records, and standing orders. Furthermore, providers must take advantage of all clinical encounters, including acute care visits, to assess immunization status and offer to vaccinate.
- 4. Research associations between HPV and pre-term birth outcomes, and the potential cost savings from HPV vaccination.** An Ob/Gyn and member of the TIP Scientific Advisory Council conducted an internal report at a women's hospital in Houston regarding the number of pre-term births that might have resulted from women having to undergo cerclages as a result of cervical incompetence resulting from cervical dysplasia. According to his calculations, in 2013 HPV could have been responsible for as many as 34 preterm births, resulting in 1,216 neonatal intensive care unit days and over \$2.4 million in direct medical costs. HPV types 16 and 18 are the two most common causes of cervical dysplasia, which may contribute to issues that result in pre-term birth—complications that could have been prevented by the vaccine. Resources should be invested in research that studies these issues and the potential benefit that the vaccine could have in reducing pre-term births.
- 5. Update Texas state law so that pregnant minors and minors with children can consent to receive the HPV vaccine.** Under current law, pregnant teens and minors with children can consent to immunizations that are recommended for administration before seven years of age. This law excludes the HPV and meningococcal vaccine, both key vaccines recommended in the adolescent platform.

VII. Monitor and Promote Awareness of Tropical and Emerging Diseases

Background

Emerging and neglected tropical diseases (NTDs) pose a real and growing threat to public health. Texas is one of many states vulnerable to the spread of neglected tropical diseases, many of which do not yet have vaccines to aid in prevention. Data show that brucellosis, cysticercosis, Chagas disease, dengue, leishmaniasis, and leprosy are endemic to the Texas border region,¹¹⁴ though the entire state has long been home to numerous tropical infectious diseases. Symptoms of NTDs can be debilitating and have chronic and adverse impacts on child development, pregnancy outcomes, and worker production.¹¹⁵ In the U.S., these diseases reveal health disparities, disproportionately affecting vulnerable groups including children, pregnant women, indigenous communities, and people of color, particularly African-Americans and Hispanics. The most common link among groups affected by NTDs is poverty, which contributes to conditions that increase risk of disease exposure.¹¹⁶ NTDs have been called the “forgotten diseases of forgotten people.”¹¹⁶

Surveillance and Monitoring

Monitoring the spread of these diseases is complex. Although NTDs are on the state’s notifiable conditions list and must be reported to DSHS,¹¹⁸ they are not consistently tracked due to misdiagnosis or lack of education on the part of the clinicians regarding reportable conditions.¹¹⁹ For example, an estimated 300,000 people in the U.S. are infected with Chagas disease, which can cause symptoms ranging from mild swelling to cardiac and intestinal complications. However, roughly half of primary care providers do not consider the disease a possible risk to their patients and are not familiar with its symptoms. In addition, a quarter of cardiologists are unfamiliar with Chagas disease, despite its significant contribution to rates of heart failure.¹²⁰ In Texas, 11 counties in the southern region of the state are at significant risk for the disease,¹²¹ and one study suggests that the incidence of the disease in Texas alone could be as high as 250,000 cases.¹²²

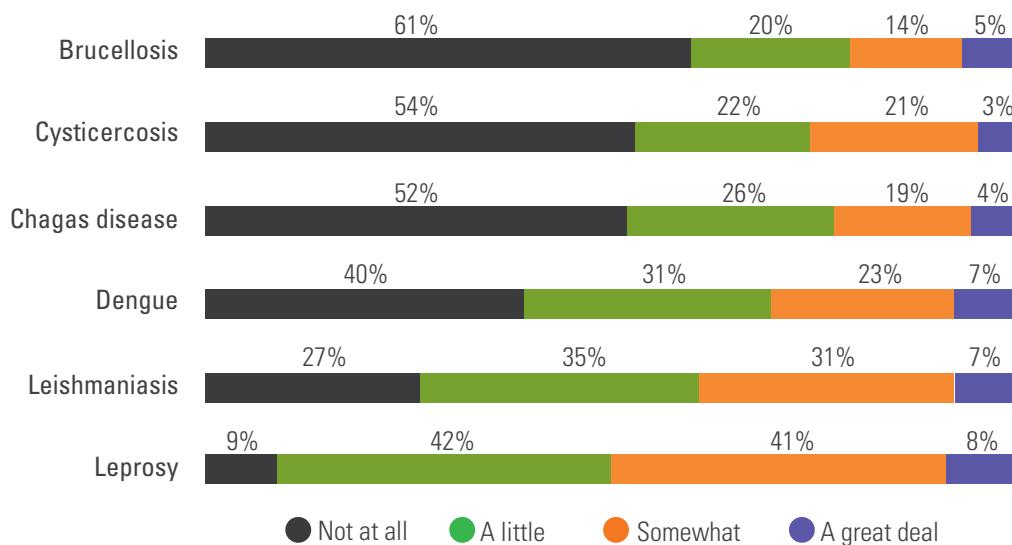
Our state, however, can play a key role in preventing the spread of tropical diseases. Many NTDs do not have vaccines, and researchers are racing to prevent these new threats not just in Texas, but also across the globe. Texas has emerged as a national leader in biotechnology and translational research and can support the development and production of vaccines. There are also opportunities for research and education to monitor, prevent, and treat these diseases.

In a world where diseases are a plane, boat, or car ride away, Texas must respond to the urgent need to implement surveillance systems, properly assess disease burden, develop treatment programs, and educate providers and the public about the risks of NTDs.

What Stakeholders Say

Stakeholders express a lack of awareness about NTDs, particularly among healthcare providers and public health departments. When surveyed, the majority of respondents admitted to knowing only “a little” or “nothing at all” about emergent tropical diseases in Texas (Figure 15).

Figure 15. Level of Knowledge: Emergent Tropical Diseases in Texas, 2014



One stakeholder indicated concerns about the spread of NTDs due to the influx of immigrants into Texas. However, surveillance data show evidence of these diseases—including dengue and yellow fever—in Texas communities for over a decade. Texas is a global hotspot for NTDs,¹²³ but the incidence of these illnesses cannot solely be linked to immigration. Many factors, including poverty and environmental changes such as global warming, are also contributing to the rise in these diseases.¹²⁴

Although awareness and knowledge of NTDs is low, stakeholders show strong interest in utilizing educational opportunities to learn more about NTDs. Over 70% of respondents said they would be “somewhat” or “very likely” to attend a “lunch and learn” or participate in a webinar on the topic of emergent tropical diseases in Texas (Figure 16). Furthermore, stakeholders recognize opportunities for collaboration among experts and key resources in the community, including the Sabin Institute, the National School of Tropical Medicine at Baylor College of Medicine, pharmaceutical researchers, and other partners in Texas.

Figure 16. Percentage of Survey Respondents Who Are “Somewhat” or “Very Likely” to Participate in Educational Events on Prevention, Prevalence, and Reporting Requirements of Emergent Tropical Diseases in the Next Six Months, 2014

How likely are you to participate in a webinar about the prevention, prevalence, and reporting requirements of these emergent tropical diseases?	75%
How likely are you to attend a “Lunch and Learn” in your community about the prevention, prevalence, and reporting requirements of these emergent tropical diseases?	71%

Recommendations

1. Strengthen research, disease control, and surveillance initiatives around NTDs.

Leaders in Texas should push for additional resources dedicated to detecting NTDs, developing vaccines, and protecting our communities from these diseases. Lawmakers should allocate funds for the research and development of new drugs, diagnostics, insecticides, and models, and to determine clearer links between NTDs and chronic illnesses like epilepsy and heart disease. In addition, resources are needed for surveillance and prevention projects. There is an urgent need to determine accurate estimates of NTD burden both statewide and nationally, improve risk assessments, and learn more about disease transmission including the role of poverty. Such data will also assist policymakers in creating evidence-based policy and implementing effective interventions.

2. Require DSHS to provide information to the greater public health community about neglected tropical diseases and the importance of diagnosis, monitoring, and surveillance.

The public health and healthcare communities are not fully educated about the risk, diagnosis, and reporting of NTDs. DSHS must partner with these professionals—as well as educational institutions and local, state, and other government officials—to promote awareness of NTDs and continue science policy discussions to support research and disease control needs.

3. Build partnerships and improve local capacity for research and services.

Partners across the state must work together to prevent the spread of NTDs and address the risk of chronic illness and disability. Partnerships are needed at a local level to train the public health workforce in recognizing, managing, and treating NTDs, as well as to monitor the incidence of disease. Potential partnerships could include major research universities and institutions, especially those near the border, to increase capacity for epidemiological research.

APPENDICES AND ENDNOTES

APPENDIX I: METHODOLOGY FOR WEB-BASED SURVEY

The 2014 web-based survey is the fifth survey of its kind. Staff from The Immunization Partnership, with assistance from Nybeck Analytics, constructed the 2014 survey, incorporating questions from the surveys administered in 2008, 2010, and 2012. Input and opinions expressed during the 2014 statewide stakeholder meetings were also considered and incorporated. Experts in immunization, immunization registries, or survey research piloted the survey and offered valuable feedback that was incorporated. The online survey was administered using SurveyMonkey.

On June 4, 2014, staff from The Immunization Partnership sent e-mails to immunization stakeholders on its mailing list, inviting them to complete the survey. Over 2,400 people are on this list. They include people who work for city and county health departments, school districts, community clinics, private provider offices, hospitals, and health centers. Other invitees included representatives of foundations, the Texas Pediatric Society, Texas Medical Association, Texas Public Health Coalition, Texas Immunization Stakeholder Working Group, and immunization coalitions across Texas. The e-mail invitation encouraged people to forward the link to their colleagues. The Immunization Partnership staff also posted the survey announcement on its Facebook page, where it was viewed by over 200 people.

The survey sought to gather information and perspectives from immunization stakeholders familiar with immunization issues in Texas. Some 179 immunization stakeholders completed the survey. Among those who completed the survey, 34% said they participated in at least one of the four stakeholder meetings hosted by The Immunization Partnership throughout Texas in 2014. This report reflects the opinions of those who completed the survey. It does not necessarily express the opinions of The Immunization Partnership or St. David's Foundation.

The survey is not representative in the statistical sense. The purpose of the survey is to collect information from immunization stakeholders familiar with immunization issues in Texas. Each response represents an important view that any number of people might share. The percentages shown in the tables can act as a guide to interpreting the salience of the issues. Findings in this report represent individual responses, and some of the respondents might work in the same clinic or office.

APPENDIX II: HOW STAKEHOLDER MEETINGS WERE CONDUCTED

During the spring and summer of 2014, The Immunization Partnership and Frontera Strategy conducted a series of stakeholder meetings across Texas. The four meetings were held in Austin, Fort Worth, Houston, and Dallas.

The goals of the stakeholder meetings were to make people aware of current events in immunization on the state and national front, determine local immunization concerns and priorities, and share advocacy strategies and techniques. The stakeholder meetings also promoted The Immunization Partnership's 2014 Texas Immunization Summit and continued to build the statewide network of Texans interested in improving immunization policies and practices.

The Immunization Partnership collaborated with local immunization coalitions, community-based organizations, and hospitals to assist in the planning, coordination, and implementation of the stakeholder meetings. Participants were recruited by local champions in the communities where the meetings were held.

A total of 193 Texans participated in the meetings including parents, students, researchers, healthcare providers, state agency personnel, and representatives from pharmacies, foundations, medical associations, health clinics, pharmaceutical companies, state legislative offices, school districts, and non-profit organizations. Events were scheduled at times and places convenient to the broadest range of participants possible.

Stakeholder meetings in 2014 addressed these topics: improvements to ImmTrac, adult immunizations, legislation related to meningitis, HPV, vaccine exemptions, neglected tropical diseases, and pertussis. Participants had the opportunity to raise additional concerns and ideas. Careful notes were taken at each session to ensure that emerging trends and themes could be included in the proceedings of the 2014 Texas Immunization Summit and this publication.

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RESOURCES

For more information on immunization, please visit the following websites:

American Academy of Pediatrics
<http://www2.aap.org/immunization/>

Center for Vaccine Awareness and Research at Texas Children's Hospital
<http://www.texaschildrens.org/vaccine/>

Centers for Disease Control and Prevention: Vaccines and Immunizations
<http://www.cdc.gov/vaccines/>

College Vaccine Requirements
<http://www.CollegeVaccineRequirements.com/>

Every Child By Two
<http://www.ecbt.org/>

ImmTrac: Immunization Information System for Texas
<http://www.dshs.state.tx.us/immunize/immtrac/default.shtm>

Immunization Action Coalition: Vaccination Information for Healthcare Professionals and the Public
<http://www.immunize.org/>

Immunization Branch, Texas Department of State Health Services
<http://www.dshs.state.tx.us/immunize/>

The Immunization Partnership (TIP)
<http://www.immunizeUSA.org/>

National Network for Immunization Information (NNii)
<http://www.immunizationinfo.org/>

PKIDs (Parents of Kids with Infectious Diseases)
<http://www.pkids.org/>

Texas Immunization Stakeholder Working Group (TISWG)
<http://www.dshs.state.tx.us/immunize/partners/tiswg.shtm>

Texas Vaccines for Children Program
<http://www.dshs.state.tx.us/immunize/tvfc/default.shtm>

Vaccinate Your Baby
<http://www.vaccinateyourbaby.org/>

The Vaccine Education Center at The Children's Hospital of Philadelphia
<http://www.chop.edu/service/vaccine-education-center/home.html>



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