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Increasing Immunization Coverage

Committee on Practice and Ambulatory Medicine and Council on Community
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Policy Statement—Increasing Immunization Coverage

COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE AND
COUNCIL ON COMMUNITY PEDIATRICS

KEY WORDS

immunization, vaccines, immunization coverage, increasing immunization coverage, vaccine financing, vaccine supply, vaccine safety, immunization information system, reminder-recall, missed opportunities, risk communication, refusal to vaccinate

ABBREVIATIONS

AAP—American Academy of Pediatrics
VFC—Vaccines for Children
VIS—vaccine information statement
DTaP—diphtheria and tetanus toxoids and acellular pertussis
Hib—*Haemophilus influenzae* type b
HBV—hepatitis B virus
MMR—measles-mumps-rubella
IPV—inactivated poliovirus
VZV—varicella-zoster virus
Td—tetanus toxoids and diphtheria booster
Tdap—tetanus-diphtheria-acellular pertussis booster
HPV—human papillomavirus
CDC—Centers for Disease Control and Prevention
ISO—Immunization Safety Office
NVAC—National Vaccine Advisory Committee
WIC—Special Supplemental Nutrition Program for Women, Infants, and Children
IIS—immunization information system

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abstract

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In 1977, the American Academy of Pediatrics issued a statement calling for universal immunization of all children for whom vaccines are not contraindicated. In 1995, the policy statement “Implementation of the Immunization Policy” was published by the American Academy of Pediatrics, followed in 2003 with publication of the first version of this statement, “Increasing Immunization Coverage.” Since 2003, there have continued to be improvements in immunization coverage, with progress toward meeting the goals set forth in *Healthy People 2010*. Data from the 2007 National Immunization Survey showed that 90% of children 19 to 35 months of age have received recommended doses of each of the following vaccines: inactivated poliovirus (IPV), measles-mumps-rubella (MMR), varicella-zoster virus (VZB), hepatitis B virus (HBV), and *Haemophilus influenzae* type b (Hib). For diphtheria and tetanus and acellular pertussis (DTaP) vaccine, 84.5% have received the recommended 4 doses by 35 months of age. Nevertheless, the *Healthy People 2010* goal of at least 80% coverage for the full series (at least 4 doses of DTaP, 3 doses of IPV, 1 dose of MMR, 3 doses of Hib, 3 doses of HBV, and 1 dose of varicella-zoster virus vaccine) has not yet been met, and immunization coverage of adolescents continues to lag behind the goals set forth in *Healthy People 2010*. Despite these encouraging data, a vast number of new challenges that threaten continued success toward the goal of universal immunization coverage have emerged. These challenges include an increase in new vaccines and new vaccine combinations as well as a significant number of vaccines currently under development; a dramatic increase in the acquisition cost of vaccines, coupled with a lack of adequate payment to practitioners to buy and administer vaccines; unanticipated manufacturing and delivery problems that have caused significant shortages of various vaccine products; and the rise of a public antivaccination movement that uses the Internet as well as standard media outlets to advance a position, wholly unsupported by any scientific evidence, linking vaccines with various childhood conditions, particularly autism. Much remains to be accomplished by physician organizations; vaccine manufacturers; third-party payers; the media; and local, state, and federal governments to ensure dependable vaccine supply and payments that are sufficient to continue to provide immunizations in public and private settings and to promote effective strategies to combat unjustified misstatements by the antivaccination movement.

Pediatricians should work individually and collectively at the local, state, and national levels to ensure that all children without a valid contraindication receive all childhood immunizations on time. Pediatricians and pediatric organizations, in conjunction with government agencies such as the Centers for Disease Control and Prevention, must communicate effectively with parents to maximize their understanding of the overall safety and efficacy of vaccines. Most parents and children have not experienced many of the vaccine-preventable diseases, and the general public is not well informed about the risks and sequelae of these conditions. A number of recommendations are included for pediatricians, individually and collectively, to support further progress toward the goal of universal immunization coverage of all children for whom vaccines are not contraindicated. *Pediatrics* 2010;125:1295–1304

BACKGROUND INFORMATION

In 1977, the American Academy of Pediatrics (AAP) issued a statement calling for universal immunization of all children for whom vaccines are not contraindicated.¹ Most immunizations in the United States are provided by private health care providers. Data from the 2004 National Immunization Survey show that 60.4% of children were vaccinated solely by a private health care provider, and an additional 24.2% received at least some of their vaccinations from a private provider.² Immunizations protect the individual child being vaccinated, but for most vaccine-preventable diseases, achieving high levels of immunization in the community offers indirect protection to others, because they are not exposed to infectious organisms. Children with contraindications to some vaccines, such as children with immunodeficiencies, who cannot receive measles vaccine, are indirectly protected when there is high coverage with measles-containing vaccines around that child. The 1995 AAP policy statement "Implementation of the Immunization Policy"³ supported specific guidelines for improving the vaccine-delivery system and increase immunization rates. Many of the 1995 recommendations have been achieved, including the expansion of immunization financing through the Vaccines for Children (VFC) program,⁴ production of parent-friendly vaccine information statements (VISs), promotion of the standards for child and adolescent immunization practices,⁵ and development of safer and combination vaccines. Additional recommendations in the initial policy statement included (1) sending parent reminders for upcoming visits and implementation of client reminder/recall systems, (2) using prompts during all office visits to remind parents and staff about immunizations needed at that visit, (3) re-

peatedly measuring practice-wide immunization rates over time as part of a quality-improvement effort, and (4) having in place standing orders for nurses, physician assistants, and medical assistants to identify opportunities to administer immunizations, unless such standing orders are prohibited by statute or other regulation.⁶

Childhood immunization rates are one of the leading health indicators used to assess the health of the nation as part of the US Department of Health and Human Services' *Healthy People 2010* initiative.⁷ *Healthy People 2010* set targets for immunization coverage rates for children and adolescents, for individual vaccines, and for the aggregate series of vaccines. For children 19 through 35 months of age, *Healthy People 2010* set a target of 90% coverage for each of the following: 4 doses of diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine, 3 doses of *Haemophilus influenzae* type b (Hib) vaccine, 3 doses of hepatitis B virus (HBV) vaccine, 1 dose of measles-mumps-rubella (MMR) vaccine, 3 doses of inactivated poliovirus (IPV) vaccine, and 1 dose of varicella-zoster virus (VZV) vaccine.⁸ For children who attend licensed child care and children in kindergarten through first grade, an additional target of 95% coverage was set for the DTaP, MMR, and IPV vaccines.⁹ An aggregate target for children in the 19- to 35-month age group was set for a minimum of 80% coverage for the full set of vaccines, referred to as 4:3:1:3:3:1 (at least 4 doses of DTaP vaccine, 3 doses of IPV vaccine, 1 dose of MMR vaccine, 3 doses of Hib vaccine, 3 doses of HBV vaccine, and 1 dose of VZV vaccine).¹⁰ For teenagers 13 to 15 years of age, *Healthy People 2010* sets a target of 90% coverage for each of the following: at least 3 doses of HBV vaccine, 2 doses of MMR vaccine, 1 or more doses of a tetanus-

diphtheria booster (tetanus toxoids and diphtheria booster [Td] or tetanus-diphtheria-acellular pertussis booster [Tdap] vaccine), and 1 or more doses of VZV vaccine (excluding those who have had varicella disease).¹¹

CHALLENGES

With the implementation of many of the recommendations from the 1995 AAP policy statement³ as well as the revised version published in 2003,⁶ much progress has been made toward achieving universal immunization, which was announced as a goal of the AAP in 1977. According to data from the 2007 National Immunization Survey, although only 77.4% of US toddlers 19 to 35 months of age had completed the combined immunization series (4:3:1:3:3:1) described previously,⁷ individual coverage for each of these vaccines, with the exception of the 4-dose series of DTaP vaccine, exceeded 90% for the first time. In 2007, 95.5% of children 19 to 35 months of age had received at least 3 doses of DTaP vaccine, and 84.5% had received 4 doses of DTaP vaccine.¹² Although the Institute of Medicine, in its 2000 report on vaccine financing, cited differences in vaccination rates on the basis of race/ethnicity, poverty, and location in inner-city or rural areas versus suburban areas,¹³ data from the 2007 National Immunization Survey showed similar vaccination rates for the 4:3:1:3:3:1 series for all ethnic/racial groups after controlling for poverty status and a difference in immunization rate of only 3.2% when comparing children at or above the poverty level with children living below the poverty level.¹² Also encouraging are recent data that showed rates of immunization coverage for American Indian/Alaska Native children to be comparable to those of white children.¹² There have been, and will continue to be, challenges to the vaccine-delivery system in terms of the science, economics, and social impact

of immunization, and these challenges have only increased as new vaccines and new vaccine combinations have been developed. Although new vaccines have the potential to improve the health of America's children, they have increased the burden on an already strained vaccine-delivery system.¹⁴ Today's vaccine-delivery system is actually a poorly integrated set of separate systems that include vaccine production, distribution, and financing. Immunization coverage of adolescents is a special challenge, and rates for adolescent immunization remain below targets set by *Healthy People 2010*. For example, data from the National Immunization Survey showed that for teenagers 13 to 17 years of age, only 30.4% had received Tdap vaccine, and only 72% had received at least 1 dose of either Td or Tdap vaccine after 10 years of age.¹⁵ Only 32.4% of adolescents had received meningococcal conjugate vaccine, and only 25.1% of female adolescents had initiated the 3-dose human papillomavirus (HPV) series. Coverage rates for some vaccines were higher but still below the *Healthy People 2010* targets for adolescents 13 through 15 years of age; only 89% of these adolescents had received at least 3 doses of HBV vaccine, 69% had received at least 2 doses of MMR vaccine, and 80% of those without a history of varicella disease had received at least 1 dose of VZV vaccine.¹⁵

Disruptions of Vaccine Supply

Shortages of specific vaccines during 2001–2002 brought to light the fragile nature of the US childhood vaccine supply and resulted in significant disruptions to childhood immunizations. Subsequent to the last publication of this statement in 2003, there have been increasingly disruptive shortages in vital vaccines. Over the past 10 years, shortages of heptavalent pneumococcal conjugate, Hib, HBV, influenza, hepatitis A virus, VZV, and menin-

gococcal conjugate vaccines have led to missed opportunities to immunize and have placed a large administrative burden on the delivery system. Some of these disruptions have lasted for an extended period of time; for example, the recent shortage of Hib vaccine has left a cohort of children not fully immunized with their final dose of Hib vaccine. Shortages of vaccines may lead to parental anxiety and increased demands on the practice setting. Children who fall behind in their coverage because of these systemic delivery disruptions should be tracked and then encouraged to return for these missed vaccine doses by using a reminder/recall system, which will be more easily accomplished with the adoption of electronic health records.

High Vaccine-Acquisition Costs and Inadequate Payment

With the introduction of VZV and heptavalent pneumococcal conjugate vaccines, a new era of higher-cost vaccines began. The introduction of other new vaccines, such as rotavirus and HPV, and combination vaccines such as Pediarix (GlaxoSmithKline Biologicals, Rixensart, Belgium) (HBV, IPV, DTaP) and Pentacel (Aventis Pasteur, Toronto, Ontario, Canada) (Hib, IPV, DTaP), as well as new indications for additional doses of existing vaccines, further increased the acquisition cost and complexity of delivering childhood immunizations. The introduction of HPV vaccine, with its single-dose acquisition cost of more than \$120, brought this issue into acute focus. Estimates from the Centers for Disease Control and Prevention (CDC) for the cost of fully immunizing an otherwise healthy child through the age of 18 years, based on the VFC federal acquisition-cost data chart, indicate that the total acquisition cost has increased to more than \$900 for boys and more than \$1200 for girls, which represents more than a sixfold increase since 1995.¹⁶

These increased acquisition costs are primarily the result of the addition of new vaccines or substitution of newer vaccines for older products by vaccine manufacturers (eg, IPV replacing oral poliovirus vaccine), as well as regular increases in the acquisition cost of older products, which often go unrecognized and unpaid by third-party payers.

Although payment for nearly all vaccines is available through either public or private sources, the high cost of buying, storing, and administering these products has increased to the point that the financial viability of many clinics and private practices is threatened unless realistic payments are provided. For some physicians, the strong desire to provide complete and timely immunizations to their patients is no longer sufficient to overcome these financial barriers. Even with universal purchase of vaccines, the administrative payment level varies tremendously and is often inadequate to justify the actual cost of administering the recommended immunizations, particularly by the Medicaid program, but also by other third-party payers. Third-party payers do not consistently pay at a level adequate to cover the cost of acquisition, storage, and administration of recommended vaccines to their intended recipients. Private payers often delay their coverage of new vaccines and fail to maintain adequate payment as acquisition costs increase, thereby resulting in payments that are insufficient to cover the costs of procuring and delivering vaccines. In a recent survey, half of the pediatricians and family physicians responded that they had delayed purchase of specific new vaccines because of financial reasons, and 5% of pediatricians and 20% of family physicians reported that they were seriously considering discontinuing the vaccination of privately insured patients because of vaccine-

acquisition cost, administration, and payment issues.¹⁷ This will be a larger problem for rural children and children who live in sparsely populated areas with shortages of pediatricians, where family practitioners are called on to provide the bulk of pediatric care. Should the financial situation worsen, the potential remains for more physicians, including pediatricians, to discontinue providing immunization services.

The public sector now purchases more than half of all vaccines administered in the United States through 3 sources of public funding: the federal VFC program, Section 317 federal discretionary grants, and state funds. Children who are eligible for the VFC program include uninsured children and recipients of government-funded health coverage such as Medicaid and the Children's Health Insurance Program in some states, children identified as Alaska Native/American Indian, and underinsured children if they receive vaccine at federally qualified health centers or rural health clinics. States also use Section 317 discretionary funds and their own funds to provide vaccines to children who are not covered by the VFC program or private third-party insurance.

The availability of vaccines through the VFC program and other government sources can be confusing. The VFC program is governed by a set of federal rules that define eligibility. Although VFC eligibility rules do not vary according to state, rules that govern Medicaid eligibility do vary according to state, thereby leading to variation in eligibility for VFC vaccines. These different Medicaid eligibility rules lead to disparities in access, with some states allowing VFC use for children from families with income up to 400% of the federal poverty level, whereas other states may limit VFC use to families with income only 100% of the poverty

level. The burden of record-keeping in the practice setting and inconsistencies in vaccine supply for vaccines funded through Section 317 and other funds places a large administrative burden on practices that elect to participate in these programs. Although the VFC program includes coverage for all CDC-recommended vaccines, variations in supply of vaccines covered by other vaccine sources as well as privately sourced vaccines introduce further complexity for practices that participate in these programs. In some states, such as Georgia, state funds are used to expand the supply of publicly available vaccines by adding these additional vaccine types to their VFC inventory of vaccines, which leads to yet more confusion for providers. Many states prohibit the interchange of VFC-sourced vaccines with private-sourced vaccines, which leads to the uncomfortable situation of having different vaccines available in the office for different groups of patients. In practices that care for both publicly and privately insured patients, these differences in vaccine availability, acquisition cost, and delivery lead to administrative confusion, vaccine-administration errors, and financial uncertainty. In many states, payments for the administration of VFC vaccines are less than the actual costs of administration, further eroding physician participation in the VFC program. Also, although Medicaid may attempt to cover administration costs for its beneficiaries, providers who care for other children enrolled in the VFC program, such as those who are uninsured, are not entitled to payment for their administrative costs of vaccination. Clearly the current "public-private partnership" for purchase, distribution, and administration of immunizations must be redesigned to maintain a consistent supply of vaccines at an acquisition cost that is predictable. This partnership also needs

to provide funding to compensate providers for storage, administration, and overhead that is sufficient to motivate practitioners to continue to participate in immunization services. Given the fact that the vast majority of immunizations are now administered by private-sector providers, it is unlikely that the public sector has the infrastructure to immunize the numbers of children who would be referred to it if private providers stopped administering vaccines. Current levels of payment to pediatricians for administration of vaccines by Medicaid and many private payers are far less than Medicare payments for administration of vaccines to adults, although administering vaccines to consenting adult patients takes significantly less work than administering vaccines to children, who are frequently nonverbal and less cooperative. Furthermore, payment for the administration of combination vaccines should be increased above that of single-component vaccines, or calculated on a per-component basis, in recognition of the fact that the additional components require additional effort on the part of the provider to explain the risks and benefits of each, and the payment should not be lower than that for the individual-component vaccines. The National Vaccine Advisory Committee recently issued a report listing 24 recommendations to ensure adequate supply, distribution, and administration of vaccines in the United States, including the elimination of the financial barriers described previously.¹⁸

Safety Concerns and Media Distortion

Another significant challenge to immunization delivery is the increasing concern within a segment of the general public about the safety and potential adverse effects of childhood immunizations. New and existing organizations and Web sites that portray

themselves as official resources for credible information on vaccines continue to appear on the Internet. These sites provide flawed or biased information that serves to fuel public concern regarding the safety of childhood immunizations, which leads to increased rates of immunization refusal or delays in on-time immunization.¹⁹ Celebrity opponents to vaccination, who are given national coverage by broadcast and cable networks because of their celebrity status, argue their case without scientific support or expert rebuttal. Adding further confusion to the public debate, well-known physicians have also published books that make recommendations, without any scientific or evidentiary basis, for altered vaccine schedules that contradict AAP and CDC recommendations. As a result, pediatricians are seeing an increasing number of parents who are demanding alternate schedules or completely refusing immunizations.²⁰ Pediatricians find themselves spending large amounts of time convincing frightened parents to follow published evidence-based recommendations for vaccine administration, thereby reducing time available for other important components of anticipatory guidance. To counter these antivaccination advocates, the CDC, AAP, and other professional agencies and organizations are also making use of the Internet and other media to promote greater acceptance of universal vaccination by providing evidence-based information and culturally sensitive and language-appropriate educational materials concerning the benefits of immunizations and their risks (eg, www.vaccinateyourbaby.org). Social marketing techniques should also be explored as a promising strategy for promoting acceptance of immunizations among members of the general public who remain hesitant or resistant to vaccinate their children.²¹

In response to the need for greater transparency and accountability regarding vaccine safety and the need to maintain constant surveillance of adverse events after vaccination, the CDC has established the Immunization Safety Office (ISO). Along with the Vaccine Adverse Event Reporting System, a cooperative program between the Food and Drug Administration and CDC, the ISO provides an infrastructure for high-quality vaccine-safety research, surveillance, and effective clinical translation of important vaccine-research findings, with an emphasis on enhanced follow-up of potential adverse events by using innovative research methods. A new and growing area of interest in the field of vaccine safety is the use of genomic research techniques to identify potential gene-based individual differences in vaccine recipients who experience adverse but not causally related events, such as Guillain-Barré syndrome or wheezing episodes after influenza vaccination and rheumatoid arthritis after HBV vaccination. In 2009, the ISO issued a statement on the CDC Web site categorically denying any scientific evidence for the highly publicized alleged linkage between vaccines and autism.²²

OPPORTUNITIES FOR IMPROVEMENT IN IMMUNIZATION COVERAGE

Despite the many challenges described, opportunities exist to improve immunization coverage in the future. With widespread implementation of the VFC program and continued availability of federal Section 317 discretionary funds and state funds, fewer children remain unimmunized in the United States because of purely financial obstacles. It is unfortunate that the level of funding for Section 317 funds is at the discretion of the federal budget and has not always kept pace with the growing cost of vaccine delivery. Con-

tinued efforts at the local, state, and federal levels are needed to further reduce the financial barriers to physicians and families associated with the complex system of vaccine financing described previously.

As reported in the previous version of this policy statement,⁶ the Task Force on Community Preventive Services, convened by the US Department of Health and Human Services with support from the CDC, reviewed evidence from published reports of interventions designed to improve the timely immunization of children and adults.²³ On the basis of the strength of this evidence as applied to the pediatric age group, the task force recommended a number of strategies for increasing immunization coverage for children.²⁴ They grouped these recommendations into 3 overall strategies: increase in community demand for vaccinations; enhancement of access to vaccination services; and provider-based interventions (see Table 1). The task force did not evaluate the extent to which financial constraints on those that provide immunizations (clinics, private offices) also affect the availability of immunizations to their clients.

In 2003, the National Vaccine Advisory Committee (NVAC) published a report titled "Standards for Child and Adolescent Immunization Practices."⁵ This report highlighted 17 immunization practices that were recommended to enhance immunization practices in the United States, including standards for vaccine availability; assessment of vaccination status at every health care encounter; improved communication with parents and patients about vaccine benefits and risks; proper storage, handling, administration, and documentation of immunizations; and a number of specific strategies for increasing coverage, such as reminder systems, office- and clinic-based patient record reviews, and community-

TABLE 1 Quality of Evidence Available to Support Potential Strategies for Increasing Immunization Coverage²⁴

Evidence Sufficient to Strongly Recommend or to Recommend	Insufficient Evidence to Evaluate or to Recommend
Client reminder/recall systems	Community education
Requirements for child care, school, and college enrollment	Patient incentives
Multicomponent patient education	Patient-held medical records
Reducing out-of-pocket costs	Using schools and child care centers as vaccination sites
Increasing vaccination settings closer to patients' homes	Provider education
Expanding clinic hours	Using standing orders
Using emergency departments and subspecialty clinics	
Using WIC sites	
Offering drop-in vaccination services	
Home-visiting services	
Use of electronic records	
Office-based quality-improvement activities	

based approaches. This extensive list of recommended immunization practices overlaps with those recommended by the CDC task force, as described previously, but does not specifically include the task force's recommended strategies involving Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) offices, home-visitation programs, or requirements for entry into child care, school, and college.

In September 2008, the NVAC endorsed a set of principles and recommendations for increasing provider and patient participation in immunization information systems (IISs), formerly known as immunization registries, as another strategy for increasing immunization coverage. The AAP, in its own policy statement in 2006, also endorsed the continued development and implementation of IISs.²⁵ To be most effective, IISs must provide bidirectional flow of vaccination information, allowing providers to enter vaccination data and retrieve patient-specific vaccination histories. It is unfortunate that many current IISs are incompatible with existing electronic medical records and, thus, present an added cost to those practices that are required or wish to participate in these systems. The time and cost of entering vaccination information into an

IIS can be considerable; therefore, payments by government and private insurers to support the entry of patient immunization data into IISs will be necessary for clinical practices that currently use paper-based records to participate in these new systems. Although the deployment of IISs will make it easier to identify patients who are behind on their immunizations, the provision of vaccinations during sick visits or emergency department visits may not be desirable in all situations because of the possible impact on patient compliance with recommendations for well-child care.²⁶

RECOMMENDATIONS

Recommendations below are based on evidence reviewed by the CDC Task Force on Community Preventive Services²⁴ and in the NVAC "Standards for Child and Adolescent Immunization Practices" report⁵ and are updated to include newer recommendations for the use of IISs and to emphasize the importance of the pediatric medical home as the optimal location for the delivery of pediatric immunization services. Additional recommendations beyond those addressed directly in either of these previous publications acknowledge the extensive financial and administrative barriers that private pediatricians and pediatric clinics

face in purchasing and delivering an adequate supply of vaccines to their patients and the current use of various media to influence parental decision-making by those who oppose a policy of universal childhood immunizations. In its most recent report, the NVAC included a set of 24 recommendations that address financial barriers that continue to undermine efforts to reach the goal of universal immunization coverage for children in whom vaccinations are not contraindicated.¹⁸ Where appropriate, those recommendations have been incorporated into this policy statement.

1. Collectively, pediatricians and child health care professionals should join with the AAP and its chapters in the following activities.

- Advocate for all children to receive comprehensive health care, including childhood immunizations, in a medical home²⁷ and improve access for children who are most likely to experience barriers to comprehensive care in a medical home, including members of racial and ethnic minorities, poor or uninsured children, children who live in inner-city or rural areas, and children with chronic medical conditions. Pediatricians can further assist by collaborating with local public and private child health services to identify children without access to a medical home and providing assistance in referring them to an appropriate medical home. The medical home should maintain the children's health records, including immunization records; furthermore, the pediatric medical home requires a level of payment at least as great as that for the adult medical home.
- Assist in the identification of other venues in which vaccina-

tions can be delivered if a significant number of children in a community do not have convenient access to a medical home or if existing medical homes are not able to meet the demand. If sufficient pediatric medical homes are not available, additional venues could include public health department clinics, WIC program offices, child care centers, school-based health clinics, and, in those states that allow it, pharmacies. Elimination of the financial barriers to immunization delivery, as described in this statement, would reduce the need to consider such alternative venues.

- Advocate for reform in the distribution and payment systems that apply to the procurement, storage, and administration of immunizations and that often act as a barrier to physicians who wish to provide immunizations in their private offices and in their clinics. It is important that private- and public-sector payers provide payments to practitioners and clinics for immunization services sufficient not only to cover the direct and indirect costs of these services but also to provide a financial incentive for ongoing participation in this vital service to the community. Using “The Business Case for Vaccine Pricing” (available from Practice Management Online [PMO] at <http://practice.aap.org/content.aspx?aid=1808>), physicians and other child health providers can better understand and advocate for adequate payment for immunization services, including the direct costs of vaccine procurement, storage, and administration as well as the cost of related materials and the professional time involved in providing counseling to concerned parents. These payments must also be sufficient to cover the added indirect opportunity costs of stocking and purchasing expensive vaccines, as well as the predictable costs of wastage, refrigeration, and space. A vaccine-cost calculator is now available on the PMO Web site (<http://practice.aap.org/vaccinecalculator.aspx>). Private physicians should also be encouraged to participate in vaccine-purchasing pools.
- Advocate for a public-private partnership in the manufacture and distribution of vaccines so that purchasers of vaccines (eg, physicians, the VFC program) know what their acquisition costs will be and what to expect in payment for these services before exposing themselves to potential financial losses because of changes in pricing and third-party payment. These efforts would also include advocating for immediate recognition of and payment for newly recommended vaccines, adjustments in payments when prices increase on existing vaccines, and payment of administrative fees per component, not per injection, so as not to discourage the use of combination vaccines. When new vaccines are introduced or when price increases are announced, manufacturers should offer reasonable terms for payment to facilitate their introduction, thereby allowing physicians to purchase and receive payment for vaccines without experiencing excessive financial burden.
- Advocate for the removal of economic and administrative barriers for physicians who wish to participate in the VFC program and other state vaccination programs. Public health department clinics and private physician offices should be included as venues for underinsured VFC-eligible children to receive immunizations, rather than limiting access for these children to federally qualified health centers and rural health clinics.
- Advocate for the removal of economic barriers to immunizations for parents by minimizing their out-of-pocket expenses for immunizations. Public and private payers should provide first-dollar coverage for all recommended vaccines (ie, without copays or deductibles). Use of a uniform acquisition-price standard as the basis for acquisition cost for all vaccine products should be advocated. Such a basis could be the CDC Private Sector Price List, as posted on its Web site (www.cdc.gov/vaccines/programs/vfc/cdc-vac-price-list.htm). Funding is also encouraged to support studies that periodically estimate the actual financial burdens, both direct and indirect, of administering vaccines, and that third-party payers should be expected to honor and pay for these costs.
- Advocate with vaccine manufacturers and state and federal governments to maintain an adequate supply of all childhood vaccines at all times and to provide adequate notice, quick planning, and equitable distribution to all entities that administer immunizations to deal with shortages as they arise.
- Advocate for studies that ensure that the safest and most effective vaccines and combination products are available to children.
- Work with other physician organizations and their representa-

tives to advocate with state and federal governments, private payers, and employers who purchase health care to ensure that timely access to all immunizations recommended by the CDC, the AAP, and the American Academy of Family Physicians for all children remains a high public policy priority.

- Advocate for interoperability of IISs and electronic health records that accommodate bidirectional flow of information to facilitate pediatrician participation in these systems. IISs should also provide support for automated identification of vaccine products (eg, bar codes or radio-frequency tags) and include integrated, up-to-date VISs.
- Advocate for payment by commercial and government payers for the entry of patient immunization information into county and state IISs or for the interfaces necessary to allow transfer of these data from electronic health records to these IISs to support pediatric care provider participation in these systems. Likewise, schools must have adequate funding to cover the costs that arise from their mandate to verify immunization coverage for their students.
- Support ongoing education and quality-improvement programs for pediatricians and other child health care professionals about important vaccine-related issues, including the dissemination of peer-reviewed evidence for more effective immunization delivery. Educational programs should be offered to help physicians incorporate optimal business practices in their office or clinic setting to maximize their opportunities to offer

immunizations to all children for whom vaccines are not contraindicated.

- Vigorously mount a public relations campaign to better inform the public and counter the influence of misinformation spread by celebrities and others who participate in the antivaccination movement to minimize the negative impact of this false information on the health of children. The public must be educated with regard to the risks associated with vaccine-preventable diseases and the impact of immunizations on their prevalence by using culturally effective materials in English and other languages.
2. Individually, pediatricians and other child health professionals are encouraged to do the following to increase the immunization coverage of those under their care.
- Expand opportunities to immunize in the setting of a medical home by extending office hours when possible, making vaccinations available during visits for minor illnesses (if appropriate), and maintaining accurate and up-to-date records of immunizations received by each patient. Participation in IISs, including those that cross political boundaries, is also recommended.
 - Implement reminder/recall systems based on office charts or electronic information systems and minimize out-of-pocket costs to patients being immunized.
 - Undertake office- and clinic-based assessment and improvement activities necessary to maximize their practices' effectiveness in immunizing children. Offices and clinics should main-

tain up-to-date protocols that are accessible wherever immunizations are delivered and ensure that medically accepted contraindications to immunizations are accurately identified. This goal can be supported by using an IIS that is easily updated with new vaccine information and changes in protocols for existing vaccines.

- Ensure that all those who administer immunizations are fully immunized (unless contraindicated), are knowledgeable about immunizations, and participate in continuing education activities regarding immunizations, including their proper administration, storage, and handling.
- Always provide and document the most current VIS to educate parents about vaccine risks and benefits of immunizations, in accordance with the Vaccine Injury Compensation Program and CDC recommendations (available on the AAP Web site at www.aap.org). Physicians are encouraged to discuss the benefits and risks of immunizations with parents who refuse or delay age-appropriate vaccinations and to document ongoing discussion and refusal by using a form such as the AAP "Refusal to Vaccinate" template (<http://practice.aap.org/popup.aspx?alD=2685&language>). Although the AAP strongly discourages pediatricians from discharging patients from their practices solely as a result of vaccine refusal, pediatricians may encourage a family to find another physician or practice if there is a substantial level of distrust, differences in philosophy of care, or persistent poor quality of communication.²⁸
- Provide their patients with the addresses (URLs) of reliable and

accurate immunization and vaccine-information Web sites that discuss immunization issues (eg, www.aap.org/healthtopics/immunizations.cfm, www.immunize.org, www.cdc.gov/vaccines, www.vaccinateyourbaby.org).

- Report all adverse events related to vaccines by using the Vaccine Adverse Event Reporting System (see <http://vaers.hhs.gov/index> for forms and instructions), as directed by the National Childhood Vaccine Injury Act.²⁹
- Support and implement the standards for child and adolescent immunization practices as

endorsed by the AAP and the NVAC.⁵

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