



A Report on Reaching Underserved Ethnic and Minority Populations to Improve Pediatric Immunization Rates



**National
Foundation for
Infectious
Diseases**

RESEARCH PREVENTION EDUCATION

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About the National Foundation for Infectious Diseases and Contributing Organizations

The National Foundation for Infectious Diseases

The National Foundation for Infectious Diseases (NFID) is a non-profit tax-exempt 501(c)(3) organization founded in 1973 and dedicated to encouraging and sponsoring public and professional education about infectious diseases, supporting research and training in infectious diseases, and aiding in the prevention and treatment of infectious diseases.

NFID carries out its mission by educating the public; educating healthcare providers; supporting research and training in infectious diseases; building coalitions; and honoring scientific and public health achievement, legislative contributions, and philanthropy in infectious diseases.

Contributing Organizations

The following organizations, representing a diversity of government as well as ethnic and multicultural groups, contributed to this report:

National Immunization Program of the Centers for Disease Control and Prevention

The National Immunization Program (NIP) of the Centers for Disease Control and Prevention (CDC) provides leadership for planning, coordinating, and conducting disease prevention and immunization activities in the U.S.

Health Canada

Health Canada is the Canadian federal department, which, in partnership with provincial and territorial governments, provides national leadership to develop health policy, enforce health regulations, promote disease prevention, and enhance healthy living for all Canadians.

National Medical Association

The National Medical Association (NMA), a national non-profit professional and scientific organization, provides educational programs and opportunities for scholarly exchange, conducts outreach efforts to promote improved public health, and establishes national health policy agenda in support of African-American physicians and their patients.

National Council of La Raza

The National Council of La Raza (NCLR) is dedicated to reducing the incidence, burden, and impact of health problems in Hispanics. NCLR works to deliver and implement quality health interventions with the focus on improving access to and utilization of health promotion and disease prevention programs.

Asian Pacific Islander American Health Forum

The Asian Pacific Islander American Health Forum (APIAHF) is a national advocacy organization dedicated to promoting policy, program, and research efforts to improve the health and well being of all Asian American and Pacific Islander communities in the United States.

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Introduction: The Problem of Vaccinating Underserved Pediatric Populations

Immunization has substantially reduced infectious diseases among all population groups in the United States (U.S.) and Canada. While national childhood immunization rates for most vaccinations are about 90% in both countries, disparities in vaccine coverage among underserved racial and ethnic groups remain an important public health concern.

Closing gaps in immunization is essential to ensure everyone in society is protected against infectious diseases. To address this challenge, the National Foundation for Infectious Diseases (NFID) convened a roundtable of experts in immunization and infectious diseases to review barriers that give rise to vaccination disparities and identify strategies to achieve full immunization.

This report summarizes discussions from the roundtable and highlights the need for healthcare professionals to recognize existing and potential gaps and take the necessary steps to improve vaccination rates among diverse cultural populations. It also calls on healthcare policymakers and healthcare professionals to more fully understand the underlying causes that contribute to disparities in immunization coverage. These include socioeconomic issues, access to healthcare, and the complexity of routine vaccination schedules, as well as cultural issues and religious beliefs.

Current Disparity Issues

Notable progress has been made in the past two decades in eliminating national disparities in the rates of immunization and immunizable infectious diseases among racial and ethnic groups in the U.S. Disparities virtually no longer exist among school-age children, due in large part to an effective public health infrastructure requiring vaccinations upon entering school. While the only current national gap between whites and other groups in the U.S. is in the fourth dose of diphtheria, tetanus, and pertussis (DTaP4) vaccine, disparities still exist among preschool children and children living in particular locations. At the local level, some urban areas across the country have differences exceeding 10% for many childhood vaccines, including DTaP4; hepatitis B3; measles, mumps, rubella1 (MMR1); and polio3. The measles outbreaks that occurred in the U.S. during the 1990s illustrate the potential danger of local-level immunization disparities, which increase vulnerability to a resurgence of disease. So, too, does

recent experience in Canada, in which small groups of unimmunized children have transmitted measles and mumps in the past several years.

Overall, U.S. and Canadian ethnic and racial populations view immunization positively and want to vaccinate children to keep them healthy. However, barriers to vaccination exist. Although each group is unique, all share issues related to lower socioeconomic status, limited healthcare access, and incomplete care among providers, which in turn can lead to lower immunization rates.

The predominant issues and barriers are more fully covered in the following sections of this report. Sections highlight information particular to the U.S. and Canada and focus on specific ethnic and racial populations and their experiences with immunization coverage.

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Recommendations for Closing the Gap

The following key recommendations, that help address the issues raised in this document, are proposed as helpful strategies to close the gap and achieve full pediatric immunization in the U.S. and Canada.

- Make full use of government and community programs and approaches already proven effective in tracking and reducing disparities.
- Increase accountability for immunization performance among individual providers (public and private) and facilities/managed care organizations.
- Educate and enable parents to track children's immunization status and advocate for needed doses with healthcare providers.
- Conduct multiple interventions, including provider- and system-oriented initiatives, in communities with identified disparities.
- Make immunization and cultural competency core parts of the medical education curriculum to better prepare future physicians as they enter into practice.
- Create immunization registries, containing a record of all immunizations given by participating providers, to facilitate more timely identification of immunization gaps and needs.
- Collect site-specific immunization statistics.
- Develop information and tools to help providers and communities deal with immigrant immunization issues.

Immunization and Health Disparity Issues: Potential Public Health Implications in the United States

by Walter Orenstein, MD, Director, National Immunization Program, Centers for Disease Control and Prevention (CDC)

Major disparities in the rates of immunization coverage and infectious disease among racial and ethnic groups have existed over the past two decades in the U.S. While tremendous progress has been made in closing most of those gaps nationally, substantial pockets of under-immunization continue at the local level. Vigilance is needed to ensure that the progress made in improving vaccination rates continues in order to avoid renewed disease outbreaks.

Childhood Immunizations: Current National Coverage and Disparities

The recent CDC 2000 survey of 19 to 35-month-old children (median age, 27 months), which captures immunization data on children born between 1997 and 1999, shows that only minimal differences now exist among racial and ethnic groups in immunization coverage for most childhood immunizations. It is also encouraging that even with three-dose schedules for polio, Haemophilus influenzae type b (Hib), and hepatitis B, it is possible to reach more than 90% of the population with these vaccines.

The only major remaining coverage issue at the national level is for the fourth dose of DTaP in the second year of life. The rates among racial/ethnic groups for DTaP3 are close in this very large survey. However, the same is not true for DTaP4. Differences of up to 10 percent still exist between whites and other racial and ethnic groups (Figure 1). The DTaP4 disparity also drives the gap seen in data for all combined series (Figure 2). It is clear that DTaP4 coverage has been difficult to achieve and is a concern that needs to be addressed.

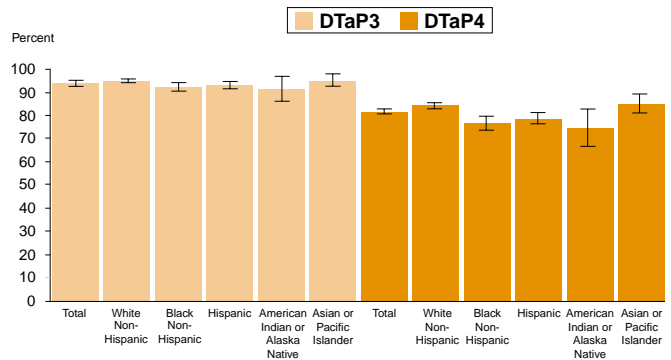
Local Disparities

Simply looking at national trends on immunization can be misleading. The U.S. is not a homogenous population; different racial and ethnic groups represent the majority population in many urban areas (Figure 3). In Atlanta, for example, blacks are the majority population; in Los Angeles, Hispanics are the majority population. Thus, notable and varied disparities can emerge at the local level that national figures do not reveal (Table 1). Differences are also common within urban areas with large racial and ethnic

populations. A 10% gap in polio coverage exists in Miami, for example, but New York City has no significant inequalities.

Figure 1:

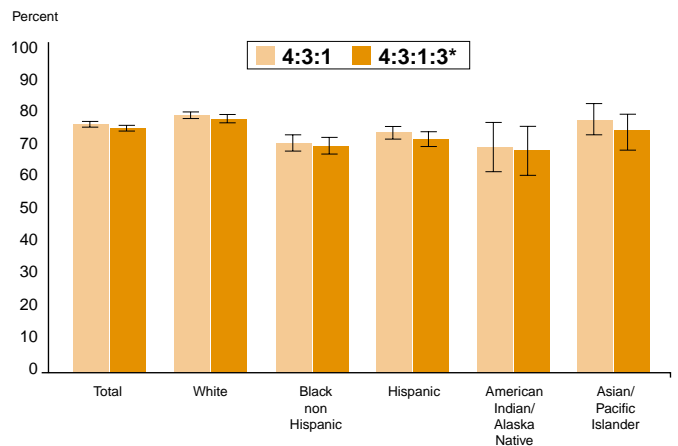
DTaP3/DTaP4 Coverage Levels for Children 19-35 Months, by Race/Ethnicity, USA, 2000



* Diphtheria and tetanus toxoids and acellular pertussis vaccine
U.S. National Immunization Survey (Q1, 2000 - Q4, 2000)¹

Figure 2:

Coverage Levels for Children 19-35 Months, by Race/Ethnicity, USA, 2000



U.S. National Immunization Survey (Q1, 2000 - Q4, 2000)¹

4:3:1 refers to children who received four doses of DTaP, three doses of polio vaccine and one dose of measles-mumps-rubella vaccine. 4:3:1:3 refers to children who received four doses of DTaP, three doses of polio vaccine, one dose of any measles vaccine, and three doses of Hib vaccine.

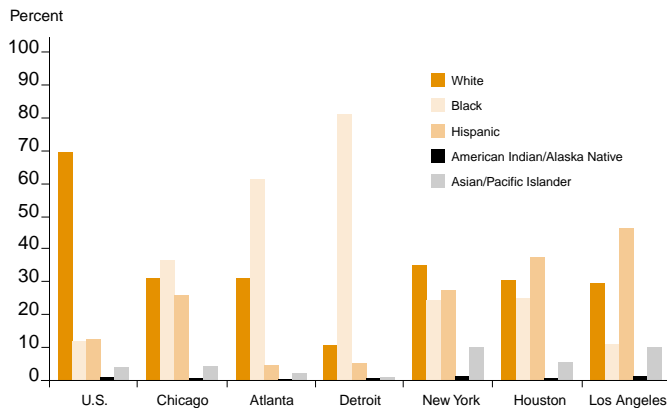
Disparities and Disease Outbreaks

CDC's goal is not just to achieve high and equal coverage rates, but also to prevent disease among all populations. Recent measles outbreaks in the U.S. are a good example of how gaps in immunization can lead to a disproportionate disease burden in underimmunized communities – and why it is so critical to maintain high coverage to avoid a resurgence of preventable diseases.

Over ten years ago, there was roughly a 20% difference between measles immunization rates for whites and other ethnic groups (Figure 4). As a result, African-American and Hispanic children had a four- to nine-fold increased risk of

Figure 3:

Census Data 2000, U.S. Population by Race/Ethnicity in Six Urban Areas



U.S. Census Bureau, 2000²

Table 1:

Major Urban Areas with Statistically Significant (>10%) Vaccination Disparities Among Children Ages 19-35 Months, 1998-2001

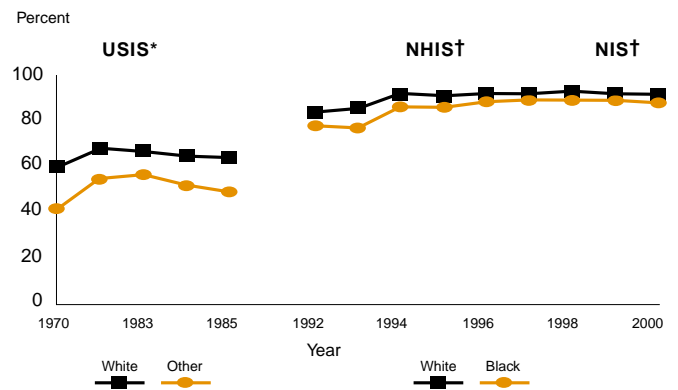
- **DTaP4**
 - Chicago, Illinois
 - Cuyahoga Co., Ohio
 - Dallas, Texas
 - Franklin Co., Ohio
 - Marion Co., Indiana
 - Milwaukee, Wisconsin
 - Santa Clara, California
 - Washington, DC
- **Hepatitis B3**
 - Franklin Co., Ohio
 - Houston, Texas
 - Washington, DC
- **MMR1**
 - Milwaukee Co., Wisconsin
 - Orleans Parish, Louisiana
 - Washington, DC
- **Polio3**
 - Miami, Florida

U.S. National Immunization Survey (Q1, 1998 - Q2, 2001)³

measles compared to white children, especially in the inner cities where population density facilitated person-to-person spread of disease. This situation galvanized the country to improve immunization rates for undervaccinated groups. As a result, measles incidence has since dropped dramatically in all racial and ethnic groups (Figure 5).

Figure 4:

Measles Vaccination Coverage Among U.S. Preschool-Aged Children by Selected Race by Year USIS, NHIS, and NIS, 1970-2000



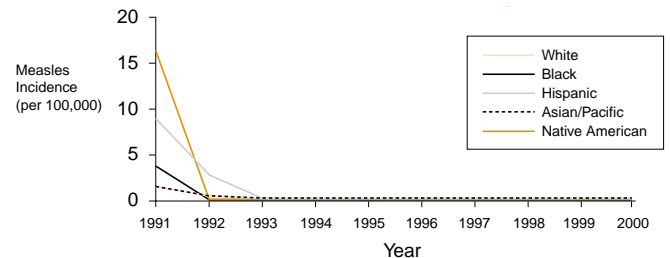
* Children in this survey were 1-4 years of age.

† Children in this survey were 19-35 months of age.

USIS: U.S. Immunization Survey, 1970-1985; NHIS: National Health Immunization Survey, 1991-1993; NIS: National Immunization Survey, 1994-2000.⁴

Figure 5:

Measles Incidence in the United States by Selected Race and Year, 1991-2000



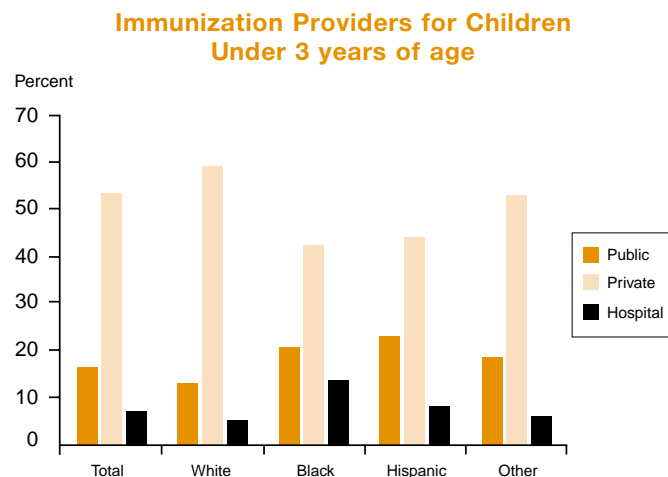
CDC. Final 2000 Reports of Notifiable Diseases⁵
 CDC. Summary of Notifiable Diseases⁶

Strategies for Moving Forward

To close local and national gaps and guard against backsliding, it will be necessary to use those public health strategies proven most effective in reaching racial and ethnic communities. These include:

- **Interventions with private providers.** While racial and ethnic minorities tend to use public providers more often than whites, private providers care for the largest proportion of every population in the U.S. (Figure 6) where immunization is concerned. Reminder and recall programs have proven effective, as the immunization schedule has become increasingly complex.

Figure 6:



U.S. National Immunization Survey, 2000⁷

- **Working with the Women, Infants, and Children (WIC) program.** This national nutrition and health benefit program for lower income families is sponsored by the U.S. Department of Agriculture. WIC covers more than 40% of the U.S. population and, in some cities, 60% or 70%. The program's wide use and acceptance by many members of racial and ethnic minority groups make it a natural access point for identifying immunization needs and referring underimmunized children for their needed vaccines. Substantial increases in immunization coverage have been seen in many instances when WIC is coordinated with immunization activities, such as incentives for parents to get their children immunized.
- **Vaccines for Children (VFC).** This state program largely removes cost as a barrier to immunization by providing free vaccines to children without health insurance, those with special government-supported insurance for poor children (Medicaid), and those in

two racial/ethnic groups (American Indian and Alaska native children) at the provider of the family's choice, rather than in public health clinics.

- **AFIX.** A public health system approach to improving community immunization rates, AFIX uses the continuous quality improvement techniques of Assessment, Feedback on results, Incentives for performance (such as monetary rewards and community recognition), and eXchange of information on best practices. Georgia has had success in using AFIX with health department clinics and private practices.

A Note on Adult Immunization

In addressing disparities in pediatric immunizations, it also is essential to remember the largest gaps exist in immunization coverage for adults. Overall, adult immunization rates need to be improved in all groups to protect against infections such as influenza and pneumococcal disease. Another focus should be to reduce racial and ethnic group disparities, such as the 20% difference between the highest and lowest group coverage for influenza vaccine and the particularly low rates of pneumococcal vaccination among African Americans and Hispanics.

Immunization and Health Disparity Issues: Potential Public Health Implications in Canada

by Paul R. Gully, MD, Director General, Centre for Infectious Disease Prevention and Control, Health Canada

While Canada exhibits high levels of coverage for major childhood immunizations, there are pockets of need in which children are still underimmunized. This has recently resulted in renewed cases of measles and mumps. Canada is currently developing a national immunization strategy to ensure immunization of all populations.

Canadian Situation at a Glance

The Canadian healthcare system features universal, public-paid access to childhood vaccines, which are provided free to private physicians and public health nurses to vaccinate children. The federal Department of Health has not set national goals for health-related programs, and currently the only national immunization goal is for measles elimination. Canada's 13 provincial and territorial governments, which are responsible for most health services, are also in charge of immunization programs for their citizens. Each program differs. For example, only three provinces (New Brunswick, Ontario, and Manitoba) have legislation or regulation requiring that children be immunized for school attendance, and in Manitoba only measles vaccination is mandated. Exceptions are permitted on medical or religious grounds and reasons of conscience.

Canada's geography is unique and contributes to immunization challenges. A small proportion (3%) of the population lives in small, widely separated communities in the 40% of landmass that lies north of 60 degrees latitude and includes the Arctic Circle. Approximately 70% of the population lives in metropolitan areas such as Toronto, Vancouver, Winnipeg, and Montreal in the southern portion of the country.

Immigration from all parts of the world is a major source of Canada's ethnic population. Approximately 210,000 new immigrants (5-year average) are added to the population of Canada each year, in addition to a substantial number of refugees, approximately 25,000 per year.⁸

Immunization Issues

Data for Canadian children born in 1995 and 1996 show high levels of coverage for major childhood immunizations (Table 2). However, pockets of unimmunized children have

led to some small localized outbreaks of measles and mumps in specific communities in the past several years. Canada has had no wild polio since 1988. While travelers have imported the polio virus into Canada, no symptomatic disease has resulted. A key reason for such outbreaks in Canada is small groups of unimmunized families or communities who get exposed to infectious disease agents within Canada following importation or travel in the endemic area. Another factor is recent immigrants from countries that do not provide all the immunizations available in Canada and the U.S.

Table 2:

Immunization Coverage for Canadian Children at Age 2*

Vaccine	Percent Coverage
DTaP (4 doses)	84%
Polio (≥ 3 doses)	90%
MMR	94%
Hib (4 doses)	75%

*For children born in 1995-1996
Health Canada⁹

In addition, compared with non-native people, native or Aboriginal people appear to have a greater incidence of some diseases for which immunization exists, suggesting a significant gap in immunization coverage. Pneumococcal disease is one example (Table 3).¹⁰

Underlying causes of immunization disparities in Canada include:

- **Mobility among Aboriginal Canadians.** While the federal government is responsible for the immunization of Aboriginal peoples (675,000 First Nations, Inuit, and Metis) living on reservations or Crown land, about 283,000 live in cities, where they are harder to reach with immunization services.⁸
- **Lower socioeconomic status.** Lower socioeconomic status is associated with lower immunization rates among Aboriginal Canadians and immigrants.
- **Isolated communities.** Many Aboriginal people live in isolated communities where the public health system does not have a strong prevention orientation or infrastructure. However, isolation also can be a factor in inner cities for native and immigrant groups, who may lack information about immunization and

have language barriers to obtaining services.

- **Differences in philosophical beliefs about immunization and other cultural differences related to health practices.** In one study, elders in Aboriginal communities often felt that children now receive too many immunizations, and these concerns influence others not to have their children vaccinated. Religious beliefs of some cultural groups also oppose immunization; religious objections often explain why the “traveling” groups mentioned earlier decline to have their children immunized.¹¹

healthcare professionals evaluate children and youth new to Canada, including detailed information on the immunization schedules of other countries.

Table 3:

Estimated Annual Incidence of Invasive Pneumococcal Disease Among Children in Alaska and Canada* 2001

Population	Annual Incidence per 100,000
Native people	749
Non-native people	80

*Children < 2 years of age north of 60° latitude
Butler, J.C. CDC Arctic Investigations Program¹⁰

Closing the Gaps

Canada is currently developing a national immunization strategy. The charge includes addressing immunization needs of special populations, and related action plans include reducing differences that occur across provincial and territorial programs. Early plans call for setting up immunization registries with a common format in each jurisdiction. These registries would make it easier to track mobile families and provide reminder and recall interventions. In addition, different jurisdictions now pay different prices for procuring vaccines and have different approaches to vaccine safety and different vaccine schedules. The national strategy will promote greater uniformity within immunization programs across Canada.

Canada also has developed two resources that contribute to reducing racial and ethnic disparities. First, the Canadian Immunization Guide recommends that any child without written documentation be started on a specified schedule for children not immunized in early infancy. This policy helps bring immigrant children to full immunization status. Second, the Canadian Pediatric Society provides a document that helps

Potential Barriers to Full Immunization: Focus on African Americans

by Rudolph E. Jackson, MD, Professor of Pediatrics and Associate Director, Office of International Health Programs, Morehouse School of Medicine; National Medical Association Liaison to the CDC Advisory Committee on Immunization Practices

Much progress has been made in improving childhood immunization coverage among African Americans. Strategies to continue and improve on this progress must address the key barriers to immunization for African Americans.

Barriers to Immunization

Many studies suggest lower socioeconomic status is a key barrier to achieving full immunization among African Americans and other groups. Among all populations, the lower the income, the lower the immunization levels. Poverty clearly plays an important role. Average annual incomes of groups with lower vaccination levels are significantly less than income of populations with better immunization rates (Table 4). Thus, it is difficult to separate race from socioeconomics.

Table 4:

Average Annual Income by Race, United States, 2000

Non-Hispanic Whites	\$25,000
Asian and Pacific Islanders	\$23,300
Blacks	\$15,197
Hispanics	\$12,306

USA Today "Snapshot" October 23, 2001¹²

The following barriers are specific to African Americans, but many also apply to people of any race or multicultural background with lower socioeconomic status.

- **Lower educational levels.** Understanding the purpose and benefits of immunization is an important motivation. Lower educational levels among African Americans result in less awareness of immunizations.
- **Family issues.** While teen pregnancies have decreased among African Americans, pregnancy leads to fewer teenagers completing a high school education. In addition, many young mothers have no partners and are dependent on other family members to care for their infants. All of these factors can make immunizations less of a priority.

- **Reduced access to healthcare.** African Americans want healthcare as much as any other group. However, very often, they have limited access to healthcare.¹³ Several factors can limit their access:

- **Transportation.** Often, medical care is not located where African Americans live. While public health departments are doing a better job of locating clinics near African-American residences, the shift toward private practitioners administering immunizations is problematic when healthcare providers are not located in or near the community.
- **Health insurance and physician relationships.** As people leave the welfare rolls for work, many take jobs that pay too much to receive free health benefits but too little to afford private health insurance. Since the uninsured cannot afford private care, they often have no enduring relationship with a physician. Instead, they rely on the emergency room, where immunization is not a focus, for healthcare services. It is also difficult to keep up with a child's immunization status without a family physician and regularly scheduled visits.
- **Competition for limited public services.** Many of the cities where immunization disparities are 10% and greater also are areas with significant numbers of immigrants and refugees. These populations compete for public health services with low-income African Americans, and both groups can become frustrated by long waits and inadequate communication.

Toward Continued Progress

In looking at immunization gaps, a recent study found African-American parents want healthcare services, but have difficulty gaining access to the healthcare system.¹⁴ The WIC, VFC, and Medicaid insurance programs have been very effective in increasing access to immunization for African Americans and are important to maintain. Case management techniques (including one-to-one education, personal reminders when immunizations are due, and support for overcoming barriers to keeping appointments, such as transportation or child care needs) also have been very effective but are costly. Selectively applied, however, they could be useful tools for increasing coverage in underimmunized community pockets that have not responded to other strategies.

Latino Children and Immunization: Challenges and Opportunities

by Henry Pacheco, MD, Project Director, Center for Health Promotion, National Council of La Raza

Immunization disparities continue to exist among some Latino populations, particularly among newer immigrants and in cities with large numbers of Latino residents.

Latinos: A Diverse and Growing U.S. Population

Latinos are now the largest ethnic minority population in the U.S. (35.3 million), having grown 60% from 1990 to 2000.² While the description “Latino” includes people of diverse national origins, one unifying factor is the Spanish language, which is useful for health communication across populations. Half of Latinos are under age 26, and most live in cities in the southwest. However, many Latinos are moving permanently to states that previously had only migrant workers, which presents immunization challenges. Like African Americans, Latinos’ socioeconomic profile affects their access to immunization. Consider the following, Latino socio-economic status “snapshots”:

Latino Socio-Economic Status Snapshots

- **Lack of insurance.** Latinos are four times as likely as non-Latinos to be chronically uninsured (over 30% uninsured).¹⁵
- **Low educational level.** Only 63% of Latinos complete high school, compared with 88% of white and African-American students.¹⁶
- **Family make-up.** Latinos have a high proportion of female heads of households and proportionately fewer married couples than the general population.²
- **Work status.** Latinos have high rates of underemployment and a large share of the working poor.¹⁵

Barriers to Immunization

As is the case for other ethnic and minority populations, common barriers to immunization for Latinos include lack of health insurance, lack of nearby healthcare facilities, lack of public transportation for reaching healthcare, an increasingly single-parent family structure, and lower educational levels that result in lower health literacy. Low income levels also cause many Latinos to work multiple jobs, which leaves little time to take children to the clinic for routine immunizations.

In addition, through studies supported by grants for community interventions by the U.S. National Immunization Program, the National Council of La Raza has identified other immunization barriers among Latinos. These additional barriers include:

- **Lack of Spanish-speaking workers at healthcare facilities.**
- **Complexity of today’s immunization schedule.** This makes it hard for parents to track their child’s immunization records.
- **Impediments to monitoring immunization status.** The impediments include high turnover among community health center staff; lack of coordination with Latino countries; and mobility, especially among migrant workers.
- **Immigration issues.** Undocumented immigrants fear that using clinic services will lead to problems with the Immigration and Naturalization Service and lack of knowledge about what health services are available for undocumented children.
- **Media scares about negative vaccine effects.** Such stories alarm many parents, especially those with lower educational levels.

Strategies for Increasing Vaccination Rates Among Latinos

Following are several strategies that could help increase Latino immunization rates:

- **Bring vaccination services to Latino neighborhoods.** This strategy includes increasing the availability of healthcare facilities in Latino communities and using outreach strategies to best reach Latinos: at home, community-based organizations (CBO’s), church, public gatherings, health fairs, bus stations, employment offices, and social services agencies.
- **Work with Latino media** to promote immunization and provide well-balanced coverage of vaccine issues.
- **Provide assistance in navigating the complex system of health and social services.**
- **Develop culturally competent* health services, including immunization.**

**Cultural competence is defined as a set of academic and interpersonal skills that allow individuals to increase their understanding and appreciation of cultural differences and similarities within, among, and between groups. This requires a willingness and ability to draw on community-based values, traditions, and customs and to work with knowledgeable persons of and from the community in developing focused interventions, communications, and other supports.¹⁷*

- **Coordinate government benefits and services** to keep children up-to-date with their immunizations. WIC programs have successfully accomplished this in many communities.
- **Increase visibility and credibility of public health agencies** within underserved Latino communities. Such agencies include the Public Health Service (PHS), CDC, and state and local health departments. The goal is to improve trust and foster community collaboration during outbreaks.
- **Capitalize on positive factors.** For example, there is high vaccination awareness among Latino immigrants.

It is important to discuss immunization and other healthcare disparities sensitively to avoid stigmatizing underserved communities. In the past, anti-immigrant groups have used reports of lower immunization rates to portray immigrants as a health risk to America. As these issues are addressed in public forums, statements should be drafted very carefully to keep from unintentionally fueling anti-immigrant sentiments.

Asian Americans: Challenges in Childhood Immunization

by Edward A. Chow, MD, Medical Director, Chinese Community Health Plan; Past Board Member of the Asian Pacific Islander American Health Forum

At the national level, Asian and Pacific Islanders (API) have high childhood immunization rates (**Table 5**). However, some disparities exist for certain Asian populations in specific parts of the country, and understanding cultural influences on health behaviors is vital for eliminating these disparities and maintaining positive immunization trends. Newer immigrants among these groups represent a particular challenge.

Table 5:

Rates of Vaccination for Asian and Pacific Islander Children 19-35 Months, 1999-2000

Vaccination	API (%)	White (%)
• DTaP4	85.1	84.7
• Hepatitis B	91.8	91
• Hib	91.7	94.7
• MMR	88.2	91.7
• Polio	93.2	90.5
• Varicella	71.8	61.2
• Combined	73.1	80.3

U.S. National Immunization Survey (Q3, 1999 – Q2, 2000)¹⁸

Demographics

About 3.6% of the U.S. population (10.2 million) identify themselves as Asian. They represent a wide variety of ethnicities and countries of origin (**Table 6**). This heterogeneous group has diverse educational, socioeconomic, political, and religious backgrounds, and no common language. In fact, Asian and Pacific Islander populations speak more than four dozen languages.

Two demographic factors with special relevance for immunization are age of the population and immigration history. Most Asian Americans are over 18, and only about 600,000 nationwide are under age five.² While this population is very important, it is smaller than children of other U.S. ethnic populations.

In addition, significant health and income disparities exist between newer immigrants and Asian Americans born in

the U.S. While census data show established Asian residents have income and education levels substantially higher than those of whites, the opposite is true for new and unassimilated Asian immigrants and refugees. According to NICOS Chinese Health Coalition*, a telephone survey conducted by five healthcare organizations in San Francisco's Chinese community showed that only 30% of respondents were born in the U.S.¹⁹

Table 6:

Asian American Population, 2000

Ethnicity	Number	Percent of Asian American Population
Chinese	2,432,585	23.5
Filipino	1,850,314	18
Asian Indian	1,678,765	16.5
Vietnamese	1,122,528	11
Korean	1,076,872	10.5
Japanese	796,700	8
Other Asian	1,285,234	12.5

U.S. Census Bureau, (2000)²

As in other racial and ethnic populations, a recent study in San Francisco¹⁹ found that immigrant status, low income level, low educational level, lack of health insurance, and speaking only one (non-English) language are significant barriers to healthcare. Thus, the new immigrant Asian population is an important target for childhood vaccination efforts.

Immunization-Related Disparities

Some Asian populations are at greater risk for two illnesses for which vaccines are available: measles and hepatitis B. Two studies, one statewide and another in three large cities, offer examples of immunization disparities in Asian populations:

- Measles. According to 1990 data from the California Department of Health Services, the incidence of

* NICOS Chinese Health Coalition is a public-private-community partnership of more than 30 health and human service organizations and concerned individuals dedicated to enhancing the health and wellness of San Francisco's Chinese community. Since 1985, NICOS has been engaged in research, training, advocacy, and resource development for the benefit of this community and the organizations that serve it.

measles among Asian populations in California is 21.1 per 100,000, as compared with 11.2 per 100,000 among whites.²⁰ One-third of measles deaths occurred among the Hmong, Samoan, Lao, and Cambodian populations.

- Hepatitis B. Low rates of hepatitis B vaccination were found in a study of Vietnamese populations in Washington, D.C.(18%-38%), Dallas (10%-20%) and Houston (10%-26%).²¹

Lack of awareness helps explain gaps identified in the three-cities studied. For example, only one in two people had heard of liver disease, and only one in four was aware that free vaccines were available through the VFC program. In addition, people who received care from private practitioners had better coverage rates than those cared for in public health facilities. However, patients of Vietnamese physicians had significantly lower immunization rates than others.

Cultural Influences

Despite the diversity of Asian populations, many aspects of culture and beliefs among different groups, except among Pacific Islanders, have some basic similarities (**Table 7**). For immunization, a key advantage is the value most Asian cultures place on children. In fact, the emphasis on protecting children is a key motivation that brings Asian families into the healthcare system.

Table 7:

Eastern Cultural Values

- Family/group oriented
- Primary relationship: parent-child bond
- Authoritarian orientation
- Fatalism/karma*
- Harmony with nature
- Cooperative orientation
- Spiritualism
- Past, present, future orientation

*Webster's Ninth New Collegiate Dictionary defines karma as, "The force generated by a person's actions held in Hinduism and Buddhism to perpetuate transmigration and in its ethical consequences to determine his destiny in his next existence."

Lee E, ed. Working with Asian Americans²²

Asians also have a positive orientation toward childhood immunization. Although immunization is a western medical concept, this is not a barrier for most Asian Americans, who do not view the two systems as competitive. Instead, Asian Americans are likely to move from folk healers to spiritual healers to western doctors to address health needs and to credit all three systems for successes.

Strategies for Success

Since Asian populations do not resist immunization, providing opportunities to have their children vaccinated is key. Increasing access to immunization involves:

- **Offering culturally and linguistically appropriate outreach** to new immigrants and others with lower socioeconomic standing.
- **Providing free and affordable immunizations** through programs like VFC.
- **Educating healthcare providers** who work with high-risk Asian populations about immunization needs and challenges.
- **Requiring up-to-date immunizations for school attendance.**
- **Using messages that resonate with Asian audiences.** For example, the message that immunization keeps children healthy is highly appropriate for immigrant families, who often come to America to seek a better life for their children.

When services meet a community's needs, positive results can be achieved. Experience at the Chinese Community Health Plan (CCHP), a managed care organization in San Francisco, demonstrates that culturally competent programs addressing these needs can improve vaccination rates among Asian Americans. The CCHP and its partner groups, Chinese Hospital and the Chinese Community Health Care Association, offer bilingual, bicultural medical services through Medicaid, Medicare, and commercial insurance plans administered to nearly 20,000 San Franciscans, many of whom are recent immigrants. A recent survey by the Health Plan Employer Data Information Set (HEDIS) found that CCHP immunization rates equaled or exceeded the national average for health management organizations (HMOs) in all single and combination vaccines except hepatitis B. Children were, in fact, vaccinated against hepatitis B, but not within the survey's time parameters.²²

by Patricia A. Keener, MD, Clinical Professor and Associate Chairman, Department of Pediatrics, Assistant Dean for Medical Service Learning, Indiana University School of Medicine

The knowledge, attitudes, and practices of healthcare providers have a critical impact on childhood immunization rates. Studies have identified a variety of provider factors associated with under-immunization as well as strategies for improving physician performance. Physician education and public health programs also need to address predicted future trends in the healthcare system relevant to immunization.

Provider Factors and Underimmunization

Immunization levels achieved by private and public health departments and clinics vary widely. Reasons why physicians do not achieve high vaccination coverage include:

- **Referring patients out of the practice for immunizations.** Most parents prefer having children immunized by their regular provider. Referrals are especially a disincentive for families with little or no health insurance, since costs increase.
- **Missing opportunities to ask about and provide immunizations.** Studies show that missed opportunities to vaccinate during well-child visits, follow-up visits, and acute care visits account for 13% to 60% of underimmunization.^{23, 24}
- **Failing to provide simultaneous administration of vaccines.** This causes an estimated 30% of underimmunizations. The underlying cause of this behavior is physician attitudes. About 60% of practicing physicians have strong concerns about administering three injections to a seven-month old. Private practice providers are more likely to have this attitude than public health providers.²⁴
- **Neglecting to use reminder/recall systems for immunizations.** Although these systems have proven very effective in promoting immunization, only about 13% of pediatric practices and 10% of family physicians use immunization reminders.²⁵

Gaps in Medical Education Cause Problems

Gaps in medical education about infectious diseases and immunizations are an underlying cause of detrimental provider attitudes and practices. Teachers of infectious

disease have identified five components of an “ideal” curriculum on immunizations: disease reporting, immunization reference sources, immunization delivery strategies, vaccine immunology, and clinical trials for vaccine evaluation. Less than half of medical schools include all five content areas, and many residency programs also provide incomplete training. Another concern is that immunization content is scattered throughout the curriculum in relation to various diseases, rather than taught as a discrete focus.

In addition, some practicing physicians who do not successfully immunize in their own practices are highly involved in training medical students on rotation in their offices. As a result, their undesirable attitudes and practices toward childhood immunizations are passed on to a new generation of providers, who perpetuate the problem.

The under-representation of minorities in medical practice is another concern for racial and ethnic populations. This problem contributes to lack of access to immunizations, since minority physicians would be more likely to practice in the community and provide culturally competent services. In a survey conducted by the Association of American Medical Colleges, nearly one third of medical students said their medical training did not teach them how to provide culturally competent care. In addition, 20% felt their medical education was not sensitive to their own cultural needs.²⁶

Future Trends: Potential Impact on Immunization Disparities

The Institute for the Future (ITF), a research organization that makes data-based projections about probable future trends, has predicted likely healthcare system trends in the next several decades, many of which are relevant for anticipating future immunization needs. Key among these trends are a continued increase in minority populations, income inequalities, disparities in access to healthcare, and lower education achievement – all of which are associated with lower immunization rates.²⁷

Nonetheless, ITF foresees little public will for changing the system in ways that would benefit the underserved. In fact, the number of those with little or no health insurance is predicted to increase at the same time as access to safety net providers decreases because of state funding shortages. The only factor that might prompt system

changes is if the health status of those in the bottom socioeconomic tier were to create a risk for the broader population. Infectious disease is a prime example of this scenario.

Closing the Gaps

The National Vaccine Advisory Committee (NVAC)* has made the following recommendations to healthcare organizations and practicing physicians for improving provider performance on immunizations:

- Assess immunization performance annually.
- Implement an immunization recall and reminder system.
- Develop an immunization registry for public and private providers.
- Use registries to identify underimmunized populations.
- Improve provider education on immunization.

A number of provider-related trends predicted by the IFTF could help encourage adoption of these recommendations and have positive implications for closing immunization gaps. These include:

- **Development of more user-friendly information technologies** that support better clinician decision-making regarding immunization, such as:
 - Computer prompts built into an electronic patient record to remind the physician when a vaccination is due.
 - Computer-assisted decision-making tools regarding valid contraindications.
 - Automated recall systems linked to immunization registries or provider assessment systems.
 - Software to assist providers in auditing their own immunization performance.
- **Creation of clinician-friendly, computer-based distance learning on immunization.** Up-to-date training on immunization could be made widely available and convenient.

- **Performance-based provider reimbursement.** This could motivate physicians to improve their immunization practices.
- **Increased authority by intermediaries over physicians and patients.** HMOs and community coalitions could review performance levels and put pressure on physicians to improve immunization levels. Greater community involvement in monitoring immunization performance could be particularly beneficial among racial and ethnic communities, utilizing community networks and reducing cultural barriers to immunization.

These strategies can help providers better play their critical role toward improving immunization rates. Given the current and future challenges, closing immunization gaps will require multiple interventions that make the most of every opportunity.

**A committee appointed by the CDC to study and recommend ways to encourage the availability of an adequate supply of safe and effective vaccination products in the U.S. The NVAC recommends ways and direction to achieve optimal prevention of human infectious diseases through vaccine development, while working towards the prevention of adverse reaction to vaccines.*

by Stanley Plotkin, MD, Emeritus Professor, University of Pennsylvania and Wistar Institute; Medical and Scientific Advisor, Aventis Pasteur

One strategy for increasing immunization rates is improving vaccine delivery, making vaccines more child-friendly and more convenient. Innovative ideas currently in research and development have the potential to simplify future immunization methods and schedules. These include new vaccine combinations that immunize against more diseases at the same time, new methods of vaccine delivery, and different routes of administration.

Future Vaccine Combinations

In terms of simplifying immunization, one of the most important methods is combined vaccines, which reduce the total number of injections needed (**Table 8**).

Table 8:

Means of Making Combined Vaccines

- Reconstitution of lyophilized vaccine with a liquid vaccine
- Double-chambered syringe
- Liquid combination of multiple antigens (e.g., DTaP)
- Live vectors carrying and expressing foreign genes of vaccine interest
- Oral administration of multiple vaccines (e.g., OPV)
- “Naked” DNAs (mixed genes)
- Microspheres with multiple attached antigens

Plotkin SA, *Infect Dis Clin N Am* 2001²⁸

There are a number of different ways to combine vaccines. One technique is through development of liquid vaccine combinations. The experience with a liquid six-antigen combination vaccine in Europe revealed that immune response was about the same for the combination as it was for most of the individual vaccines. The six-fold combination is not licensed in the U.S., because in distinction to other valences, the Hib response is lower.

In the future, it is expected that Hib will drop out of the current six-fold combination for children, and hepatitis A will be substituted when problems related to using the hepatitis A vaccine in infants are resolved. Hib will be part of a meningitis combination, and another combination will protect against otitis media. These three combinations are injections, so several shots are still needed; however, they include more vaccines. A nasal spray form of respiratory syncytial virus (RSV)/parainfluenza virus vaccine is also a possibility.

Two other injectable methods of combining liquids also are available. One, already in use with some vaccines, is to combine liquid and freeze-dried vaccines in one syringe, where the dried vaccines rehydrate. The other is to use a double-barreled syringe that simultaneously delivers different liquid vaccines from different chambers.

Vaccine Vectors

A vaccine vector is an attenuated microbe that can carry genetic information for a protein from a disease-causing organism that protects against disease. **Table 9** lists a variety of potential vaccine vectors. Edible plants are a particularly intriguing vector for orally delivered vaccines. Since some plant viruses replicate in many different plants, the potential exists to produce orally administered vegetables containing recombinant viruses that induce responses to vaccine antigens. Of course, safety issues must be resolved, and practical application of this approach is some years away.

Table 9:

Potential Vectors for Live Recombinant Vaccines

Viruses	Bacteria	Plants
Vaccinia virus	Bacille Calmette-Guérin	Potatoes
Fowlpox virus	S. typhimurium	Bananas
Canarypox virus	S. typhi	Tomatoes
Adenoviruses	E. coli	
Herpes virus	Listeria	
Varicella zoster virus	Bacillus	
Picornavirus		
Flavivirus		
Hepatitis B		
Influenza		

Other Approaches for Future Vaccine Delivery

Several other approaches also have the potential to improve vaccine delivery. These include:

- **DNA vaccines.** Injecting DNA into the muscles or skin of mice produces an immune response, suggesting that DNA vaccines may someday be feasible.
- **New routes of administration.** These include:
 - **Nasal.** The live attenuated influenza vaccine (LAIV) delivered via nasal spray has proven very effective for the virus strain it was designed to protect against, and for other distantly related strains as well.
 - **Oral.** It may be possible to create combination oral vaccines, such as a combination of polio and rotavirus vaccines.
 - **Vaginal and rectal** vaccine delivery is being studied for possible use in vaccines that protect against sexually transmitted diseases.

In addition to resolving medical/scientific concerns, vaccine-related “inventions” using these approaches will face the complex regulatory process that slows commercial application of many technological innovations. Thus, most of these ideas are likely to be realized only in the long-term future.

Socioeconomic, Health System, and Provider Factors Driving Gaps

Socioeconomic Factors

- **Lower incomes equate with lower immunization levels.** This is generally true with African-American, Latino, Asian, and Native/Aboriginal populations. Income-related barriers to immunization include lack of health insurance, lack of time for immunization (e.g., working multiple jobs), and competing life and health priorities (e.g., other expenses that strain a limited budget or other, more acute health needs).
- **Lower education levels.** This may result in less knowledge and understanding of immunization needs and benefits.
- **Family structure.** Teen pregnancies and one-parent households increase dependence on extended family members for assistance in caring for infants. Immunization may be less of a priority than other competing demands. In addition, no one person may have specific responsibility for the child's immunizations.
- **New immigrant issues.** These include mobility, which makes immunization status more difficult to track; differences in immunization policies between home countries and North America; concern by undocumented U.S. immigrants that the health system will report them if they register children for immunizations; and, in Canada in particular, differences in philosophical beliefs among some immigrant groups about vaccines.

Health System Barriers

- **Lack of culturally competent services.** Many healthcare facilities and practices do not have personnel who speak the languages of North America's diverse ethnic populations, nor do their services reflect the cultural needs and preferences of all patients.
- **Access to healthcare services.** In the U.S., healthcare facilities often are not situated in the neighborhoods where undervaccinated groups live, and lack of adequate public transportation in many communities further compounds the problem. In Canada, Aboriginal populations are entitled to receive vaccinations and other healthcare, and healthcare facilities serving First Nations are located on reserves where many live. However, this approach can reduce access for the 283,000 registered Aborigines who live in cities rather than on the rural Indian reserves.
- **Competition for limited public health services and resources,** particularly for new immigrants versus low-income citizens.

- **Complexity of the immunization schedule,** which makes vaccinations difficult for parents to remember and healthcare professionals to track.
- **Lack of accountability for underimmunization.** The performance of individuals and organizations (public and private) that provide immunizations is not routinely assessed. Publicizing performance levels and rewarding success could be powerful motivation for improvement.

Provider-Specific Issues

- **Missed opportunities to vaccinate.** Immunization levels fall when providers either refer patients to other facilities for vaccinations or fail to ask about and perform immunizations during well-child visits, follow-up visits, and acute care visits.
- **Suboptimal immunization practices.** If immunization providers used all opportunities to vaccinate and administer all childhood vaccines, immunization rates would improve. The added injections for new vaccines increase the challenge to providers to give all the injections needed during a single visit. Failing to simultaneously administer multiple vaccinations is the cause of an estimated 30% of underimmunizations. Some physicians have concerns about administering three injections to a seven-month-old infant. Too few office practices utilize reminder/recall systems which have been shown to enhance vaccination coverage levels among all racial/ethnic groups. Currently, about 20% of providers use recall systems.
- **Insufficient medical education about immunization and cultural competence.** This may result in inadequate provider knowledge, attitudes, and practices. Neither medical schools nor intern/residency programs address immunization cohesively, and most programs do not include comprehensive coverage of vaccine topics.
- **Under-representation of minority students in medical training.** This lack of physician diversity means that ethnic and racial populations rarely develop relationships with providers from their own culture, hindering patient/physician communication and cultural understanding.
- **Providers are not always oriented to prevention.** In Canada, for example, clinical nurses are most often the primary care providers in isolated health centers serving Aboriginal populations, because public health nurses have been difficult to recruit and retain. Clinical nurses are typically more attuned to providing emergency care and treatment rather than immunization and other preventive measures.

After examining the current state of pediatric immunization among the ethnically diverse populations in the U.S. and Canada, the panelists proposed a number of approaches for achieving full immunization among all populations. In addition to supporting the recommendations of individual presenters, the panel agreed on broad strategic principles and actions to comprehensively address immunization disparities. These recommendations include:

- Make full use of government and community programs and approaches already proven effective in reducing disparities in the U.S., particularly:
 - Vaccines for Children (VFC) state programs, which provide free vaccines for children in poverty by the provider of the family's choice.
 - Women, Infants, and Children (WIC), a U.S. Department of Agriculture program that provides nutrition and other health benefits for lower-income families. Many communities have achieved higher immunization rates when WIC programs have coordinated efforts with immunization programs.
 - Reminder and recall programs have proven very effective to remind families when vaccinations are due or to recall families who miss appointments.
- Increase accountability for immunization performance among individual providers (public and private) and facilities/managed care organizations. Communities, provider organizations, and individual providers could publicize results, reward good performance, and focus improvement efforts on identified problems. Individual provider self-assessment could also help identify needs and lead to improved immunization practices.
- Educate and enable parents to track children's immunization status and advocate for needed doses with healthcare providers. Two approaches suggested were:
 - Return to use of the low-tech "yellow card" parents once used to check off each time their children received immunizations. The card also showed when the next dose was due. This strategy could be particularly useful when targeted to specific ethnic groups or underimmunized population pockets within the community.
 - Conduct public education to capitalize on current public interest in immunizations.
 - Conduct multiple interventions, including provider- and system-oriented initiatives, in

communities with identified disparities. Focusing exclusively on parents and families will miss important opportunities for positive change. Enhanced provider education about current immunization practices is needed.

- Make immunization and cultural competency core parts of the medical education curriculum to better prepare future physicians. There are substantial variations in medical education with regard to immunization and cultural competence. Encouraging the adoption of culturally sensitive immunization practices will help to close the gap within medically underserved, ethnically diverse communities.
- Create immunization registries, containing a record of all immunizations given by participating providers, to enable more timely identification of immunization gaps and needs. Although efforts to create statewide/provincial immunization registries have been costly and difficult to implement, developing an easy process for physicians to follow could help overcome these problems.
- Collect site-specific immunization statistics. Managed care organizations, clinics, and private providers could use these data to identify and close their individual immunization gaps. It will be particularly important for providers to look for children who have received some, but not all, doses of one or more vaccines, since very few "zero-dose" situations occur.
- Develop information and tools to help providers and communities deal with immigrant immunization issues. For example, Canada has created two resources that have proven useful to practitioners. One, developed by Health Canada, is an immunization guide that explains how to manage children with no written documentation of vaccinations (available at <http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/immguide/>). The other, developed by the Canadian Pediatric Society, includes detailed information on the immunization schedules of other countries (ordering information available at <http://www.cps.ca/english/publications/Bookstore/ChildrenNewToCanada.htm>). Providers can use this information to identify likely immunization gaps among recent immigrants.

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