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Strategies and Models for Promoting Adolescent Vaccination for Low-Income Populations

Katherine M. Harris, Laurie T. Martin, Nicole Lurie

Sponsored by Sanofi Pasteur

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PREFACE

In 2007, Sanofi Pasteur asked RAND Health, a division of the RAND Corporation, to study the current climate for adolescent immunization in the United States, to recommend broad strategies for immunizing low-income adolescents (through age 18), and to identify promising “on the ground” practices consistent with the proposed strategic framework. To complete our assessment, we conducted a review of the relevant published and unpublished literature and held a series of key informant interviews. This documented briefing presents the results of our assessment. The intended audience includes public health officials, school administrators, and health care providers.

Comments are welcome and may be addressed to Katherine Harris by email at kharris@rand.org or by mail at RAND Corporation, 1200 South Hayes St., Arlington, VA 22202. A profile of RAND Health, abstracts of its publications, and ordering information can be found at www.rand.org/health.

***Strategies and Models for Promoting
Adolescent Vaccination for
Low-Income Populations***

**Katherine Harris
Laurie Martin
Nicole Lurie**

March 2009

Why Is This Project Needed?

- **New vaccines for adolescents and revised recommendations for existing vaccines have been introduced**
- **Vaccine use among adolescents is low**
- **Adolescent vaccination poses unique challenges**
 - Venue
 - Parental consent
 - Communication
 - Documentation

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With the introduction of new vaccines and the recent recommendation of the Centers for Disease Control and Prevention's (CDC's) Advisory Committee on Immunization Practices (ACIP) that all individuals 18 years old and younger receive a flu shot [1], there is new and growing interest in adolescent immunization. Since 2005, three new vaccines for older children have been licensed in the United States and recommended by the ACIP, including Meningitis vaccine (MCV4); Tetanus, diphtheria, pertussis vaccines (Tdap); and HPV vaccine [2-5]. While data from the 2007 National Immunization Survey–Teen (NIS-Teen) show that the majority of 13–17-year-olds have received recommended vaccines, rates remain below 2010 targets.¹

The coverage rates for low-income adolescents and minority youth, however, are likely to be lower, given historically low vaccine coverage rates among blacks and Hispanics, regardless of age [6]. Further impetus for this project comes from the realization that, compared to the pediatric or adult population, promoting

adolescent vaccines presents special challenges with respect to venue, consent, communication, and documentation.

Venue. Adolescents in general and low-income adolescents in particular make low use of primary and preventive care and are less likely to have a “medical home” (that is, a primary provider and site where their medical records are stored). Thus, they are less likely to see a provider who has vaccines on-site [7, 8].

Parental Consent. Parental consent is relatively easy to obtain for vaccines administered in medical office settings because parents tend to accompany their adolescent children on medical visits. Obtaining parental consent in other settings, especially those where adolescents congregate without parents (e.g., schools, after-school programs, sports events), is substantially more challenging because vaccinations require “real time” or “near real time” consent.

Communication. Unlike pediatric or adult vaccines, around which messaging and communication are targeted to adults, adolescent vaccination requires targeting messages to both parents and adolescents, regardless of whether the parent or adolescent makes the decision to get vaccinated.

Documentation. Adolescent vaccination records may be incomplete because adolescents see numerous providers in multiple venues. Also, adolescent vaccinations are less likely to be entered into centralized registries accessible to health care providers, schools, and parents.

¹Among adolescents aged 13–17, coverage rates were as follows: Quadrivalent meningococcal conjugate vaccine – 32.4%; Tetanus/diphtheria – 72.3%; Hepatitis B – 87.6%; Measles, mumps, and rubella – 88.9%; varicella protection – 91.7% (65.8% had history of varicella disease; 25.9% received 1+ dose of vaccine); Human Papillomavirus – 25.1% [9].

Goals of This Project

- **Examine the policy and practice climate surrounding adolescent immunization with a focus on low-income populations**
- **Identify promising models and practices for promoting adolescent vaccination**
 - Have a limited evidence base
 - Consistent with theory and principles of behavior change, health communication, and public health practice
 - Development and testing recommended prior to implementation
- **Focus on vaccination in school- and community-based settings**

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Despite the recognition that low-income adolescents may pose special challenges, adolescent vaccination has not received focused attention from the public health community until recently. Recommendations aimed at expanding adolescent immunization recently issued by the Department of Health and Human Services National Vaccine Advisory Committee (NVAC) are illustrating this focus. In this context, Sanofi Pasteur asked RAND to study the current climate for adolescent immunization in the United States, to recommend broad strategies for immunizing low-income adolescents (through age 18), and to identify promising “on the ground” practices consistent with our proposed strategic framework. By their nature, the promising practices we identified do not rest upon a mature evidence and experience base, have not been fully evaluated, and should not be considered “implementation ready.” Nonetheless, they are consistent with established theories of behavior change, health communication principles, and/or public health practice.

Although our original charge was to focus on low-income adolescents, we found the current policy and practice infrastructure supporting the vaccination of the general population of adolescents to be underdeveloped and thus unlikely to yield substantial increases in vaccination uptake among low-income adolescents in the absence of structural change. For this reason, we addressed the issue of adolescent immunization from a broad perspective, identifying more general approaches that can be tailored to low-income populations, and addressed specific issues and challenges for low-income adolescents where appropriate. Our investigation suggested that current practices are not well suited to overcome structural and attitudinal barriers to expanded vaccine coverage among adolescents. As a result, the approaches we identified do not rest upon a mature evidence and experience base and, thus, should not be considered “implementation ready.” As such, we recommend that the approaches described here be further refined with input from key stakeholders and/or tested with the guidance of evaluation researchers.

Organization of the Briefing

- **Study approach**
- **Findings from the literature and interviews**
- **Recommendations**
- **Summary and next steps**

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This documented briefing presents the results of RAND's study. It is organized in four parts: (1) discussion of our approach for accomplishing our objective; (2) discussion of the findings from our literature review and interviews; (3) our recommendations for overcoming barriers and increasing coverage of adolescent vaccine; and (4) potential next steps.

Organization of the Briefing

- **Study approach**
- **Findings: barriers to expanded adolescent immunization**
- **Recommendations**
- **Summary and next steps**

Our approach consisted of interviews with experts and other key stakeholders and a review of the scientific literature. We describe these in more detail below.

Study Approach

- **Key stakeholder interviews using “snowball” methods**
 - School nurses and public health professionals
 - Researchers and legal experts
 - Trade and professional association representatives
 - Immunization coalitions and programs
 - Third-party billers
 - Nontraditional vaccinators
- **Literature and Internet searches, conference proceedings**

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We first conducted a series of interviews, approved by RAND’s Human Subjects Protection Committee. Using a “snowball” approach, we initially identified a select group of relevant stakeholders, expanding our pool as the project unfolded to include nominations from previously interviewed stakeholders, as well as experts who we felt could assist us in refining our specific recommendations. Second, we reviewed the scientific literature, which we identified using Web searches, attending NVAC meetings, and viewing relevant presentations from the 2006, 2007, and 2008 Immunization Conferences via the Web.

Study Approach (cont'd)

- **Used literature and interviews to**
 - Characterize policy and practice environment
 - Identify key barriers to widespread use
 - Formulate and refine recommendations
- **Developed seven recommendations to either**
 - Adopt promising practices
 - Modify good ideas not currently in use
 - Build from scratch to address barriers in current system

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For this project, we took a qualitative approach. Based on the findings from our interviews and literature reviews, we developed a conceptual model of the policy and practice environment surrounding adolescent immunization; identified barriers in the current practice and policy environment that limit the widespread use of recommended vaccines among low-income adolescents; and formulated and refined a set of recommendations for improvement.

Organization of the Briefing

- Study approach
- Findings: barriers to expanded adolescent vaccination
 - Lack of “medical home”–centered care
 - Complex and varying VFC rules
 - Stringency of parental consent requirements
 - Complexity of school-based immunization
 - Underdeveloped vaccine system
 - Vague messaging
- Recommendations
- Summary and next steps

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In this section, we present our findings based on our literature review and stakeholder interviews.

Medical Homes May Not Provide Vehicle for Substantial Expansion of Adolescent Vaccination

Young Children

- Frequent well and sick visits
- Many vaccinations
- Clear provider: Pediatrician

Adolescents

- Healthier, fewer visits
- Fewer vaccinations
- Provider less clear:
 - Too old for pediatrician
 - Too young for internist
 - Reproductive health
 - School clinics

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A *medical home* is defined as a health care setting that is “accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective” [10]. Young children typically have a medical home centered on a pediatrician whom they see frequently for both well-child and sick visits. Medical homes serve as the primary venue for vaccinating young children. While expanding adolescents’ access to medical homes is a desirable goal, their use as a vehicle for achieving substantial expansions in adolescent vaccination may not be practical for a number of reasons. First, compared to children, adolescents have fewer sick visits. Moreover, studies have shown that they are also less likely to have a preventive health visit within the course of a year [11].

Second, given that adolescents use a combination of health care settings and providers, including primary care physicians, reproductive health clinics, emergency departments, and school or community health clinics, the location of their medical homes is less clear [12–14]. For example, among 11–17-year-olds,

approximately one-third of health care visits are made to physicians other than pediatricians or family physicians [7].

A final area of concern is that many adolescents do not receive any health care [12, 15]. In 2002, for example, among adolescents aged 11 to 21, 29% of females and 39% of males reported not having any visits to a health care provider within a 12-month period [8, 12]. Further, disadvantaged youth, including many blacks, Hispanics, uninsured, and nearly poor are less likely to visit a health care provider [14].

The federal program intended to provide free vaccinations for low-income teens is problematic because many teens lack medical homes and do not visit doctors regularly. The Vaccines for Children (VFC) program is a federally funded program that provides ACIP-recommended vaccines at no cost to eligible children [16]. Children are VFC-eligible if they are age 18 or younger and meet one of the following criteria: (1) Medicaid eligible, (2) uninsured, (3) American Indian or Alaska Native, or (4) underinsured¹ [17]. While the VFC program is not limited to traditional providers, one of the original intents of the program was to encourage comprehensive health care in a medical home [18].

The central challenge in vaccinating many VFC-eligible adolescents, particularly those who are uninsured, is their lack of regular contact with health care providers who administer VFC-purchased vaccine [19, 20]. In principle, public health departments are in a position to reach a fraction of VFC-eligible youth who are not currently receiving vaccines through their usual source of care. However,

the scope and scale of public health department efforts are limited by budget and staffing. Thus, the role for alternative vaccinators in improving access to vaccines for VFC-eligible adolescents is potentially large. *Alternative vaccinators* are providers outside of the medical home setting and may include retail-based medical clinics or schools who partner with third parties able to deliver VFC vaccine and bill private insurance, depending on VFC eligibility.

¹Unlike uninsured children, underinsured children are eligible to receive VFC vaccine only through a Federally Qualified Health Center or Rural Health Clinic (RHC).

VFC Rules Have Chilling Effect on Participation of Alternative Vaccinators

- **Wide variation in requirements at the state and local levels**
- **Some requirements make alternative vaccinators ineligible**
- **No practical mechanism for verifying insurance status outside of office-based settings**

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VFC rules complicate efforts to deliver vaccinations through alternatives other than medical homes. Although VFC is an entitlement program run by the CDC, the CDC provides its 61 grantees (typically state and local governments) the opportunity to tailor the program to meet the needs of local areas. As such, grantees must ensure that the VFC providers they enroll meet the nine federal requirements at a minimum (see footnote for more detail).¹ However, grantees may also require participating providers to meet additional requirements, such as replacement of wasted doses, inventory reports, or back-up refrigeration [21]. Approximately one-quarter to one-third of grantees have such requirements [18]. In addition, there is further grantee variability in the provider enrollment process and in whether grantees allow specialty providers to offer a select number of VFC vaccines² [22]. Such variability makes enrolling alternative vaccinators challenging. Enrollment and regulatory compliance can be highly burdensome for organizations such as retail clinics that operate in multiple geographic regions under the purview of multiple grantees with different enrollment requirements.

Local requirements can also make it difficult for alternative vaccinators who provide vaccines outside of office-based settings to become VFC-eligible providers. For example, some VFC grantees have requirements that preclude schools or mobile vans as vaccination venues, because these do not have the equipment necessary to store VFC vaccines for long periods. Other grantees, however, consider the vans mobile extensions to or partners with the VFC provider office, and do allow them.

Finally, unlike office-based vaccinators, alternative vaccinators lack access to insurance records and thus lack a practical mechanism for identifying VFC-eligible children. While no formal documentation of VFC eligibility is currently required, alternative vaccinators are concerned about the potential of a *future* requirement and their ability to fulfill that requirement to receive vaccine reimbursement.

¹ The nine federal requirements are as follows: Screen and provide vaccines to VFC-eligible children; comply with ACIP recommendations; maintain records for three years; do not charge for the vaccine; do not charge an administration fee exceeding state limits; do not deny administration of vaccine due to inability to pay fee; distribute vaccine information statements (VISs); comply with VFC administrative requirements; if VFC provider status is terminated, return unused vaccine.

² The CDC has clarified VFC rules, stating that specialty providers are now allowed to offer a limited set of vaccines specific to their line of work, rather than all ACIP-recommended vaccines as originally required for VFC providers. Despite this clarification, grantees have the final decision, and many have chosen to continue requiring VFC providers to administer all ACIP-recommended vaccines to eligible children and youth.

Parental Consent Laws Complicate Adolescent Vaccination Outside Office-Based Settings

- **Legal environment surrounding parental consent is ambiguous**
 - Consent not required by federal law
 - Not explicitly addressed by state statute
 - Legal precedent treats consent in “real time” as with invasive medical procedure
- **Collecting parental consent requires close physical proximity between parent and child**
 - Occurs in office-based settings
 - Precludes places where adolescents congregate without parents

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Confusion and lack of clarity surrounding parental consent rules are substantial barriers to broadening teen vaccination. While federal law does not explicitly require parental consent for vaccinations, it does require providing information about particular vaccines when they are administered, delivered in the form of a VIS [23, 24]. States have the authority to require parental consent and determine whether minors may consent for their own health care, including vaccination [24]. However, there are ambiguity and substantial variation in the wording and interpretation of state vaccine laws [8].

Because most states do not have comprehensive statutes that specify consent requirements for the vaccination of children, vaccination is generally covered under laws that address parental consent for health care more broadly [24, 25]. As such, consent must be obtained in “real time” or “near real time” (as with an invasive medical procedure) for each dose in a series.

Parental consent is relatively easy to obtain for vaccines administered in medical office settings because parents tend to accompany their adolescent children on medical visits. Obtaining parental consent in other settings, especially those where adolescents congregate without parents (e.g., schools, after-school programs, sports events), is substantially more challenging [24].

Schools Are Ideal Venue but Logistically Complex

- **Conventional wisdom: Schools offer predictable access to universe of adolescents**
 - Schools have a “captured” enumerated population
- **Practical complexities of school-based vaccination are underappreciated**
- **Vaccines are often required for school entry, but schools are not accountable for ensuring high vaccination rates**

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It would appear at first blush that vaccinating teens in a school setting would be a practical way to address the barriers posed by the lack of a medical home. Schools are the only place where the vast majority of adolescents are found consistently and predictably. And, in fact, we found scattered examples of schools that have successfully partnered with local health departments to sponsor vaccination programs [26, 27]. However, the current literature has not rigorously explored the range of practical considerations posed by immunizing in schools—these relate to obtaining parental consent, caseloads, coordination with public health departments, and administrative burdens, particularly for schools without on-site health clinics [28–30]. Our interviews suggest that barriers to school involvement appear to be both significant and underappreciated. Several informants remarked that state education departments’ fear of liability drove strict consent procedures for school-based immunization.

The lack of school resources, including time, money, and staff, is perhaps the biggest challenge to school-based immunization. Unfortunately, schools with students who would most benefit from school-based adolescent vaccination (e.g., those in rural areas or with a large underserved population) often have access to the fewest resources [29]. Other obstacles to vaccine education or administration include cultural or linguistic barriers and the societal context in which each new vaccination is introduced. Certain subgroups of adolescents or their parents, and even the school administrators themselves, may not be interested or willing to support school-based vaccination because of their personal values and beliefs [29]. While vaccinations are often required for school entry, schools are not generally held accountable for vaccinating their students. Thus, schools have little incentive to devote resources to the activity.

To illustrate the complexity of school-based vaccine administration, we consider the case of flu shots. Flu shots represent the simplest case of school-based immunization for several reasons. First, only one dose is required. Second, there are limited education needs. While there remain myths about the flu shot that do need to be addressed, most people are familiar with the disease and the vaccine. Third, the influenza vaccine is administered in the fall, when parents and students expect to review and process communication from school administrators (e.g., emergency cards, bus schedules, requests for school supplies).

Even the simplest case of school-based vaccination, however, is complicated. The flow chart above highlights the need for four key players: vaccine provider (e.g., public health department; contracted health service), school, adolescent, and parent, with the burden of education, communication, and eligibility verification falling to school personnel. The scenario becomes even more complicated for vaccines that require multiple doses—particularly with youth who have already received or are expected to receive one or more of those shots outside of the school setting.

Vaccine Registries for Adolescents Are Underdeveloped

- **Strategies for increasing adolescent immunization rates need to be informed by data**
 - Identify deficiencies and areas for improvement
- **Registries underused for adolescents, despite potential value**
- **Adolescents are difficult to enumerate**
 - Local birth records can be inaccurate or incomplete
 - Voting rolls and drivers' license data are not suitable

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Vaccine registries for adolescents present an opportunity to support increased adolescent vaccination. Reliable and valid data on coverage rates are key to the development and monitoring of initiatives aimed at increasing adolescent vaccination, and vaccine registries are a potential source of such data. *Vaccine registries* are computerized information systems that can be used for measuring vaccine coverage, generating reminders and recalls, identifying pockets of need for targeted interventions, improving vaccine safety by reducing over-immunization, and calculating accurate denominators important for a range of vaccine-related statistics and activities [31].

However, registries are only as useful as the data they contain. The ability to link birth records to vaccination records makes registries a particularly useful tool in implementing and monitoring pediatric vaccination programs for infants and toddlers. While registries have tremendous potential for improving adolescent immunization coverage, they are currently underused. This is due in large part to the fact that birth records are not useful in enumerating the population of adolescents. Promising practices for addressing this challenge are presented in the Recommendations section of this briefing.

Messaging Around Adolescent Vaccination Is Not Actionable

	GetVaxed.org	PKIDS.org	CDC National Immunization Program	Vaccine Education Center
What diseases do vaccines prevent?	X	X	X	X
How do vaccines work?			X	X
When to vaccinate?	X		X	X
Vaccination risks?		X*	X	X
Info on free vaccines?	X		X	
Where?	X			
Cost?				
MD permission required?				
How to notify my doctor?				

*Links to Surgeon General's Report, not written in plain language.

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We found numerous examples of public health messaging aimed at promoting adolescent immunization that were developed and disseminated by public health authorities, vaccine manufacturers, and advocacy organizations. By and large, they lacked educational content or information about specific actions that can be taken (e.g., check local health department Web site for the hours and location of a vaccination clinic near you) to guide those positively inclined to be vaccinated. This slide shows several typical examples of messaging. Most cover information about infectious diseases and vaccines but do not provide actionable information about the process of being vaccinated.

Content of Messaging to Adolescents Is Not Actionable

- **Messaging edgy, but lacks educational component**
- **Not clear what message is**
 - What is the choice?
 - Vaccinated against what?
 - Where do you get vaccinated?
 - What are real consequences of not getting vaccinated?

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These are examples of messaging that is provocative and edgy and uses images to suggest that vaccination is cool. However, the messaging lacks information about the diseases that vaccines prevent and how and where to be vaccinated.

Messages Do Not Reference the Challenges of Parenting Adolescents

- **Content assumes medical home and insurance**
 - Less actionable when you are not insured and do not have a primary care physician
 - Implication: messages appear naive
- **Materials not packaged in a way that is engaging**

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We also found that messaging to parents of adolescents emphasizes positive, nonspecific messages that were often based on unrealistic assumptions. Advertisements such as the one above [32] may assume that teens are covered by insurance, have a regular primary care provider, and are always compliant with parents' wishes. Such a message may appear naïve to many parents, particularly if they do not have insurance, established relationships with medical care providers, or the skills to persuade resistant teens to be vaccinated. In this way, vaccine messaging resembles anti-drug messaging during the 1990s. Studies found that those messages were largely ineffective because they focused on reinforcing awareness of the problem but did not model skills or provide other information necessary to promote behavior change [33].

However—Positive Messaging May be Better Strategy for Minority Parents

- **Positive messaging effective for minority parents**
 - Shows respect for children, their potential, and their future
 - Population already flooded with negative messages
- **Messaging particularly influential when coupled with cost savings (for all parents)**
 - Your child will need this vaccination for college
 - Can get it for free now, or you can pay for it when they enroll

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It is important to note, however, that stakeholders felt positive messaging may be a good strategy for minority parents living in a community flooded with negative messaging. While messages advocating primary care visits will still have significant limitations because they do not acknowledge challenges related to the lack of health insurance or the usual source of care for many individuals, a positive tone reflecting on the years ahead is likely to be effective [32]. One stakeholder reported that the most effective statement to convince minority parents to vaccinate their adolescents was to tell them that their children will need this vaccination to go to college. If the teen gets the vaccination right here, right now, it will be free. If they wait until the teen is going off to college, they will likely have to pay for the vaccine out of pocket. The stakeholder noted that parents often voiced their appreciation for the respect the outreach worker had for their children's potential, and found that the cost savings argument resonated well with all parents.

Key Finding: Parental Consent Laws Are a Crucial Barrier to Meaningful Expansions of Adolescent Vaccination

“Obsolescence, inconsistency, and inadequacy may render some public health laws ineffective or even counter productive”

-- Erickson et al., 2002

- **Current law does not allow for flexibility in methods to obtain parental consent**
- **Modernization is required to**
 - Improve delivery of communication with parents, particularly parents with limited literacy
 - Make program management more effective and efficient

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Many of the barriers we identified—while seemingly distinct—were tied to current consent laws. We found that the requirement that parental consent for vaccination be provided in real time clearly limits the vaccination of adolescents in venues such as schools, where parents and adolescents are not likely to be together.

Ambiguity and variability in consent laws also hinder the role of alternative vaccinators and the use of information technology to improve documentation, management, and communication. Current approaches for collecting consent foreclose opportunities for the delivery of more-effective communication with parents about vaccine—particularly among parents with limited literacy—and impede effective and efficient program management that might be possible with modernized parental consent laws.

Organization of the Briefing

- Study approach
- Findings: barriers to expanded adolescent immunization
- Recommendations
- Summary and next steps

Roadmap to Recommendations

	Can be accomplished within existing legal framework
Create concrete, actionable, and active messaging	X
Foster school accountability	X
Develop strategies for targeting VFC-eligible teens	X
Use registries to promote process improvement	X
Make parental consent time-enduring	
Administer consent through Web portal	
Integrate communication, documentation, and consent	

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We developed seven recommendations to address many of the barriers in the current system and to improve vaccination rates among adolescents. Four of these recommendations can be accomplished within the existing legal framework; three, which we term “breakthrough” recommendations, have tremendous potential to improve coverage rates among adolescents and children but require modernization of current consent laws. Some recommendations lack a strong evidence base yet have strong face validity and address current gaps raised by stakeholders.

We suggest several approaches for achieving each recommendation.

***Recommendation 1:
CREATE CONCRETE, ACTIONABLE, AND ACTIVE
MESSAGING***

- **Ensure that messaging to both parents and adolescents is**
 - Culturally appropriate
 - Engaging AND informative
 - Understood regardless of literacy level
 - Compelling enough to engage youth in promoting vaccination to peers

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We identified a need to create concrete messaging with clear action steps. Messaging should be engaging and informative as well as culturally appropriate and accessible, regardless of individuals' literacy level. Ideally, the education and messaging would be compelling enough to engage youth in promoting vaccination to peers within his or her community.

We have identified three complementary approaches to achieving this recommendation, described in more detail in the following slides.

MESSAGING, Approach 1: Messages to Adolescents Should Be Edgy, Informative, Concrete, and Peer-to-Peer

- **Provides actionable strategies for youth**
 - “I’m not into that”
- **Peer-to-peer perspective**
- **Portrays real-life consequences of drug use**
 - Loner / isolation
- **Source for additional information and strategies**

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While adolescents, and in particular young adolescents, may not drive the decision about whether or not to get vaccinated, educating adolescents about vaccines may have longer-term implications. First, as future parents, they may be more likely to vaccinate their children. Second, as future adults, they may be more amenable to adult vaccinations. Third, educated adolescents may be able to inform and influence skeptical parents and peers.

One of the challenges of public health campaigns to promote healthy behaviors or actions, however, is that they are often successful at raising awareness of the problems but do little else to effect the intended behavior [34].

Among the influences motivating adolescents, peer pressure is often cited as one of the most important because youth “are socialized to behave according to group norms, role constraints, and situational scripts” [35]. As such, messaging from peers to peers may be most effective. However, researchers have found that non-experts, or “novices,” are more likely to process messages more literally

and recommend that messages aimed at adolescents (novices) be clear, framed in terms of concrete benefits, and able to be interpreted literally [34, 36, 37].

This slide shows an example of an actionable, peer-to-peer messaging strategy.

The example portrays the consequences of drug use as conveyed by one adolescent to another and provides strategies for obtaining additional information.

MESSAGING: Approach 2

Messaging to Parents Should Be Clear, Balanced, but Not Paternalistic

- **Actionable Messages**
 - Be a parent and set rules—it's your job
 - Easier to do it now than when they are in trouble
- **Resources with strategies**
- **Message packaged in a way that grabs attention of parents**
 - “I Hate You”

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Even when parents understand the benefits of vaccinating their adolescents and intend to do so, it can be challenging to follow through on the intention at a time when children often rebel against parental authority. In this context, messaging that depicts strong, positive bonds between parent and child (see slide 18) may be dismissed by parents as naïve or overly paternalistic.

Research suggests that when the recommended course of action (e.g., vaccination) is uncertain to produce the desired outcome (e.g., full protection against a communicable disease), people will process messages in more depth. In this case, negatively framed messages are often more persuasive than positive messages. Regardless of whether the messaging is framed in the positive or negative, to be effective messages must be clear, balanced, actionable, and realistic [34, 38, 39].

In this slide, we provide an example of anti-drug messaging aimed at parents that illustrates some of these desirable characteristics. The example provocatively portrays the emotional challenges of parenting an adolescent and provides clearer steps and strategies for taking action to keep children away from drugs. While the message is attention grabbing, it stops short of exaggerated fear appeals, which have been shown to be ineffective in similar media campaigns [40, 41]. Finally, it provides information on where parents can obtain additional resources.

MESSAGING, Approach 3: Engage Adolescents in Vaccine Promotion

- **Passive involvement of youth is not enough**
- **Capitalize on youth leadership to promote vaccination**
- **Consider Tobaccofreekids.org as a model**
 - Youth advocates sit on board of directors
 - Interactive Web site
 - Public Service Announcement contest
 - Educational and actionable
 - Packaged effectively
 - Promote a National Immunization Day
 - Model: Kick Butts Day—youth plan activities to promote tobacco awareness in their community

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Although advocacy organizations such as PKids.org have engaged a limited number of youth to assist with the development of marketing campaigns, the majority of youth overall are at best passively involved in this issue. Although not rigorously evaluated, Tobaccofreekids.org is a potentially useful model for more directly engaging youth and developing adolescent vaccine “champions” [42]. Ardent supporters of a cause, champions can bring about change by educating those around them and spurring others into action through local events, meetings, or publications.

Tobaccofreekids provides a range of opportunities for youth to become involved, including a public service announcement contest and a scholarship competition for youth advocates. In addition, both the past and present Youth Advocate of the Year sit on the Tobaccofreekids board of directors. During their nationwide “Kick Butts Day,” youth, parents, and other community members plan events in their

community that are supported by Tobaccofreekids.org in the form of advertising and materials. Many youth advocates have expanded their efforts beyond local work, to include statewide, nationwide, and overseas advocacy [44]. The vaccine industry may also provide opportunities for youth to organize local activities related to vaccination.

Recommendation 2: FOSTER SCHOOL ACCOUNTABILITY BY ADDING IMMUNIZATION MODULE TO SCHOOL HEALTH INDEX

- CDC's School Health Index (SHI) is a self-assessment and planning tool to promote school accountability
- SHI has 8 modules. Vaccination education and administration is not one of them

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CDC's School Health Index (SHI) offers a framework for increasing school accountability for vaccine promotion and administration, either in the absence of or in conjunction with state mandates. The SHI was developed by the CDC in partnership with school staff, school health experts, parents, and other governmental agencies [45]. It is a self-assessment and planning tool for schools to evaluate and improve their health and safety policies and programs. Structured around CDC's eight-component model of a coordinated school health program (CSHP), it includes the following modules: (1) School Health and Safety Policies and Environment; (2) Health Education; (3) Physical Education and Other Physical Activity Programs; (4) Nutrition Services; (5) Health Services; (6) Counseling, Psychological, and Social Services; (7) Health Promotion for Staff; and (8) Family and Community Involvement. While vaccines are covered somewhat in Health Education and somewhat in Health Services, the lack of a comprehensive focus is a barrier to promoting school accountability and moving toward more comprehensive school-based vaccination programs. Preventive health care, including vaccine-related issues, is not currently included.

Assess Current Performance

Module 5: School Health Services

Score Card (photocopy before using)

Instructions

1. Carefully read and discuss the Module 5 Discussion Questions (pages 5-14), which contain questions relating to expectations for each item on this Score Card.
2. Enter the student's score for each item on this Score Card.
3. After all questions have been scored, calculate the overall Module Score and complete the Module 5 Planning Questionnaire at the end of this module (pages 17-18).

	Fully in Place	Partially in Place	Emerging	Not in Place
C2.1 Health services provided by a full-time nurse				
C2.2 Health and safety personnel for students and teachers		3	2	1
C2.3 Professional staff only				
C2.4 For activities involving risks at community programs				
C2.5 For activities involving risks at school				
C2.6 Providing health services to students				
C2.7 Providing health services to staff				
C2.8 Providing health services to parents or guardians of students				
C2.9 Administering of selected health services				
C2.10 Establishing a treatment plan				
C3.1 Monitor and coordinate students with health conditions				
C3.2 Monitor physical activity				
C3.3 Monitor and coordinate students with health problems				
C3.4 Monitor the program				
C3.5 Monitor and coordinate with school				
C3.6 Treat students with health conditions				
A.1 Provide or facilitate one-on-one support for the students with physical conditions				
A.2 Ensure to monitor and coordinate students with conditions				
A.3 Obtain necessary information and resources for all students with health conditions				

COLUMBIA TOTALS: Add the number of items on this condition, not the number of items in the table.

(Fill in this data by adding up the total number of items on your page and comparing to the Module 5 Score (2) by subtracting 1 for each condition correctly.)

TOTAL ITEMS: Add the five and eight items on the two last pages	
MODULE SCORE = (Total Items - Five) X 10	10

Identify Priorities

[illegible]

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The SHI is made up of two activities that are to be completed by a diverse team of staff, parents, community members, health experts, and students. First, the team conducts a self-assessment, in which it identifies what the school is currently doing to promote good health and discusses the school's strengths and weaknesses. Second, after the self-assessment process is complete, the SHI guides the school team through a process for prioritizing the various recommendations it has developed. When these two activities are complete, the SHI team can complete the School Health Improvement Plan, which outlines steps necessary for implementation.

Immunization Module of SHI May Promote School Involvement

- **Facilitates expansion of the role of school in adolescent vaccination**
- **Immunization module could include**
 - Vaccine education: youth, parents, staff
 - School nurse training
 - Use of registry to assess vaccination status
 - Identify and refer to community providers
 - Vaccinate on-site
- **Promotes accountability in the absence of or in conjunction with legislative mandates**

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A vaccine-specific module dovetails nicely with existing SHI modules, and would give schools a sense of where they fit on the continuum (from minimal education to vaccination on-site), and where there is room for improvement. As such, an SHI immunization module would help schools increase their involvement and accountability with respect to vaccine promotion and/or administration in ways that are consistent with available resources and levels of interest. In this way, the SHI could be a flexible tool for increasing school accountability for vaccine-related activities in the absence of potentially contentious school mandates, or it could help schools organize and carry out their responsibilities to ensure that students are vaccinated under mandates.

***Recommendation 3:
DEVELOP STRATEGIES FOR TARGETING VFC
ELIGIBLES***

- **VFC eligibility is difficult to assess outside of office-based settings**
- **Strategies for identifying and targeting VFC-eligible adolescents are needed to**
 - Increase vaccination among disadvantaged youths
 - Spur more-aggressive outreach to ALL adolescents

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Because medical offices maintain insurance records, office-based providers can assess VFC eligibility with reasonable accuracy. Such assessments are more difficult outside of office-based settings. Challenges in identifying VFC eligibility in the general population limit the ability of public health administrators to conduct outreach to low-income adolescents and to participate in broader efforts to vaccinate all adolescents, regardless of VFC eligibility.

TARGETING, Approach 1: Consider Combining Geographic Data to Pinpoint and Prioritize Outreach

- **Geographic data on health status and socioeconomic status come from a variety of sources**
 - Census Bureau
 - Department of Education
 - Local government
- **Maps can assist local agencies to prioritize based on need and available resources**

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We found that both traditional providers and alternative vaccinators have been uncertain, and at times frustrated, about how to efficiently identify underimmunized youth and to effectively target VFC vaccines. To help providers and other key stakeholders address these issues, RAND has been developing a set of Geographic Information System (GIS) mapping and decision tools specifically designed for health care decisionmakers. These tools help stakeholders quickly visualize where individuals with different characteristics reside, pinpoint areas where health or health care is suboptimal (hotspots), and assess the broad sociodemographic and neighborhood-level factors that may contribute to poor health outcomes. Maps such as these may be used to facilitate the targeting of VFC vaccine, and prioritization of outreach and education based on such factors as the proportion of students receiving free or subsidized school lunches, the availability of primary care providers participating in VFC, and the geographic clustering of Medicaid-eligible children.

TARGETING, Approach 2: Explore Third-Party Billers as a Way to Expand Access Beyond Low Income Areas

- **Third-party billers can**
 - Purchase and administer vaccine stocks
 - Submit claims for reimbursement
 - Accept out-of-pocket payments
- **Public health departments can contract with third-party billers to administer publicly purchased vaccine**
- **Together they can reach a broader population of adolescents with reduced risk of vaccinating insured youth with publicly purchased vaccine**

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One challenge inherent in any outreach effort is determining where it should be targeted. During the course of our investigation, we encountered several programs sponsored by local health departments to vaccinate low-income adolescents in neighborhood venues, such as fast-food restaurants or community centers. While targeting the highest-need youth ensures that almost all are VFC-eligible, this approach is limited because eligible youth residing in more affluent areas will not be reached. However, expanding the scope of such a program to include youth in higher-income areas raises the risk that insured youth would be provided free vaccines through the VFC program.

Public health departments can broaden the reach of the VFC program by partnering with private third-party billers, such as Maxim Healthcare Services [46], to administer VFC-purchased vaccine outside of low-income areas. Because third-party billers can assess insurance status, submit insurance claims, and process credit card payments, they can engage in broad outreach beyond

geographic areas with high concentrations of VFC-eligible adolescents and make vaccination more convenient for adolescents with and without health insurance. VFC eligibility screening in this case would take place during the parental consent process, in which parents would show documentation of health insurance or VFC eligibility.

Recommendation 4:
***BUILD THE CAPACITY OF REGISTRIES TO
PROMOTE PROCESS IMPROVEMENT***

- Immunization registries for adolescents are not well developed
- Registries underutilized by schools despite potential value
- Natural partnership between schools and registries not fully realized

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While immunization registries have traditionally focused on younger children, improving their utility for the adolescent population has great potential to facilitate improvement in the management of adolescent vaccination programs. One natural partnership, not yet fully realized, is with local schools.

***REGISTRIES, Approach 1:
Consider Populating Registry with School
Enrollment Data***

- **Provides an accurate and current list of all youth in the area**
 - Coverage estimates more precise
- **Facilitates targeting of VFC vaccine**
 - Allows for a more efficient use of resources
 - Targets schools with high percentage of free or reduced-price lunches
- **Establishes platform for continuous quality improvement (CQI) within schools**

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Populating immunization registries with school enrollment data could accomplish several objectives. First, more-precise estimates of coverage rates may be obtained because the accuracy of the denominator (all youth within a given area) will be significantly improved. Second, communication with the public health department would be streamlined and cross-referencing minimized, allowing for easy location of undervaccinated youth. Third, given that schools could also report the percentage of their students receiving free or reduced-price lunches, it would facilitate the targeting of VFC vaccines. Children living below 130% of the federal poverty limit (FPL) are eligible for free lunches, while those below 185% of the FPL are eligible for reduced-priced lunches. Medicaid eligibility varies by state but covers individuals up to 200% of the FPL. As a result, free or reduced-price lunches may be a good proxy for VFC eligibility. Populating immunization registries with school enrollment data may also have the added benefit of promoting school interest and buy-in and establishing a platform for Continuous Quality Improvement (CQI) within schools to achieve high vaccination rates.

***REGISTRIES, Approach 2:
Explore the Use of Champions to Build Registry
Capabilities***

- **Identify “Registry Champions” striving to make effective use of registries for adolescents (e.g., Washington, D.C., Michigan)**
- **Involve registry champions in developing tools for**
 - **Assessing registry capabilities and identifying opportunities for improvement**
 - **Communicating “lessons learned”**
- **Create new champions by demonstrating tool in a small handful of new localities**

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While adolescent vaccine champions can bring about change by educating the community and promoting vaccination among their peers, “clinical champions” can facilitate the adoption of new and unfamiliar technologies. Such motivated individuals are trained to share the on-the-ground experiences and insights gained in implementing and using new technologies [43].

Through the course of this project, we identified a very small number of state and local public health officials actively engaged in creating vaccine registries who are capable of documenting and monitoring adolescent vaccination. Such “registry champions” may be willing to share their lessons learned during the development of their registries and to assist in the creation of one or more tools designed to assess registry capabilities and identify opportunities for improvement with respect to adolescent vaccination. Such tools could, in turn, be piloted in a handful of new localities, while fostering new “registry champions.”

Breakthrough Recommendations Requiring Modernization of Consent Laws

	Can be accomplished within existing legal framework
Create concrete, actionable, and active messaging	X
Foster school accountability	X
Develop strategies for targeting VFC-eligible teens	X
Use registries to promote process improvement	X
Make parental consent time-enduring	
Administer consent through Web portal	
Integrate communication, documentation, and consent	

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The first four recommendations are achievable in the current legal environment. The last three recommendations would require modernization of parental consent laws. We discuss those three in more detail below.

Model State Statutes Can Facilitate Reform by Fostering Communication and Consensus

- **Ambiguity and variation in state laws hinder**
 - A greater role for alternative vaccinators
 - Use of IT to improve efficiency, management, and communication
- **Development model state statutes can**
 - Promote stakeholder awareness and understanding
 - Produce consensus among diverse and competing stakeholders
- **End result**
 - Provides sample statutory language
 - Serves as guide for assessing current law
 - Defines and clarifies roles and responsibilities

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The development of model state statutes is a strategy for achieving reform of complex and varying state laws [47, 48]. Model statutes have been developed by a number of public and private institutions on a wide range of social and economic issues. By design, the process for developing model statutes is open and deliberative, involving interaction among community organizations, professional associations, representatives from state and local governments, and legal experts. Thus, model statutes can promote an understanding of complex issues among key stakeholders and constituencies—even if model provisions are not directly or immediately enacted. Examples of model state statutes include model state drug statutes [49], a model state anti-trafficking criminal statute [50], and the Home Loan Protection Act [51].

The current consent process for school-based vaccination, or vaccination in any venue where adolescents are not with their parents, involves four stakeholders and places a high burden on the adolescent. For full coverage of any multi-shot vaccinations, this process must take place multiple times over the course of the year. Modernization of parental consent laws to allow for time-enduring consent would reduce this complexity.

Time-enduring consent would reduce administrative burden by permitting the distribution of the VIS and consent forms in the fall, at the beginning of the school year. During the fall, the school sends numerous documents home with students that require parental signatures (e.g., emergency cards, school lunch accounts, various permission forms). At this time of year, students expect to be transporting forms and parents expect to be reviewing them. Thus, the incremental burden of vaccination consent forms is low.

Time-enduring consent should be revocable in the event of the development of a counterindication or other unforeseen circumstance. The appropriate duration of the signed consent depends on the objectives of the immunization program. Consent that remains valid during the four months following the beginning of school would be sufficient to administer annual influenza vaccine and other single-dose vaccines. Programs intended to facilitate the administration of

multiple-dose vaccines, such as HPV and varicella, would require consent that remained valid over a longer period of time and procedures for revoking consent in the event of an adverse reaction.

***Breakthrough Recommendation 2:
ADMINISTER CONSENT THROUGH A WEB PORTAL***

- **Eliminates the need for classroom teachers to distribute, collect, and process forms**
- **Generates registry-ready rosters**
- **Technological capabilities and precedents exist**
 - **Personal health records**
 - **Electronic signatures in “captured” populations**
 - **Electronic consent in hospitals**
 - **School-based systems accessible to parents for monitoring real-time student performance**

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One challenge to the current consent process is that it involves handing pieces of paper back and forth across four stakeholders. Electronically distributing the VIS and administering consent through a Web portal minimize the need for classroom teachers to distribute, collect, and process forms in a way that minimizes dependence on the adolescent students. While we consider this a breakthrough recommendation, it is important to note that both precedents and technological capabilities exist in the form of personal health records, electronic signatures, and electronically administered consent in some medical facilities. An increasing number of school districts make student performance data available via the Web.

One potential challenge may be access to the Internet among low-income individuals. About one-quarter of adults in the United States report not accessing the Internet, with older individuals and low-income individuals less likely to report access [52]. However, given that free Internet access is available in many libraries and schools, and that access to the Internet is becoming cheaper and more widely available, some have argued that use, rather than access, may be a

better indicator [52]. One recent study found no digital divide by income because individuals in low-income households spent more time on the Internet than others [52]. However, given that technology is likely to continue as a barrier, both electronic and paper consent forms should be made available.

Electronically administering consent drastically reduces the administrative burden and removes the adolescent from the consent processes. Such a reform would make school-based administration more feasible. Vaccination coverage rates should improve because school nurses may concentrate their efforts on a smaller number of high-priority cases.

***Breakthrough Recommendation 3:
INTEGRATE COMMUNICATION, DOCUMENTATION,
AND CONSENT***

- **Capitalize on existing technology to integrate all aspects of vaccination**
- **Develop and demonstrate a model registry capable of such integration**
 - Links consent with vaccination records
 - Expands parental education with downloadable VIS, materials
 - Facilitates communication between stakeholders
 - Facilitates monitoring and management of vaccination programs
 - Improves ability to tailor messages / content / reminders
 - Provides links to community venues offering vaccination services

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Efforts related to education, administration of parental consent, and documentation of vaccine receipt are, for the most part, implemented in a decentralized and uncoordinated fashion, despite being interrelated. Leveraging information technology to integrate communication, documentation, and consent reduces the administrative burden, making adolescent vaccination programs more effective and efficient.

States Can Build Content and Capabilities Using Registries As a Platform

Parents	Adolescents	Health Care Providers	Schools
<ul style="list-style-type: none"> • Learn how vaccines can protect your child • Get vaccines for free • Locate a vaccine provider • Give permission for your teen to be vaccinated • Verify and print your teen's vaccination records • Schedule and pay for vaccinations 	<ul style="list-style-type: none"> • Learn how vaccines can protect you • Learn why you need your parent's permission to be vaccinated • Get vaccines for free • Locate a vaccine provider • Verify and print your vaccination records • Help your parents schedule and pay for vaccinations 	<ul style="list-style-type: none"> • Verify and update your patient's vaccination records • Locate alternative vaccine providers • Locate vaccine education materials • Locate tools for administering parental consent 	<ul style="list-style-type: none"> • Verify students' vaccination records • Locate vaccine education materials • Locate tools for administering parental consent • Learn how to organize on-site vaccination

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Registries can become a centralized tool and source of information for a range of stakeholders. Content can be tailored and made available to parents, adolescents, health care providers, and schools, with varying levels of access to vaccine records with appropriate privacy protections. In designing such systems, it is important that vaccine registries be interoperable across states to create a portable record.

Consider Department of Motor Vehicles As Model

The image shows a screenshot of the Michigan Department of State website. Several services are highlighted with colored arrows and labels:

- Education:** A blue arrow points to the 'Owning a Vehicle' section on the left sidebar.
- Register to Vote:** A blue arrow points to the 'Voter Registration' link in the 'Other Business Services' section.
- Renew License:** A green arrow points to the 'Renew License Plates' link in the 'Quick Links' section.
- Register a Vehicle:** A pink arrow points to the 'Register a Vehicle' link in the 'Quick Links' section.
- Pay Fees:** An orange arrow points to the 'Pay Fees' link in the 'Quick Links' section.
- Get Information in Spanish:** A purple arrow points to the 'Get Information in Spanish' link in the 'Quick Links' section.

The website header includes the Michigan Department of State logo, the name 'Terri Lynn Land, Secretary of State', and navigation links like 'Michigan.gov Home', 'SOS Home', 'Site Map', 'FAQ', 'Online Services', 'Forms', and 'Contact SOS'. The main content area features a 'Quick Find' search bar, a 'How Do I...' dropdown menu, and a 'Welcome to the Department of State Web site' message. The right sidebar contains a 'Search' bar and a 'Quick Links' section with various service links.

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Web portals operated by state Departments of Motor Vehicles are a potential model for the electronic integration of vaccine-related activities. It is now standard practice for states to allow citizens to verify their driving records, register their vehicles, renew driver's licenses, and access driver-education materials. Some systems can generate electronic reminders to a driver whose car registration or license is about to expire or whose car needs emissions testing. Such systems make electronic data available to support law enforcement functions and government planning and administration of the transportation infrastructure.

Some States Use Vaccine Registries to Link Stakeholders

Michigan

North Carolina

Wisconsin

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Several state vaccine registries have key elements of a DMV-like infrastructure already in place. Michigan, North Carolina, and Wisconsin allow health care providers (read, write), school officials (read, submit for review), and parents (read only) to access vaccine records. Registries can build upon these models and platforms to further facilitate communication among stakeholders and facilitate the management of vaccination programs by integrating consent, educational materials, forms, and vaccine availability and accessibility into the registry.

Organization of the Briefing

- Study approach
- Findings: barriers to expanded adolescent immunization
- Recommendations
- Summary and next steps

Take-Home Messages

- **VFC is not structured to vaccinate adolescents outside of traditional settings**
- **Parental consent laws create barriers to the development of alternative vaccination options**
 - Modernization is required to make substantial progress
 - Practical models for achieving legislative reform exist

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We have presented findings and recommendations for improving vaccination rates among adolescents, with an emphasis on low-income youth. We found that promotion strategies relying on vaccination in medical homes are problematic in the case of teens, in large part because the use of primary care declines markedly as children age. At the same time, VFC, the federal program that provides free vaccination to low-income children, is not well structured to support the delivery of vaccines outside of traditional, office-based settings. We also found that modernization of parental consent laws is required to vaccinate substantial numbers of adolescents in the community. While such reform may be controversial and complex, successful models exist and should be investigated more thoroughly.

Practical Next Steps

- **Develop opportunities to identify and nurture adolescent vaccine champions**
- **Develop background information to support the development of an immunization module for SHI**
- **Identify promising demonstration sites to examine feasibility of school–public health registry data linkages**
- **Assess feasibility of a model state statute and identify potential partners for its development**

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We conclude with a list of practical next steps for implementing and assessing the feasibility of the approaches discussed in this briefing. Given the range of time and resources needed to accomplish each recommendation, the industry may consider prioritizing those that can be implemented relatively quickly and inexpensively, while simultaneously assessing the feasibility of those recommendations that are more “downstream.”

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