

Immunization & Health Disparities





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EXECUTIVE SUMMARY

This report analyzes the state of immunization and immunization disparities in Minnesota and provides a set of recommendations for continuing to make progress toward the twin goals of achieving high overall immunization rates and eliminating disparities.

Vaccination against childhood diseases is one of the greatest public health success stories since the mid-20th century. In the United States immunization rates are at all-time high levels, and vaccine-preventable diseases (with few exceptions) are at all-time lows.

Many factors influence immunization rates. School immunization laws, such as Minnesota's law requiring all students to receive certain immunizations by the time they begin kindergarten, can dramatically increase vaccination rates and lower rates of vaccine-preventable diseases. Access to health care, insurance status, vaccine financing policies, provider knowledge and recommendations, and parental concerns can also have significant effects on immunization rates.

While Minnesota's high overall rates of immunization place it at or near the top in most state rankings, disparities in immunization rates among racial/ethnic groups continue to be a pressing issue. In response to the Legislature's charge to reduce immunization disparities among children and adults by 50% by 2010, this report analyzes the state of immunization and immunization disparities in Minnesota and provides a set of recommendations for continuing to make progress toward the twin goals of achieving high overall immunization rates and eliminating disparities.

Key Findings:

- Minnesota's immunization law requires that all children be fully vaccinated by the time they begin kindergarten; however, a significant number of children do not receive the required doses or antigens on time, lessening their potential effectiveness.
- One of the most important indicators of low immunization rates is poverty. Poverty rates are closely intertwined with insurance status, access to a regular source of care, and other risk factors for low immunization, as well as race, contributing to disparities across racial/ethnic groups.
- Changing immunization schedules and standards make comparison of "on time" immunization rates across years challenging.
- While multiple sources of data on adult and child immunization rates exist, none of the available data sources are currently complete enough to allow an assessment of immunization rates for Populations of Color, particularly for children.

Measuring Progress:

- While disparities in adult influenza and pneumococcal vaccination rates between Whites and Populations of Color remain, substantial progress has been made in raising rates across the board. Influenza vaccination rates for Populations of Color increased by between 3.5 and 14 percentage points between 2000 and 2007.
- Estimated U.S. immunization rates for children ages 19-35 months indicate that all racial/ethnic groups had rates over 90% for most required vaccines in 2007; in the case of varicella vaccine, only White and Black children were below 90%, with other racial/ethnic groups exceeding that rate.
- The Red Lake Indian Health Service reports that 75% of two year olds are up to date on required immunization, a rate significantly higher than the surrounding counties. The White Earth Tribe also reports higher on-time immunization rates than surrounding counties.

The Minnesota Department of Health's Immunization Program has a long history of working with community partners to increase overall on-time immunization rates and reduce disparities in immunization across populations. Key activities include:

- Working through the Federal and Minnesota Vaccines for Children Programs to expand eligibility for free vaccines for uninsured and underinsured children, reducing barriers to on-time immunization due to poverty.
- Using Minnesota's school immunization law to ensure that all children are up-to-date on required immunization by the time they begin school.
- Translating information about immunization requirements, concerns, and payment/coverage into multiple languages, and increasing outreach to populations at high risk for under-immunization.
- Hiring a tribal health liaison to work directly with American Indian Tribes; the immunization program was instrumental in hiring this person.
- Administering the Eliminating Health Disparities Initiative, through which 8 community grantees are working to educate at-risk populations about immunization and offer opportunities to receive required immunizations.

In recent years, significant progress has been made in raising overall on-time immunization rates for children and adults, and in decreasing disparities in immunization rates across populations. In order to continue towards the goal of eliminating health disparities in immunization, a series of steps need to be taken:

- Ensure that all children have access to high quality primary care beginning at birth. While the federally funded MnVFC program helps to reduce financial barriers to immunization for uninsured or underinsured children, lack of a primary provider or regular source of care can lead to lower immunization rates.
- Continue collaborating with partners who work with low income people and Populations of Color to enhance and coordinate activities to raise immunization rates. Opportunities for increased collaboration include the integration of immunization into Child and Teen Check-ups through the WIC program, as well as county, hospital, and provider partnerships to track immunization rates in high-risk or high-poverty areas.
- Collaborate with health care providers/clinics who work with low-income people and Populations of Color to enhance and coordinate activities to raise immunization rates, and to collect race/ethnicity data. Strategies include encouraging providers to use reminder/recall systems and improving patient-provider communication on topics such as vaccine safety.
- Improve immunization data collection in Minnesota to allow better assessment of progress towards eliminating disparities in immunization rates. Key steps include increasing participation in MIIC and updating patients' MIIC records by inputting historical immunization data into the system, as well as expanding the sample size of the Behavioral Risk Factor Surveillance System (BRFSS) to allow collection and analysis of immunization rates by racial/ethnic group.
- Support policies that reimburse providers for all vaccination costs, such as increasing the Medicaid reimbursement rate for vaccine administration.

The Minnesota Department of Health's Immunization Program has a long history of working with community partners to increase overall on-time immunization rates and reduce disparities in immunization across populations.



INTRODUCTION

On a variety of measures, Minnesota is recognized as one of the healthiest states in the nation. We typically have lower rates of certain chronic diseases, lower rates of smoking and obesity, and lower rates of uninsurance than the national average, all contributing to a population that enjoys one of the longest life expectancies of any state. Our high ranking holds true for immunization, as well: in terms of immunization rates (defined as being up to date on vaccinations by 2 years of age), Minnesota ranks seventh in the nation among children 19-35 months old for the 4:3:1:3:3 series as measured by the CDC's National Immunization Survey (NIS).^a

Immunization rates serve as an important measure of preventive care and overall public health. But high overall immunization rates can mask disparities in rates among different populations. Lower rates of immunization are closely linked with health insurance status, access to a primary care provider, poverty, and other social characteristics – characteristics that, due to their unequal distribution in the population, can lead to disparities in immunization rates across racial and ethnic groups.

Disparities in immunization are a crucial public health issue for Minnesota. Goals to increase overall immunization rates and eliminate disparities in on-time immunization for children, and in influenza vaccination for adults, are the focus of several statewide efforts. Increasing on-time immunization and implementing strategies to increase rates of immunization against influenza for high-risk adults are also an important component of the Minnesota Public Health Goals to ensure that we reduce the incidence of vaccine-preventable diseases.

In recognition of the importance of health disparities as an indicator of public health, the Minnesota Legislature passed the Eliminating Health Disparities Initiative (EHDI) in 2001. This 10-year program has the goal of strengthening and improving the health status of Populations of Color and American Indians in eight targeted health areas, including adult and child immunization. The legislation set a goal to decrease the disparities in child and adult immunization rates between Populations of Color and Whites by 50 percent by 2010.

MDH used the 2001 Minnesota Kindergarten Retrospective Survey to set the 2001 EHDI baseline, from which progress towards this goal would be measured. Based on the survey, the overall immunization rate for the 4:3:1^b vaccine series for White children at 24 months of age in Minnesota was 85 percent compared to 65 percent for non-White children, a gap of 20 percentage points. For Populations of Color, American Indians had the highest immunization rates at 73 percent and Blacks had the lowest at 62 percent. In other words, while nearly nine out of ten White children had received all recommended immunizations by age 2, only roughly six out of ten African American children had reached that threshold. (Table 1)

a The 4:3:3:1:3 vaccine series consists of 4 DTaP, 3 polio, 1 MMR, 3 Hib, and 3 hepatitis B.

b The 4:3:1 vaccine series consists of 4 Dtap, 3 Polio, and 1 MMR

TABLE 1

**2001-2002 Immunization Levels for the 4:3:1 Series
by Race/Ethnicity at 24 Months in Minnesota**

Race (Number of Children)	Percent Up to Date at 24 Months
White, non-Hispanic (48,317)	85%
American Indian (1,072)	73%
Asian/Pacific Islander (3,331)	66%
Hispanic/Latino (3,079)	65%
African American, non-Hispanic/ Latino (4,599)	62%

Source: 2001 Minnesota Retrospective Kindergarten Survey

Disparities by race/ethnicity were also apparent among adults. MDH used data from the 2001 National Health Interview Survey (NHIS) to set the baseline for the EHDI adult immunization goal.^c The survey did not break the information down by state, only by region, because that was the only information available at the time for this group. The survey showed that for the Midwest region^d 67.3 percent of White adults age 65 or older had received an influenza vaccination, compared to just 49.5 percent of African American adults. The survey also showed that 58.8 percent of White adults age 65 or older had received a pneumococcal vaccination, compared to just 35.3 percent of African American adults. (Table 2)

TABLE 2

**Percentage of Adults* Vaccinated Against Influenza and Pneumococcal
in the Midwest during the 2000-2001 Influenza Season**

	Percent Vaccinated Against Influenza	Percent Vaccinated Against Pneumococcal
African American	49.5%	35.3%
White	67.3%	58.8%

(Source: 2001 National Health Interview Survey)

*Hispanics, American Indians and Asians were excluded from this analysis because the data was unreliable due to small sample sizes.

While these numbers clearly indicate that disparities in immunization rates among Minnesota children and adults are real and significant, assessing progress towards meeting the EHDI goal of a 50% reduction in disparities in child and adult immunization rates is challenging. With the discontinuation of the Minnesota Retrospective Kindergarten Survey after 2001, no surveys of childhood immunization rates in Minnesota exist, meaning that no adequate comparative data are yet available to assess whether the gaps are increasing or decreasing.

As this report will show, an examination of data on childhood immunization rates from the Minnesota Immunization Information Connection (MIIC) yields inconclusive results. Nationally, disparities have narrowed over the past seven years, and MDH believes the same is true in

c The rates in Table 2 are different than the rates originally used to establish the 2001 EHDI goals. The rates in Table 2 are more accurate.

d The states included in the Midwest region are: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

Minnesota because of programs targeted at “pockets of need.” However, we are not able to say conclusively whether or not this is the case, nor the degree to which disparities may have narrowed. In addition, as the studies show, it is often hard to separate poverty and income from race/ethnicity when assessing immunization rates.

Among adults, as well, Minnesota-specific data indicate narrowing of the disparities among some racial and ethnic groups in flu shot coverage among Medicare recipients. Between 2001 and 2007, the gap between the White and African American rates shrank by roughly five percentage points, while the gap between Whites and Asians was reduced by roughly eight points. However, it is not clear whether these changes are significant because the data used had its limitations, which are discussed later in this report.

The lack of data specific to Populations of Color about the burdens of chronic disease, or scores on certain indicators of health, such as immunization, are common challenges in trying to eliminate many types of health disparities. Moving forward, more comprehensive strategies will need to be developed to ensure the availability of a wide range of reliable health data for all of Minnesota’s racial and ethnic communities.

This report begins with a brief discussion on the importance of maintaining high immunization rates, followed by a discussion of different ways to measure immunization rates, and factors affecting immunization rates. The report will also examine available sources of data on overall immunization rates among Minnesota children and adults, as well as evaluate potential sources of data on immunization disparities among Populations of Color. Finally, the report will describe steps that can be taken to continue our progress towards eliminating disparities in immunization rates in Minnesota.



A Public Health Success Story

Vaccination against childhood diseases is one of the greatest medical success stories of the twentieth century. It has been one of the critical weapons in the battle to control and eliminate infectious diseases. In the United States, immunization rates are at an all-time high, and vaccine-preventable diseases (with few exceptions) are at all-time lows. At the beginning of the 20th century, infectious diseases were widely prevalent in the United States and took an enormous emotional, social, and economic toll on the population. However, since the mid-1900s, with the development of vaccines such as diphtheria, pertussis, tetanus, measles, rubella, mumps, polio, and meningitis - to name a few - there has been a dramatic decline in many infectious diseases in the United States (Table 3) and Minnesota (Attachment A).

*29 of these measles cases were imported from abroad.

TABLE 3

Selected Vaccine-Preventable Diseases, United States

Disease	Cases per year (Average Before Vaccines)	Cases in 2007	Decrease in Cases Per Year
Diphtheria	175,885	0	100%
Smallpox	48,164	0	100%
Hib (<5 yrs old)	20,000	2,541	87%
Measles	503,282	43*	99.9%
Mumps	152,209	800	99.5%
Pertussis	147,271	10,454	93%
Polio	16,316	0	100%
Rubella	48,164	12	99.9%
Tetanus	1,314	28	98%

Sources: *MMWR Weekly Notice to Readers: Final 2007 Reports of Nationally Notifiable Infectious Diseases* August 22, 2008;57(33);901, 903-913. *Impact of Vaccines Universally Recommended for Children – United States, 1900-1998. MMWR 1999;48(12):243-8.*

Herd Immunity – the Key to Immunization Success

Herd immunity is achieved when the vast majority of the population is immune to a disease; the infectious agent cannot readily spread in a highly immune community. Those who are susceptible to the disease will be protected by the immune people around them. This is called herd (or community) immunity. With herd immunity, vaccinated people help those who do not or cannot receive a vaccine by reducing the likelihood that they will come in contact with an infected individual. A small number of people cannot be vaccinated (e.g., those who are immunocompromised) and a small percentage of people do not respond to vaccines. These people are susceptible to disease; their only hope of protection is for the people around them to be immune – meaning they will not pass disease to the unvaccinated. Therefore, it is important that immunization

rates remain high among all groups of people in a society. High immunization rates can result in disease rates of less than 1 percent or even disease eradication and prevent the spread of disease among entire populations.

Cost Effectiveness

Preventing disease through immunization has proven to be one of the most cost-effective preventive health measures. Vaccine-preventable diseases not only harm and sometimes kill their victims, but also have high financial and societal costs. For example, resurgence in measles in the United States in the early 1990s resulted in more than 55,467 measles cases, 132 measles-related deaths, and 11,251 hospitalizations, resulting in more than 44,100 hospital days, with an estimated \$150 million in direct medical costs.¹ In Minnesota, between 1989 and 1991, this epidemic resulted in 559 cases and the deaths of three preschoolers. The measles epidemic struck primarily in un- or under-immunized groups (i.e., children who had not been vaccinated or who had been inadequately vaccinated).

Table 4 summarizes the expected cases of disease, deaths, and costs of a number of vaccine-preventable diseases with and without a vaccination program. For example, if there was not a vaccine for diphtheria, it is projected that there would be 247,214 cases and 24,721 deaths annually in the U.S. However, with the vaccine, those cases and deaths from diphtheria were prevented.

TABLE 4

Health and Economic Outcomes for Selected Vaccine-Preventable Diseases With and Without a Vaccination Program*

Disease	Without Vaccination Program				Prevented or Saved by Vaccination Program			
	Cases, No.	Deaths, No.	Direct Costs \$ (Million)	Total Costs \$ (Million)	Cases, No.	Deaths, No.	Direct Costs \$ (Million)	Total Costs \$ (Million)
Diphtheria	247,214	24,721	2358	24,930	247,212	24,721	2358	24,930
Tetanus	153	23	8	29	146	22	8	28
Pertussis	2,662,307	1049	2265	3668	2,614,874	1008	2193	3545
Haemophilus Influenzae type b	17,530	663	1434	2696	17,469	661	1430	2689
Poliomyelitis	60,974	723	2084	4890	60,974	723	2084	4890
Measles	3,433,722	2795	2646	5875	3,433,036	2794	2645	5874
Mumps	2,100,718	11	936	1459	2,095,917	11	934	1456
Rubella	1,786,334	14	88	381	1,784,030	14	88	380
Congenital Rubella Syndrome	616	68	115	173	602	66	112	169
Hepatitis B	232,001	3427	168	1272	207,353	3024	149	1121
Varicella	3,788,807	70	205	1184	3,160,391	57	173	993
Total	14,330,376	33,564	12,307	46,557	13,622,004	33,101	12,174	46,075

*Costs are rounded and given in US dollars.

Source: Zhou F. et al. *Arch Pediatr Adolesc Med.* 2005;159:1136-1144.

In addition, for every dollar spent on vaccines, we save between \$0.50 and \$10.39 in medical dollars and \$2 to \$24 societal dollars. (Table 5) A 2005 study found that for the 2001 U.S. birth cohort alone, routine childhood immunization resulted in substantial cost savings: \$10 billion in direct medical costs and over \$43 billion in societal costs. Thus, for every dollar spent, the U.S. vaccination program saves more than \$5 in direct costs and approximately \$11 in additional societal costs.²

TABLE 5
**Benefit-Cost Analysis of Commonly Used Vaccines
(Savings per Dollar Invested)**

Vaccine	Medical dollars saved	Societal dollars saved*
Diphtheria, tetanus, acellular pertussis (DTaP)	\$8.50	\$24.00
Measles, mumps, rubella (MMR)	\$10.30	\$13.50
Hib	\$1.40	\$2.00
Hepatitis B (hep. B)		
Perinatal	\$1.30	\$14.50
Infant	\$0.50	\$3.10
Adolescent	\$0.50	\$2.20
Varicella	\$0.90	\$5.40
Inactivated polio vaccine	\$3.03	\$5.45

*Includes work loss, death, and disability
Source: AAP/ASTHO Congressional Briefing on Immunization

Preventing disease through immunization has proven to be one of the most cost-effective preventive health measures



MEASURING IMMUNIZATION COVERAGE

In order to sustain the benefits of vaccination, high immunization rates must be attained for each birth cohort of 4 million children in the United States (about 70,000 children are born in Minnesota annually). Because immunizing is an ongoing process and certain populations, such as Populations of Color, may need additional support to achieve adequate vaccination coverage, immunization rates must be regularly evaluated.

Data on immunization coverage can help to identify groups at risk of vaccine-preventable diseases, target interventions to increase coverage, and evaluate the effectiveness of programs designed to increase vaccination coverage levels. However, deciding exactly what to measure and how to measure is not simple. There are a number of methodologies used to measure immunization rates and a variety of variables can be evaluated. In addition, there are multiple vaccines that prevent over seventeen life threatening diseases for both children and adults. Currently, there are 12 vaccines recommended for children ages 0 to 18 years,^e many of which are given in combination, such as Pediarix,[®] which contains DTaP, IPV, and Hepatitis B antigens. There are four additional vaccines recommended exclusively for adults – pneumococcal vaccine, tetanus booster, zoster vaccine and influenza vaccine.

Immunization Data

There are several different ways to collect and evaluate immunization data by varying the data elements collected, such as age, vaccine doses, geographic area, and race/ethnicity. Even though these factors are discussed separately, researchers most often measure immunization rates by combining multiple factors.

Age

Immunizations are given across the lifespan. Children receive their first vaccination shortly after birth and individuals continue to need vaccinations into old age. Adults and children have different recommended vaccination schedules. (See Attachments B, C, and D: Recommended Immunization Schedules.) The factors affecting immunization rates at each life stage (e.g., immunization laws, vaccine financing, and number of vaccinations needed) may share some similarities, but they can also be very different.

Measuring immunization rates, whether in adults or children, requires determining age goal points, for example, the ages when a child should have received certain vaccines in order to optimize disease protection and enhance herd immunity.

For the purposes of measuring immunization rates, it is not uncommon to divide childhood into three different age groups: 24 - 35 month old, 5 - 6 year olds (kindergarten), and 11-12 year olds (seventh grade). These are the ages at which the majority of vaccines are recommended to be given. However, rates are most commonly assessed in the 24 - 35 month age range, by which time the child should have received their “primary series” of vaccines. The primary series for a

two year old includes four DTaP, three polio, one MMR, three Hib, three hepatitis B, one varicella, and three pneumococcal vaccines. This is often referred to as the 4:3:1:3:3:1:3 series. (Attachment B) A child is considered to be up to date if they have received all vaccines in the primary series within the month they are recommended. Childhood immunization rates are also sometimes measured at 3 months of age, which reflects how many infants actually saw a health care provider to initiate immunization.

The federal Advisory Committee on Immunization Practices (ACIP) recommends that all adults receive one pneumococcal vaccine at age 65, a tetanus booster every 10 years, the zoster vaccine (to prevent shingles) at age 60, and an annual influenza vaccine.

Vaccine Doses

Another factor to measure to determine immunization rates is to look at the number of doses of each vaccine or antigen received at a given point in time. Typically, an antigen is defined as a foreign substance in the body (such as a bacterium, virus, or protein) that can cause disease and whose presence triggers an immune response (the formation of antibodies). For example, the antigens in the DTaP vaccine are diphtheria, tetanus, and pertussis. When measuring immunization rates, researchers might look at the number or percentage of people who have received antigens in a specific vaccine group (e.g., DTaP) based on the nationally recommended immunization schedule. For example, a researcher might measure immunization rates by looking to see if an 18-month old has received the nationally recommended four doses of DTaP. One challenge is that as new vaccines are added to the immunization schedule, we must add them to our immunization coverage measurements as well.

Geographic Area/Zip Code

Looking at immunization rates by geographic location can be a useful way to measure disparities among groups. A state's overall immunization rate may be high, but further analysis may identify certain geographic areas of the state with low immunization rates. For example, a 1992 study in Minnesota found that coverage rates frequently varied significantly by neighborhood (zip code).³ Further analysis found that zip codes with low immunization rates also had high poverty rates. These areas also had a higher proportion of Populations of Color than zip codes with higher immunization rates.

Race/Ethnicity

Finally, there are different ways to compare immunization rates by race/ethnicity. One method compares each racial/ethnic group's immunization rate to a specific target goal (e.g., Healthy People 2010); another is to compare groups to one another, (e.g., Black rate vs. White rate). You can also compare the target group to the total population. Finally, one of the newer methods is to do a comparison among three or more racial/ethnic groups using summary statistics such as the "index of disparity." This index summarizes the differences between subgroup rates and the total population, providing an overall measure of disparity for a health status indicator, such as immunization.

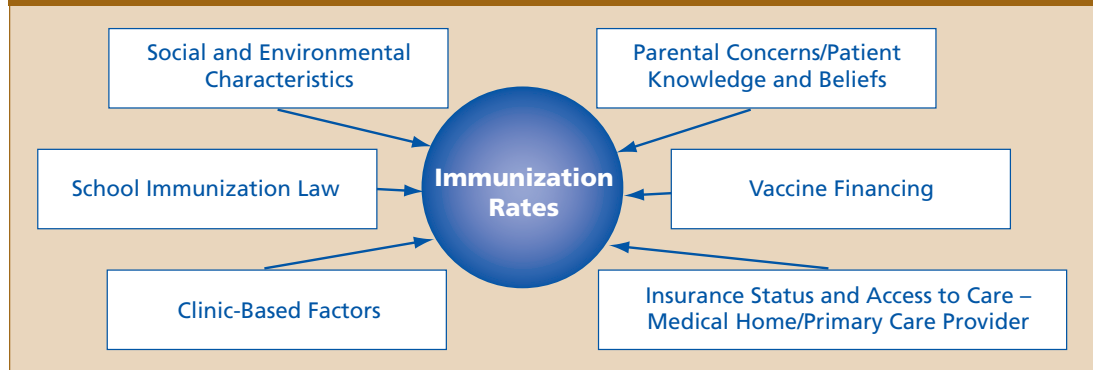
Looking at racial/ethnic disparities can be useful to determine where interventions should be targeted; however, limited data are available and they can be confounded by other factors, such as income.



FACTORS AFFECTING IMMUNIZATION RATES

Many factors affect our ability to achieve high immunization rates. This report will address six of them: school immunization laws, insurance status and access to medical care, vaccine financing, clinic-based factors, parental concerns/patient knowledge and beliefs, and social and environmental characteristics.

FIGURE 1:
Factors Affecting Immunization Rates



Due to Minnesota’s school immunization law, Minn. Stat. §121A.15, almost all children are up to date, regardless of race, by the time they enter kindergarten.

School Immunization Laws

School immunization laws provide an important mechanism for preventing disease outbreaks in settings where children and adolescents congregate and can spread disease. Moreover, these laws provide a safety net for those children who have not accessed preventive services, including immunizations. Finally, these laws help assure that children are immunized by the time they enter school, regardless of where they live, their socioeconomic status, or their race/ethnicity.

A number of studies have shown that school immunization laws increase⁴ vaccination rates and reduce rates of vaccine-preventable disease. School immunization laws can also reduce immunization disparities among racial and ethnic lines and socioeconomic status. One recent study found that there was a dramatic decrease in disparities of hepatitis B vaccination coverage among White, Black, and Hispanic students after a hepatitis B vaccine school-entry requirement was enacted. This requirement effectively increased hepatitis B vaccination coverage levels regardless of race/ethnicity.⁵

Insurance Status and Access to Care

A variety of issues surrounding access to care and medical services affect immunization rates. These include a person’s insurance status and out-of-pocket expenses and whether the person has a “medical home” or primary care provider.

Insurance Status

Most studies of the relationship between insurance status and immunization have found that children who are uninsured have a greater risk of not being vaccinated on-time. For example, a 2005 study found that children who were continuously uninsured since birth, children who were currently uninsured but previously insured, and children who were currently insured but had experienced a break in insurance coverage had significantly lower vaccination rates than did children who were continuously insured.⁶

Types of insurance can also be a factor in explaining differences in immunization rates, although the strength and nature of the relationship is not always clear.

A recent report on disparities in health care in Minnesota by Minnesota Community Measurement found that income and insurance status affect the quality of health care, including immunizations. The report found that Minnesotans enrolled in state health plans had lower immunization rates than those with private insurance.⁷

However, a recent study from the University of Minnesota contradicts the previous findings. The study found that children with public full-year health care coverage were significantly more likely to be up to date with their immunizations than children with either private full-year or intermittent private health care coverage.⁸ This study further found that children uninsured the entire year had higher up-to-date immunization rates than those with private full-year coverage. The researchers believe that this may reflect federal and state efforts to provide free vaccines and other safety net programs to eligible children.

Related to uninsurance is underinsurance, defined for immunization purposes as patients who have health insurance but also have high deductibles or copays for immunizations or plans that do not cover immunizations at all. A 2004 study found that 21 percent of U.S. children with private health insurance had no immunization coverage and another 6 percent had private insurance with significantly high copayments and deductibles, which deter immunization.⁹ Patient cost-sharing in the form of deductibles and copays has been shown to reduce the use of recommended preventive services and decrease the likelihood of being up to date for recommended vaccines.¹⁰

On the other hand, reducing out-of-pocket costs for vaccination increases coverage for recommended vaccines.¹¹ For example, state vaccine purchasing policies that enhance the federal Vaccines for Children's (VFC) program have raised vaccination rates among those who have inadequate or no insurance for preventive care.¹² The VFC program is a federally funded program that pays for vaccines for the uninsured, Alaskan Native/American Indians, and some underinsured children.

Minnesota-specific Insurance Information

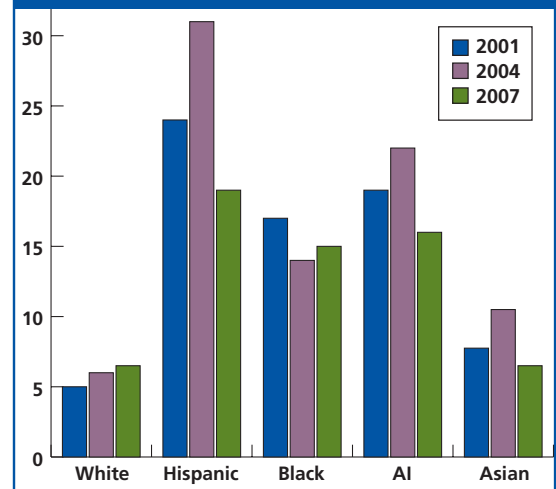
Since insurance status is related to having a primary care provider and receiving preventative health services, it is important to look at the insurance status of Minnesotans.

In 2007, about 7.2 percent of all Minnesotans or about 374,000 people were without health

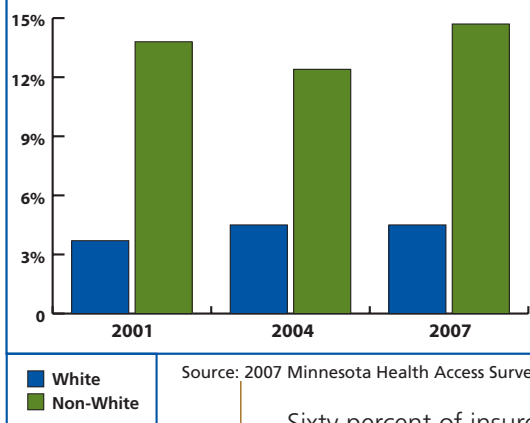
Children who are uninsured have a greater risk of not being vaccinated on-time.

insurance. Graph 1 presents uninsurance rates by race/ethnicity for three years. The chart shows that Hispanic/Latino Minnesotans were three times as likely as White Minnesotans to lack health insurance coverage. In addition, rates of uninsurance for Black Minnesotans and American Indians in the state were also disproportionately high, 14.7 percent and 16 percent respectively. In general, uninsured Minnesotans in 2007 were disproportionately likely to be young adults between 18 and 34 years old, Hispanic/Latino or Black, not married, with incomes below 300 percent of poverty, and less than a college education.¹³

**GRAPH 1:
Uninsurance Rates in Minnesota by
Race/Ethnicity 2001, 2004, and 2007**



**GRAPH 2:
White and non-White Uninsurance
Rates for Children (0-18) in Minnesota
2001, 2004, and 2007**



In 2007, the rate of uninsurance among White children between the ages of 0 to 18 years in Minnesota was 4.5 percent compared to 14.7 percent for non-White children. (Graph 2) While the uninsurance rate for Whites remained relatively stable, the rate for non-White children increased from 2004 when it was 12.4 percent. Uninsurance rates are similar for the Twin Cities metro region and greater Minnesota.¹⁴

In Minnesota, the types of insurance plans people have can also play an important role in immunization rates because State law (Minn. Stat. §62A.047) requires that Minnesota health plans cover all nationally recommended childhood vaccines. However, of the Minnesotans who are insured, only 40 percent are covered under a Minnesota health plan subject to State requirements.

Sixty percent of insured Minnesotans are covered by self-insurance plans that are regulated by the federal government under the Employee Retirement Income Security Act (ERISA).¹⁵ These plans are not subject to Minnesota law and do not have to cover immunizations. While the majority of these plans do cover the recommended childhood vaccines, some of them require a copay or include immunizations in a person's deductible. As a result, they often require the patients to pay for all or part of their vaccination costs. This is a growing problem in Minnesota, and nationwide, as deductibles increase.

Medical Home/Primary Care Provider

Having health insurance is strongly associated with access to primary care and having a regular source of care.¹⁶ Moreover, studies have shown that having a regular source of health care is one of the most important factors associated with receiving preventive care services, including immunizations.¹⁷ Children who have had multiple vaccination providers and/or do not have a "medical home" are less likely to have received all recommended vaccines than children who had one primary care provider.¹⁸ Studies have found that Black and Hispanic children are considerably less

likely to have a usual source of care than White children, even when health insurance and socioeconomic status were held constant.¹⁹

Vaccine Financing

In 1995, the cost to vaccinate a child with all the nationally recommended vaccines was \$155. In 2006 the cost increased to \$893.60 for a male and \$1,181.60 for a female. These figures only reflect the cost of vaccines, which are just one component of vaccine financing. There are also many other factors that must be factored into the total cost, such as cost to administer, manage, and store the vaccine, supplies for administration, and training on vaccine usage. In addition, physicians generally have to buy the vaccine up front and are reimbursed later.

The American Academy of Pediatrics (AAP) has found that the rising cost of vaccines and lack of insurance reimbursement for the full cost of vaccinating a child is causing some physicians to not stock some of the newer and more expensive vaccines. This is especially true among family practitioners in rural areas.²⁰ While about 85 percent of children in the U.S. are vaccinated by pediatricians, rising costs may lead some pediatricians to send patients to the local health department for vaccines, potentially leading to fragmentation of care and lower immunization rates.²¹

The Minnesota Vaccines for Children (MnVFC) Program addresses one part of the vaccine financing issue. MnVFC is an expanded version of a federal entitlement program that pays for vaccines for the uninsured, Alaskan Native/American Indians, and some underinsured children. MDH uses discretionary federal immunization funding (aka 317 funding) to expand eligibility for free vaccines to include the underinsured. MnVFC considers a person underinsured if their health plan does not cover vaccines, covers only certain vaccines, or caps vaccine coverage at a certain amount. This allows underinsured children to receive vaccines from their usual health care provider, rather than restricting services for the underinsured to Federally Qualified Health Centers (FQHC) or Rural Health Centers (RHC), which may not be convenient and can become a barrier. (For a complete description of MnVFC and the federal VFC program, see Attachments E and I.)

Clinic-Based Factors

Provider Policies and Procedures

Suboptimal policies and procedures, which result in missed opportunities to vaccinate, are just some of the system factors that influence on-time vaccination. On-time vaccination is crucial to ensuring a child is up to date on their immunizations. In 1994 and 1997, the Minnesota Department of Health collaborated with local public health agencies to conduct a survey designed to identify parental barriers to receiving immunizations. The survey found that not being up to date at 3 months of age was the most common predictor of underimmunization.

One reason for delayed immunizations in both adults and children is that clinics miss opportunities to vaccinate, for example, when providers do not administer all the vaccines that are due in a given visit or when they are unaware that the patient needs additional vaccines. A 2005 study found that among elderly Medicare beneficiaries, White enrollees were more likely to report having received an influenza vaccination than were African Americans or Hispanics. The study found

that eliminating missed opportunities for vaccination would have raised vaccination rates in both African Americans and Hispanics. Disparities in access to care and provider discrimination played little role in explaining racial/ethnic disparities in influenza vaccination.²²

Complicated immunization schedules, fragmented medical records, inconvenient clinic hours, and long wait times for immunizations are other examples of provider practice barriers to immunization.²³ But clinic practices can also help to increase immunization rates, such as reminder and recall systems.²⁴

Provider Knowledge

Another area that has been linked to vaccination status is provider's lack of knowledge about the indications for and contraindications to immunization. In addition, continually expanding uses for current vaccines for children aged 12 months or older and new vaccines can make it challenging for health care providers to stay current with immunization schedule.²⁵

Provider Recommendations

Providers can have a strong influence on patients' decisions about whether or not to immunize. Physicians, nurses, and other health care professionals must increase their efforts to build honest and respectful relationships with parents, especially when parents express concerns about vaccine safety or have misconceptions about the benefits and risks of vaccinations.²⁶

Parental Concerns/Patient Knowledge and Beliefs

Vaccines have reduced and, in some cases, eliminated many diseases that killed or severely disabled children and adults just a few generations ago. However, the disappearance of many childhood diseases has led some parents to question whether vaccines are still necessary. A growing number of parents are concerned that vaccines may actually be the cause of conditions such as autism, hyperactivity, diabetes, multiple sclerosis (MS), and sudden infant death syndrome (SIDS), even though scientific studies have shown that vaccines are not associated with these conditions. Nonetheless, these concerns have caused some parents to delay or withhold vaccines for their children. For example, a 2005 study found that parents who claimed nonmedical exemptions to vaccination were more likely than parents of vaccinated children to report low perceived vaccine safety and efficacy, a low level of trust in government, and low perceived susceptibility to and severity of vaccine-preventable diseases.²⁷

Some parents fear that multiple immunizations given to a child may cause certain neurological conditions, even though there is no reliable scientific data that supports this hypothesis. They may believe that a child's immune system is not mature enough to cope with receiving several antigens in one vaccine or that multiple immunizations will weaken the child's immune system,²⁸ even though the actual number of antigens in vaccines has decreased over the last two decades. The rate of deferral of vaccination is associated with the number of vaccine doses due at a child's appointment and is a predictor of a child not being up to date on their immunization at 1 year of age.²⁹

Concerns about vaccine effects can also influence adults' decisions about their own care. A study of adults by the CDC found that knowledge about influenza and influenza vaccination did not correlate with or predict whether adults would get the influenza vaccine. They found that

individuals who did not get the shot believed the shot caused the flu and they could control their own health.³⁰

Social and Environmental Factors

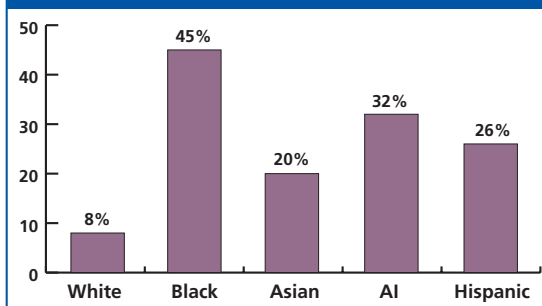
A variety of social and environmental factors play a role in immunization rates, including: poverty, family size, education, culture, language, discrimination, religious beliefs, and homelessness.

Poverty is strongly found to be associated with vaccination status. In 1992, a Minnesota Department of Health study analyzed immunization rates and geographic area data collected from the Minnesota Retrospective Kindergarten Survey. The study found that analysis by geographic area helped identify underimmunized populations in each region of the state, as well as underimmunized neighborhoods within a city. For example, in the city of St. Paul, 90 percent of the children residing in zip code 55105 received their initial DTP and polio vaccines by 3 months of age. However, in neighboring zip code 55103, only 67 percent of children had received their first DPT and polio vaccines by 3 months.³¹ Zip codes with higher rates of poverty correlated with low immunization coverage rates.

In 1998, MDH analyzed data from the 1996-97 Retrospective Kindergarten Survey to evaluate characteristics of zip codes with the lowest immunization rates, focusing on the association between geographic areas with low rates and indicators of poverty. The study found that immunization rates were lowest in zip codes with a lower median family income and great proportion of residents below the poverty line.

GRAPH 4:
Minnesota Children in Poverty
by Race in 2006

Source: 2008 CDF MN Kids Count

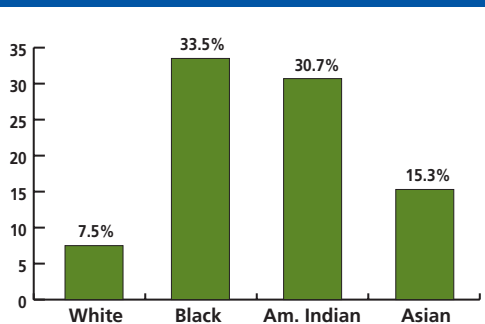


Several studies have looked at parental beliefs on the immunization status of socioeconomically disadvantaged children. The researchers found that underimmunization was significantly associated with financial barriers, family environment, and a history of inadequate prenatal care. Parental health beliefs were not associated with a child's immunization status when they controlled for income.³²

A number of studies have looked at a variety of maternal characteristics and concluded that the age of the mother, her educational level, marital status, and the number of children in the household affect a child's vaccination status. A mother's low literacy level, which is often tied to education and poverty status, also negatively affects her child receiving preventive care, includ-

GRAPH 3:
Percent of Minnesotans in Poverty
by Race in 2006

Source: US Census Bureau



In Minnesota in 2006, 9.5 percent of all Minnesotans lived below the poverty level, with a larger proportion of these individuals being non-White (Graph 3). In 2006, 12 percent of Minnesota children (n=152,000) lived in poverty, which was a 33 percent increase in the number of children living in poverty since 2000. The 2006 rate for non-White children living in poverty was much higher than for White children (Graph 4).

In many cases, the relationship between race/ethnicity and poverty makes it difficult to isolate the impact of race alone

ing immunizations.³³ In Minnesota, in 2000, over two times as many Blacks, American Indians, and Asians, and four times as many Hispanics reported earning less than a high school degree as compared to Whites.³⁴

In general, the factors most strongly associated with undervaccination include having a mother who is Black, who has less than a high school education, is divorced, separated or widowed; has multiple children and is eligible for WIC but not participating, or has an income below 50% of the federal poverty level.^{35,36} For example, a 2001 CDC study found that children eligible for enrollment in WIC had lower immunization coverage rates than those not eligible for WIC.³⁷ In Minnesota, the 2006 NIS results indicate that children participating in WIC had slightly lower immunization coverage rates than those not participating in WIC.

However, another study found that children of less educated mothers and children in Hispanic and non-Hispanic Black families with low income-to-poverty ratios were more likely to have completed their immunizations. The researchers believe that one important factor that explains these immunization rates involves the WIC immunization programs. Low-income families tend to receive WIC services more frequently than non-Hispanic White families, and some states require that families comply with the program's immunization requirements.³⁸ It should be noted that in Minnesota there are no immunization requirements for WIC participation; however, many WIC programs are affiliated with local health departments so there is some coordination across programs.

The explanation for the contradictory findings above appears to be due to the extent of linkages between WIC and Immunization activities. For example, a 2007 national study found that activities that linked WIC and immunizations increased immunization rates among WIC users. The activities included having WIC staff check children's immunization records and tell parents when shots are due, requiring families to pick up their WIC vouchers monthly if their child was not up to date with their immunizations, using computers to keep track of shots, and offering parental incentives.³⁹ Monthly voucher pickup programs have been shown to dramatically improve immunization coverage among WIC clients.⁴⁰ However, the Minnesota WIC program does not allow the monthly voucher program citing the hardship it would put on families, and the National WIC Association does not support the monthly voucher program either. Increasing the frequency of assessment and referral was not shown to increase immunization rates in states which already had a high baseline coverage rate.⁴¹

Race and Ethnicity

Race and ethnicity also affect immunization rates, with Populations of Color generally having lower rates than White children.⁴² However, in many cases, the relationship between race/ethnicity and poverty makes it difficult to isolate the impact of race alone. A 2001 study of Black pre-schoolers found that they had lower immunization rates due to missed opportunities by clinics to vaccinate, however access to care was not the issue among this group.⁴³ Another study found that being both Black and living in poverty resulted in lower immunization rates among children under 5 years-old but neither race nor ethnicity was a significant independent factor.⁴⁴

In 1994 and 1997, the Minnesota Department of Health collaborated with local public health

agencies to conduct a survey to identify parental barriers to receiving immunizations. In most cases, the selected communities were areas with low immunization levels, as identified by the Retrospective Kindergarten Immunization Surveys. Even though the parental barrier survey found that each community had a unique set a barriers, there were certain “core factors” that predicted underimmunization across multiple communities. These “core predictors” included the child’s being ill at the time of immunization, non-White race, and not having older siblings.

Studies have also found that there are different reasons for being undervaccinated and unvaccinated. Specifically, unvaccinated children (those who do not receive any vaccinations) compared to undervaccinated children (those who receive some but not all their vaccinations) are more likely to be White and more likely to have a mother who had a college degree and a mother over 30 years of age, and with a household annual income at or exceeding \$75,000.⁴⁵ MDH believes this reflects the parent’s choice not to vaccinate due to philosophical objections, which are more common among middle and upper income White parents.

Finally, almost all studies that have looked at racial/ethnic differences in influenza vaccination coverage in adults have found that differences in vaccination coverage among racial and ethnic groups remain after adjustment for various sociodemographic variables, such as age, gender, income, education, access to care, health status, risks for influenza, and health care utilization.⁴⁶ A 2005 study specifically found that differences in attitudes and beliefs about influenza vaccination and rates of primary care encounters explained some of the differences.⁴⁷

IMMUNIZATION DATA SOURCES



There are a variety of possible data sources for determining immunization rates, and no one gold standard. As described in Table 7 on the next page and at the end of the report (Attachment F), the Minnesota Department of Health has used several data sources to look at Minnesota immunization rates for both children and adults.

In addition to the different data sources, it is important to realize that “immunization” measurements are fluid. Thus, comparing one year (or goal point) to another year (or goal point), as many of the surveys do, is complicated. For example, in 2001, the National Immunization Survey (NIS) for Children measured rates for only two vaccine series. As of 2007, the NIS measured six series and only two of them overlapped with the 2001 survey. (Table 6) New immunizations are continually being added to the schedule making it more difficult to compare measurements over time.

TABLE 6 NIS Immunization Series Measurements: 2001 and 2007	
2001	2007
4:3:1	4:3:1
4:3:1:3	4:3:1:3
	4:3:1:3:3
	4:3:1:3:3:1
	4:3:1:3:3:1:3
	4:3:1:3:3:1:3:4

TABLE 7
Immunization Data Sources

Sources (sponsor)	Population Targeted	Method of Collection (Mode of Administration)	Information Collected	Purpose	Years Survey Conducted
National Immunization Survey – Child (NIS) <i>Sponsor: The Centers for Disease Control and Prevention (CDC)</i>	Children ages 19 to 35 months (Approximately 30,000 children nationwide)	Telephone interview and follow-up survey with child's provider to verify vaccine dates.	Number of doses a child received of the nationally recommended childhood immunization.	Provides national and state estimates of childhood vaccination coverage. Helps track the progress of Healthy People goals.	1993 to present Conducted annually
National Immunization Survey – Teen (NIS) <i>Sponsor: CDC</i>	Teens ages 13 through 17 years	Telephone and follow-up survey with teen's provider to verify vaccine dates.	Information on immunizations received as a child and teenager	Provides national estimates of teen vaccination coverage.	2007 to present
National Immunization Survey – Adult (NIS) <i>Sponsor: CDC</i>	Adults 18 years and older	Telephone survey – no follow-up with the provider to verify vaccine dates.	Information on the influenza, pneumococcal, HPV, Td/Tdap, hep. B and hep. A	Provides national estimates of adult vaccination coverage.	2003, 2004, & 2007
National Health Interview Survey (NHIS) <i>Sponsor: CDC</i>	All Ages	Personal household phone interviews – Self Report	Personal and demographic information, including race/ethnicity. Information on a variety of health issues, including a small amount of information on immunizations.	To monitor trends in illness and disability and to track progress toward achieving national health objectives. The data are also used by the public health research community.	1957 - present, Immunizations added in 1991 Conducted annually
Behavioral Risk Factor Surveillance Survey (BRFSS) <i>Sponsor: CDC, however, states conduct the survey</i>	Adults ages 18 and over	Telephone Survey – Self Report	Information on health risk behaviors, preventive health practices, including immunization information on adults over 65 years of age on yearly flu shots and pneumococcal vaccination.	To identify emerging health problems; establish and track health objectives; develop, implement, and evaluate an array of disease prevention activities.	1984 to present Conducted annually
Minnesota Retrospective Kindergarten Survey <i>Sponsor: MDH</i>	Minnesota Kindergarteners	School immunization records	Status of 2-year olds in Minnesota. Immunizations required for kindergarten entry	To measure statewide progress toward Minnesota's year 2000 and 2010 immunization goal	1989-2002
Minnesota Annual Immunization Status Report (AISR) <i>Sponsor: MDH</i>	Students in K-12	Schools submit reports to MDH. MDH reports the information to the CDC	No. of students attending the school; no. of students immunized according to the law; and no. of persons receiving an exemption	Required by law.	1980 to present Conducted annually
Minnesota Immunization Information Connection (MIIC) <i>Sponsor: MDH</i>	All Minnesotans, especially children	Confidential computerized information system used by health care providers, public health agencies, and schools.	Immunization history and patient demographics	To ensure that Minnesotans, especially children, have all their immunizations and the information is in a central place when the doctor needs it.	Ongoing since 2002

IMMUNIZATION RATES

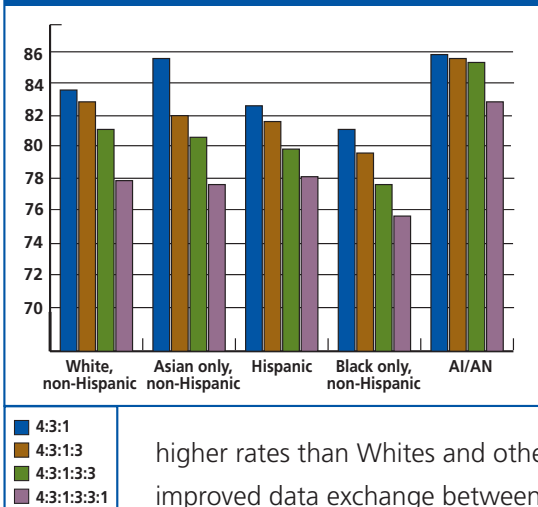
Childhood Immunizations

As this report points out, there are different ways to measure immunization coverage rates, different cut-off points, and different data sources one can use. However, in 2001, the Minnesota Department of Health (MDH) used the 2001 Minnesota Retrospective Kindergarten Survey, which looked at percent up to date for children 24 months and younger, as the baseline for the EHDI goal of reducing disparities in child immunization rates between Populations of Color/American Indians and Whites by 50 percent by 2010 (Attachment G). To align with that goal, most of the data presented here will focus on percent up to date for children up to 24 months.

National and State Immunization Trends

Estimated national and Minnesota immunization rates are at an all-time high. Based on the 2007 National Immunization Survey (NIS), the estimated vaccination coverage rate for the primary series (4 DTaP, 3 polio, 1 MMR, 3 Hib, 3 hep B; 1 varicella, abbreviated as 4:3:1:3:3:1) among all U.S. children 19-35 months of age was 77.4 percent nationally, compared to 80.5 percent in Minnesota. Minnesota was 7th among all 50 states in immunization rates for the 4:3:1:3:3:1 series in 2007. If the varicella vaccine is not included (4:3:1:3:3 series), the percentage of children immunized increases to 84.7 percent in Minnesota and 80.1 percent nationally.⁴⁸ (Graphs 5 and 6)

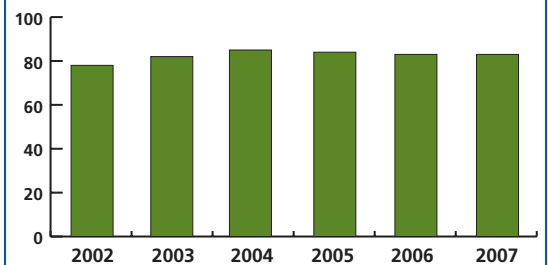
GRAPH 7:
Estimated Percent of Vaccination Coverage Levels Among U.S. Children Aged 19-35 Months by Selected Vaccine Series in 2007



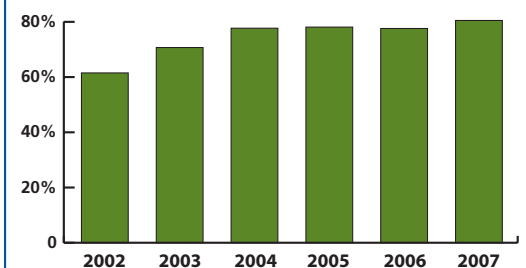
higher rates than Whites and other Populations of Color, which is most likely due to improved data exchange between the Indian Health Service (IHS) information system



GRAPH 5:
Estimated Vaccination Coverage with Vaccine Series 4:3:1:3:3 Among Children 19-35 Months of Age in Minnesota



GRAPH 6:
Estimated Vaccination Coverage with Vaccine Series 4:3:1:3:3:1 Among Children 19-35 Months of Age in Minnesota



Immunization coverage rates go down as the number of vaccines in a series increases. The addition of the varicella vaccine to the assessment in 2002 decreased rates from 76.5 percent to 61.5 percent. (See Attachment H for a table of immunization coverage by different vaccine series from 1995 to 2006 in Minnesota.)

Racial and Ethnic Disparities

The 2007 National Immunization Survey (NIS) found that immunization rates nationally were significantly lower overall for Black children compared with White children for all vaccine series. (Graph 7) American Indians/Alaskan Natives had

For both the Retrospective Survey and the NIS, Minnesota's Population of Color includes both American and foreign born. In the 2000 census, the total population of African Americans in Minnesota was estimated at 167,857 with 17.5 percent (29,457) being foreign-born.

and state immunization information systems and implementation of evidence-based strategies, such as reminder/recall, at IHS and tribal facilities.

Overall, White children had vaccination rates approximately three percentage points higher than Black children for all vaccination series. However, when the model controlled for differences in income across racial/ethnic groups, there were no significant differences in coverage between Black and White children.⁴⁹ In other words, poverty accounted for the observed difference.

Since the NIS sample size for each state is not large, the survey can only provide data on state-wide immunization coverage, not community specific rates. This means the survey cannot break down race/ethnicity data by state.

Minnesota Race/Ethnicity Specific Data

As stated earlier, the EHDI statute specifically established a goal of a 50 percent reduction in disparities in child immunization rates between Populations of Color/American Indians and Whites by 2010. To measure progress towards that goal, MDH chose the 4:3:1 series (DTaP, Polio, MMR) for children four months to 24 months.

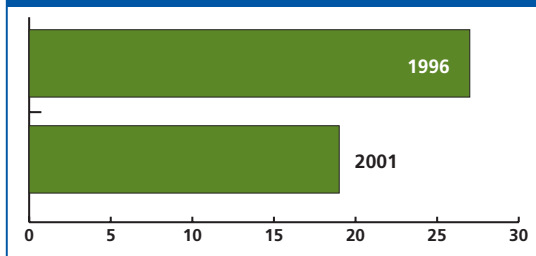
Immunization data in Minnesota by race comes from two different sources: the Minnesota Retrospective Kindergarten Survey and MIIC. The following is a discussion of the data from both sources for children four months to 24 months of age.

Retrospective Data

Between 1989 and 2001, MDH conducted a series of retrospective kindergarten surveys to determine the immunization status of 2-year-olds in the state based on their school immunization records. The survey only evaluated immunizations required for school entry at kindergarten. The surveys conducted consistently found that White students had higher average immunization levels than all non-White students.

However, it is important to note that over time the difference between White and non-White children's immunization rates lessened. In 1996, the average difference was 27 percent across all goal points, and in 2001 the difference between white and nonwhite children was 19 percent. (Graph 8)

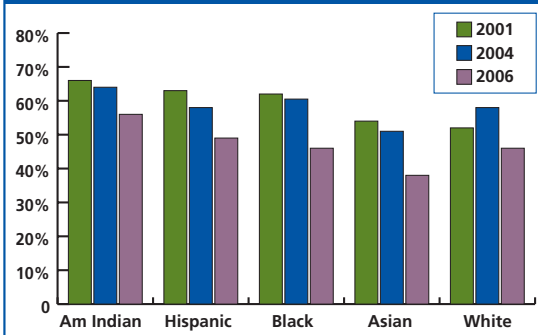
GRAPH 8:
Average Rate Difference Across
All Goal Points White vs Non-White
Children in Minnesota



Several factors likely contributed to the reduction in disparities between 1996 and 2001; targeting the “pockets of need” identified in the retrospective survey, increasing VFC funding, and implementing the Immunization Practices Improvement (IPI) program all contributed to the relative improvement in rates among Populations of Color.

Similar to national studies, poverty appears to play a significant role in immunization rates at the state level. When the Minnesota Department of Health conducted a more in-depth analysis of the 1996-97 retrospective survey, they found that immunization rates were lowest in ZIP codes with a lower median family income and greater proportion of residents below the poverty line. In addition, these areas had higher concentrations of non-White children.⁵⁰ More recently, MDH

GRAPH 9:
Percent of Children Vaccinated with the 4:3:1 Series at 24 Months by Race and Year Born in Minnesota



compared two other retrospective surveys (1992-93 and 2001-2002) to the 1996-97 survey and found that in each survey the same zip codes consistently had lower immunization rates. These zip codes were primarily urban (Minneapolis and St. Paul) and had a high percentage of families in poverty.

The Minnesota Department of Health stopped conducting these surveys, in part, because they were a burden on local public health and schools, requiring high cost and staff time. In addition, MDH had planned on using data from

the Minnesota Immunization Information Connection (MIIC) for this type of survey. However, MIIC has not been able to fill this role as quickly as hoped. Further, despite gradually increasing rates, MDH continued seeing the same pattern of immunization rates on each of the surveys so it did not seem useful to continue conducting them.

For more information on the Minnesota Kindergarten Retrospective Survey, see Attachment F.

Minnesota Immunization Information Connection (MIIC) Data

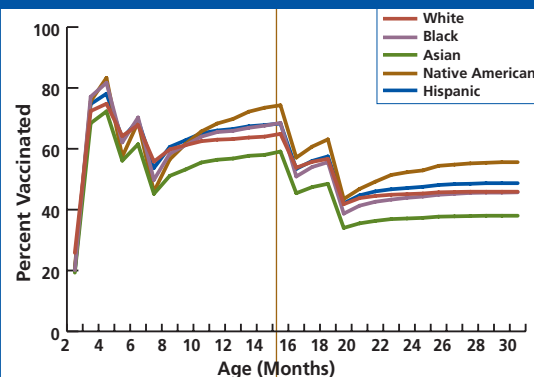
The Minnesota Immunization Information Connection (MIIC) is an information system used by health care providers, public health agencies, and schools. MIIC is a confidential, computerized information system that contains a record of a person's immunizations no matter where they got their shots in Minnesota.

Information from MIIC on children born in Minnesota in 2001, 2004, and 2006 between the ages of 2 and 30 months shows immunization coverage rates declining among all races over time for those born in Minnesota. More surprising, Whites and Asians had the lowest coverage rates in MIIC and American Indians had the highest coverage rates. (Graphs 9, 10, 11) As mentioned earlier, in the 2007 NIS, American Indians also had the highest rate nationally.

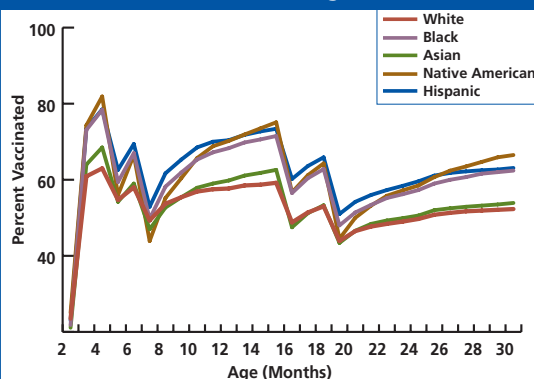
This information contradicts earlier retrospective surveys and the data from the National Immunization Survey, which show that racial disparities exist in immunization rates. One of the reasons for this finding may be that the data in MIIC is incomplete and thus not useful at this time for accurately measuring immunization rates by race/ethnicity.

MIIC data is entered either electronically from billing systems or by direct data entry. MIIC relies on providers to input immunization data, which includes immunization history and other historical data, such as race/ethnicity, for children who have not been in the system since birth. However, many private providers do not put a patient's historical immunization information in to MIIC. In addition, even

GRAPH 10:
Percent of Children Vaccinated with the 4:3:1 Between 2 and 30 Months by Race, Born in Minnesota During 2006



GRAPH 11:
Percent of Children Vaccinated with the 4:3:1 Between 2 and 30 Months by Race, Born in Minnesota During 2001

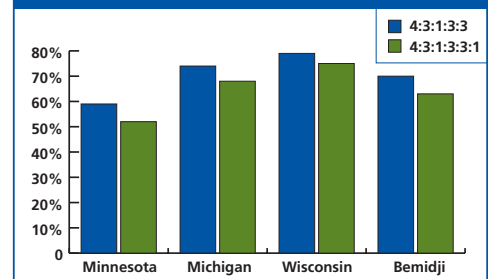


though a high percentage of providers are enrolled in MIIC, coverage is not 100 percent. Eighty-nine percent of Minnesota Vaccines For Children (MnVFC) providers are enrolled in MIIC, and usage by MnVFC providers tends to be higher in rural areas than urban areas.

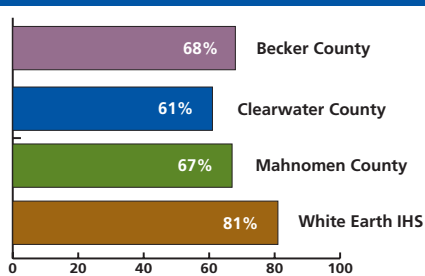
Even though the MIIC system does not have a record of all immunizations for all children, the data that is in the system is of good quality. The proportion of records showing that 1) the child was born in Minnesota, 2) the record had two or more vaccinations; and 3) the record had at least one vaccination between the ages of 12 and 24 months was similar across all racial groups (average: 73%). The only exception was the Hispanic group, which showed a significantly lower proportion of active records. Of the small group of active Hispanic records that remained, there were relatively high immunization rates (84% in Hispanics vs. 69% other races). The low percentage of “active” complete records among the Hispanic group may indicate an actively moving population or a population with poor access to health care.

For more information on MIIC, see Attachment F.

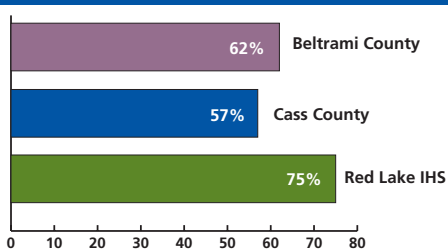
**GRAPH 12:
2002 Immunization Rates by
Selected HIS Areas in the U.S.**



**GRAPH 13:
January 2007 Selected Immunization
Rates of 2-Year Olds in Minnesota**



**GRAPH 14:
January 2007 Selected Immunization
Rates of 2-Year Olds in Minnesota**



Minnesota American Indian Data

Another source of data on American Indian (AI) children’s immunization rates is the Indian Health Service (IHS). In 2002, IHS looked at overall childhood immunization rates by several IHS areas in the United States. Minnesota had much lower rates for the 4:3:1 and 4:3:1:3:3 vaccine series (59 percent and 52 percent) compared to Michigan (74 percent and 68 percent) and Wisconsin (79 percent and 74 percent). However, Bemidji, Minnesota, had higher rates than the state average (70 percent and 65 percent). Graph 12 shows these results.

In Minnesota, currently, all 12 of Minnesota’s American Indian Tribes have access to MIIC; however, only four of them input data into the system at this time. They are Red Lake, Cass Lake, White Earth, and Prairie Island. Red Lake Indian Health Service Agency reports that as of January 2007, 75 percent of two-year olds in the MIIC system were up to date on their recommended vaccines. This compares to 62 percent of two-year olds in Beltrami County and 57 percent in Cass County. These are the counties closest to the Red Lake tribe. In addition, MIIC reports that the White Earth Tribe has higher rates than the counties closest to it (Graphs 13 and 14).

Adult Immunization Rates

Regional Immunization Trends

Even though childhood immunization has been extraordinarily successful, with 90 percent of kindergarteners vaccinated, adult rates of influenza and pneumococcal immunizations are far

below the national Healthy People 2010 goals of 90 percent.⁵¹ This is of particular concern since 99 percent of vaccine-preventable deaths occur in adults, and most are due to pneumococcus or influenza.⁵² And it is an even greater concern for the racial/ethnic groups whose immunization rates are even lower.

For the EHDl goal to reduce disparities in adult immunization rates by 50% by 2010, MDH used information from the 2000-2001 National Health Interview Survey for the Midwest region. (Table 8) This was the only baseline data available at the time; there was no state data available. Information on Asians, American Indians, and Hispanics was not included in the NHIS due to small sample size.

TABLE 8

Percentage of Adults Vaccinated Against Influenza and Pneumococcal in the Midwest during the 2000-2001 Influenza Season

	Percent vaccinated against influenza	Percent vaccinated against pneumococcal
African American	49.5%	35.3%
White	67.3%	58.8%

While the 2001 NHIS survey shows a gap of nearly 20 percentage points between White and African American adults, the same data from 2007 show an increase of approximately 10 percentage points for influenza vaccine and approximately 13 percentage points for pneumococcal vaccine among African American adults. There was a small increase for White adults for both vaccines. (Table 9)

TABLE 9

Percentage of Adults Vaccinated Against Influenza and Pneumococcal in the Midwest during the 2006-2007 Influenza Season

	Percent vaccinated against influenza	Percent vaccinated against pneumococcal
African American	59.1%	48.0%
White	69.3%	62.0%
Reduction in disparity	42.7%	40.4%

These changes between 2001 and 2007 represent a reduction in the size of the disparity between White and African American adults of 42.7% for influenza and 40.4% for pneumococcal vaccine. It is important to note, however, that these results represent changes in the Midwest region as a whole, not just in Minnesota. It is impossible to know whether the changes in Minnesota are larger or smaller than the regional results.



State Immunization Trends

MDH, in conjunction with the University of Minnesota, looked at influenza vaccination rates by race for fee-for-service Medicare beneficiaries age 65 years and older from 2000 to 2007 (Graph 15). As the graph indicates, White beneficiaries in this group have higher rates of influenza vaccination than Populations of Color. Rates for Whites are substantially higher than rates for Black and American Indians, who have the lowest rate.

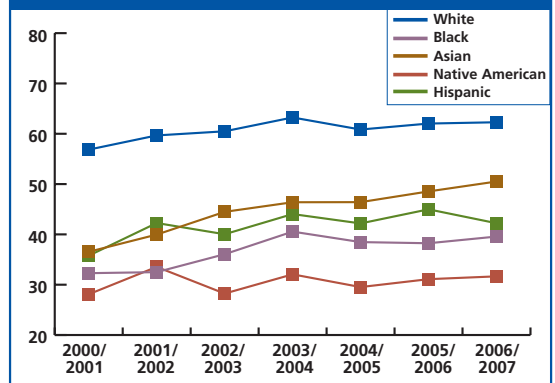
While the gap between Populations of Color and Whites remains in 2007, it appears to have decreased slightly with some racial/ethnic groups experiencing greater improvements in rates. Asian made the largest gain between 2000 and 2007, 14 percentage points, while American Indians only gained 3.5 percentage points. American Indians who lived in the seven-county metro area had influenza vaccination rates 14 times higher than those who lived in greater Minnesota. Since all these adults are insured through Medicare, cost is not a barrier to their being vaccinated. However, Blacks and American Indians have the highest poverty rates in Minnesota, which is associated with lower immunization rates.

There are important limitations to the CMS data that must be considered when interpreting the results. First, the data did not include Medicare beneficiaries in managed care plans because HMOs are not required to report this information to CMS. In Minnesota, the percentage of elderly Medicare beneficiaries in managed care ranged from 14 percent in 2001 to 30 percent in 2006.

Moreover, Populations of Color tend to use managed care programs more than Whites, thus these data under-represent Populations of Color. Finally, not all vaccinations are billed to Medicare; some patients pay “out of pocket,” so the overall rates of vaccination in these data may be underestimated.

Another survey that collects influenza and pneumococcal vaccination rates for Minnesota adults is the Behavioral Risk Factor Surveillance System (BRFSS). In 2007, the BRFSS collected data on influenza and pneumococcal vaccination rates for adults age 65 years and older and found that 79.6 percent reported receiving the influenza vaccine in the preceding 12 months, and 70.9 percent received a pneumococcal vaccine. For all states the median rate for flu vaccines was 72.0 percent and 67.2 percent for pneumococcal,⁵³ indicating higher rates in Minnesota for both vaccines. However, the sample size for Minnesota’s BRFSS program is too small to allow calculation of influenza and pneumococcal vaccination rates for racial/ethnic groups.

GRAPH 15:
MN Age Adjusted Influenza
Vaccination Rates by Race.
2000 - 2007 Influenza Season



PAST AND CURRENT EFFORTS TO IMPROVE IMMUNIZATION RATES AMONG POPULATIONS OF COLOR



The Minnesota Department of Health has a long history of working to close immunization gaps between whites and Populations of Color and American Indians. Eliminating barriers to cost, having a school immunization law, and having access to continuous quality care, a regular primary care provider, and a “medical home” for all Minnesotans are just some of the factors that influence immunization rates. The following describe past and current efforts undertaken at the federal, state, local, and community level to help increase immunization rates across the board as well as to eliminate specific health disparities in immunization rates among Populations of Color.

Federal and State

- 1. Vaccines for Children (VFC) Program.** In 1989 - 1991, a measles epidemic in the United States resulted in tens of thousands of cases of measles and hundreds of deaths. The CDC found that more than half of the children who had measles had not been immunized, even though many of them had seen a health care provider. In partial response to that epidemic, Congress passed the Omnibus Budget Reconciliation Act (OBRA) on August 10, 1993, creating the Vaccines for Children (VFC) Program. Known as section 1928 of the Social Security Act, Vaccines for Children is an entitlement program for eligible children, age 18 and younger.

VFC helps children who may not otherwise have access to vaccines by providing free vaccines to health care providers who serve them. CDC administers VFC by contracting with vaccine manufacturers to buy vaccines at reduced rates. States and certain large urban areas enroll physicians who provide routine immunizations to eligible patients through 18 years. For more information on the program See Attachment I.

- 2. Minnesota Vaccines for Children (MnVFC) Program.** The MnVFC program supplements the federal VFC program with discretionary federal 317 vaccine funds to expand eligibility for who can receive vaccine. (Attachment E) In 2007, Minnesota received \$23.1 million for vaccines for the VFC program and \$4.32 million from the 317 program for a total of \$27.42 million for the MnVFC program. Because VFC is a federal entitlement program, the amount of VFC funding has increased over the years as the number and cost of immunizations has substantially increased. However, the amount of 317 funding (a discretionary program) has remained relatively stable, which has put increasing challenges on the immunization program because this funding is critical for reaching out to certain populations. (Attachment J)

Over the years, MDH has used the 317 funding to ensure that children who cannot afford vaccines, such as those that are underinsured, can continue to get them from their usual primary care provider. By combining the two sources of federal funding, Minnesota has been

Eliminating barriers to cost, school immunization laws, access to continuous quality care, a primary care provider, and a ‘medical home’ all influence immunization rates.

able to expand eligibility for the program to include unvaccinated children who have high copays and deductibles for immunizations.

Even though this program eliminates costs as a barrier to children getting their vaccines on time, it does not address health care access or other social issues related to immunization rates. In addition, not all parents are aware of the MnVFC program. MDH is currently working on ways to increase parents' awareness of this program; however, limited resources make this a challenge.

- 3. Immunization Action Plan.** In response to the 1989-1991 measles epidemic in the United States, the federal government also required all states, and a few urban areas, to develop Immunization Action Plans (IAPs) to ensure that children under 2 years of age received all recommended immunizations. As part of the project, MDH conducted the first Kindergarten Retrospective Survey in Minnesota to identify "pockets of need" and to distribute federal funds accordingly. Minnesota counties were required to develop IAPs to address the areas that were identified in the survey as pockets of need. Funding for the IAPs, though highly effective, was limited and lasted only a few years; however, it appears to have helped raise Minnesota's immunization rates. For example, for the 4:3:1:3 series, immunization rates went from 78 percent in 1994 to 86 percent in 2000.
- 4. Minnesota Laws.** There are three Minnesota laws that directly impact immunization. First, in 1967, the Minnesota Legislature enacted the School Immunization Law, which required all children entering kindergarten to show proof of either measles immunization, a history of having had the disease, or a medical exemption. The law has expanded over the years to include an exemption for conscientiously held beliefs, include children in child care, and to add to the list of required vaccines. The vaccines currently included in the law include: measles, mumps, rubella, polio, tetanus, diphtheria, pertussis, hepatitis B, chickenpox, Haemophilus influenzae type b, and the pneumococcal conjugate vaccine. (See Attachment K for a history of the Minnesota School Immunization Law). As stated earlier in this report, immunization laws reduce disparities by assuring that children are immunized by the time they enter school, regardless of where they live, their socioeconomic status, or their race/ethnicity.

The second immunization related Minnesota law (Minn. Stat. §62A.047) requires Minnesota health plans to cover all nationally recommended childhood vaccines. The third law, Minnesota's Medicaid law (Minn. Stat. §256.0625, subd. 39), requires Medicaid providers who administer pediatric vaccines to enroll in the VFC program. The law also requires medical assistance to reimburse providers \$8.50 for a vaccine administration fee. Both of these laws help assure that children who cannot afford immunizations receive them. As stated earlier in this report, poverty is a factor in immunization rates and in Minnesota there are more non-Whites than White children that are uninsured and living in poverty. Even though both these laws help reduce cost as a barrier to getting vaccinated, they do not directly address health care access issues.
- 5. Minnesota Immunization Information Connection (MIIC).** MIIC, the statewide immunization registry, has been, and continues to be, a useful tool to ensure that patients are up

to date with their immunizations. Using a prediction algorithm, MIIC is able to make recommendations for future vaccination based on the patient's age and the vaccines they have received to date, which makes it easier for clinicians to make sense of complicated vaccine schedules and prevents over- and under-immunization. MIIC also provides reminders to patients when immunizations are due or have been missed. In addition, MIIC helps ensure timely immunizations for children whose families move or switch health care providers within the state. MIIC is also considered a reliable "official" immunization record for school entry, child care, and any other immunization validation. Finally, providers can track whether or not their patients are eligible for the MnVFC program and generate summary reports for MnVFC via MIIC.

MDH is currently working with the Department of Human Services to add immunization information on Medicaid patients into MIIC.

- 6. Annual Immunization Status Report (AISR) and Child Care Reports.** Minnesota law requires schools and child care facilities to report immunization information to MDH annually. Schools, Community Health Service (CHS) agencies and counties can access the AISR data and run specific reports on their community. Local public health agencies can run reports on schools in their areas and work with school nurses on improving their immunization rates. These organizations can also go back to previous years' reports and compare the information. (For a description of the AISR, see Attachment F and Table 7)

MDH sends the child care summary reports to each CHS agency and includes reports for each county along with a list of child care centers by county that did and did not report and how their individual percentages rank compared to the state. Often the county/CHS agency will contact underreporting/nonreporting centers in their area.

MDH is currently working on enhancing the information it collects from these sources.

- 7. Immunization Practices Improvement (IPI) and AFIX.** The MDH Immunization Program began a quality assurance program for clinics called Immunization Practices Improvement (IPI) in 2001. This program helps address some of the disparities' issues by ensuring that providers do not miss opportunities to vaccinate. We know that people of color and those in lower income groups have more missed vaccination opportunities. IPI merges key aspects of the overall immunization program, which includes vaccine management, vaccine accountability, and clinical immunization practices at the provider level. The program reviews vaccination activities in all clinics enrolled in MnVFC. State and local public health staff conduct site visits of each clinic to assess their vaccination practices, including storage and handling of highly perishable vaccines. Staff then provides feedback to the clinic on how to assure vaccine viability, streamline paperwork, and increase immunization levels. MDH contracts with local public health agencies to conduct site visits to immunization providers across the state. MDH also conducts some visits. In 2007, there were a total of 377 IPI site visits in Minnesota (MDH staff conducted 50 of these).

In 2001, Minnesota, along with other states, also began implementing a program called AFIX (Assessment-Feedback-Incentives-Exchange), a quality improvement strategy to raise

immunization coverage levels and improve standards of practices at the provider level. It is a process for improving immunization rates and identifying common reasons for low immunization rates (e.g., missed opportunities) and developing a plan with the provider to overcome those obstacles. AFIX is done in conjunction with IPI visits

- 8. Provider and Patient Education.** MDH develops many patient and provider informational materials on immunizations in English and other languages. For example, MDH has translated basic fact sheets on when immunizations are due, what immunizations are needed for school and child care, and how to pay for shots into several languages (e.g., Somali, Spanish, Russian, Vietnamese, and Hmong).

MDH also provides education for immunization providers through multi-media conferences, which are attended by a variety of health care professionals, including tribal health officials. In 2007, MDH held its first statewide immunization conference and had 397 people attend over two days. MDH also held a regional immunization conference in Willmar in October 2008 and over 200 people attended. Print materials are also available at these conferences.

MDH not only translates materials into other languages, but it also has produced a perinatal hepatitis B television program, which was broadcast in seven different languages through the Emergency and Community Health Outreach (ECHO) Project in October 2008. ECHO is a not-for-profit collaborative of public health and safety agencies, ethnic advisory organizations, community based organizations, and public television in Minneapolis/St. Paul. All seven programs had English subtitles. The program is also available in web streaming.

MDH Interventions Specifically Targeting Populations of Color

The Minnesota Department of Health and its community partners have initiated a number of projects specifically targeting Populations of Color in an effort to reduce disparities in immunization rates.

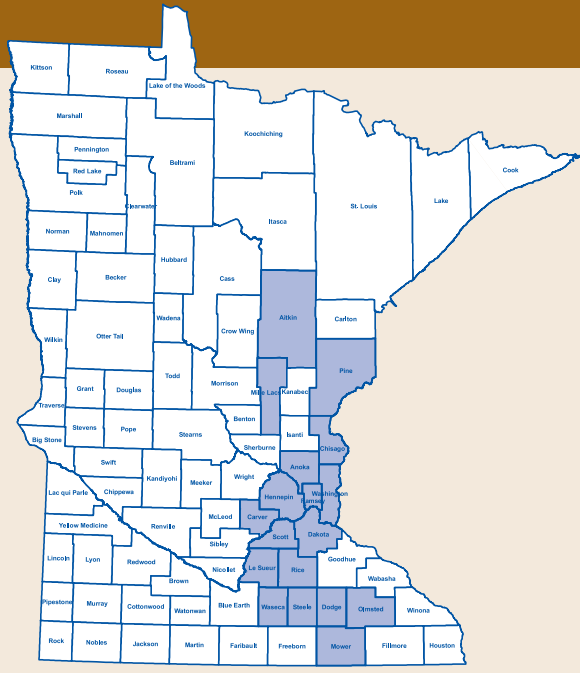
- 9. Eliminating Health Disparities Initiative (EHDI).** In addition to its work to improve overall immunization rates among children and adults, MDH and its community partners have also used a variety of approaches to address the disparities that still exist among Minnesota's racial/ethnic groups. One of the most prominent efforts is the Eliminating Health Disparities Initiative (EHDI) established by the Minnesota Legislature in 2001, Minn. Stat. §145.928. In the most recent biennium, the EHDI program awarded a total of \$10.4 million in competitive grants to local programs and projects statewide, with an additional \$500,000 going to support tuberculosis programs for foreign-born persons through local public health agencies. The grants are aimed at improving the health status of Minnesota's populations of color and American Indians. The grants are distributed through the Minnesota Department of Health's Office of Minority and Multicultural Health.

In 2007, eight of the EHDI grantees included immunization-related work as part of their grant, but only two focused solely on increasing immunization rates as their objective while others were pursuing a broader set of goals, including immunization. These grants cover a total of 18 counties in Minnesota. (Figure 2) Attachment L summarizes the work of EHDI

In their work to decrease the magnitude of disparities in immunization rates, the EHDI immunization grantees focused on realizing a variety of outcomes in the communities in which they worked:

- Many of the approaches used by grantees to achieve these goals mirror what research and best practices have already told us about how to increase immunization rates overall and in communities of color: work with parents to ensure that their children receive required immunizations on schedule, educate individuals and families about immunizations in their native language and in a variety of settings, and reduce financial, insurance-related, and transportation barriers to immunization. In particular, the grantees illustrate the importance of education as a precursor to behavior change; people who do not understand why immunizations are important are less likely to access them, and knowledge change generally precedes changes in behavior.

FIGURE 2:
Counties Reached by Immunization Grantees



Highlights of EHDI immunization grantees' results:

Olmsted County Public Health: In 2004, District 535 (Rochester) reported there were 93 students who were excluded from school because their immunizations were not current. In 2005 there was only one student who was excluded because of their incomplete immunization status. Between June and September, 2006, 95 percent of the students who were behind on their immunizations received the required immunizations needed to attend school.

Center for Asian and Pacific Islanders: Out of 260 clients served, 208 did not have medical home. By the end of the program 169 had been connected to a medical home. The results showed that helping clients with teaching sessions, immunization clinics and medical paperwork has empowered them in their dealings with the Western medical system.

Storefront Group: Bridge to Success conducted immunization awareness workshops, provided one-on-one support, and information and resources for Somali families resulting in an increase in knowledge about the need for immunization. 87% of participants completed a survey with the results indicating that they have learned about immunization and the need to have children immunized.

immunization disparities will need to be shared with providers, community organizations, and other stakeholders in order to continue to make progress toward increasing immunization rates in all communities.

- 10. Asian Pacific Islander (API) Outreach Project.** During the 1988-91 measles epidemic, there were three deaths from measles in the Hmong community in Minnesota. As a result, in 1993, a coalition was formed that conducted a multimedia health-promotion campaign and an education and outreach targeted to providers. CDC later evaluated this program by measuring hepatitis B vaccination rates. They compared states that had active API outreach programs with those who did not. The study found that those with active programs (including Minnesota) had much higher rates of hepatitis B immunization than those that did not have outreach programs. The project has been discontinued; however, MDH continues to provide translated materials and other information to this population.
- 11. Tribal Health.** In 2003 and 2004, the MDH Immunization Program focused on increasing visibility of the program among American Indian Tribes in Minnesota. To that end, the MDH immunization program was instrumental in the Department's hiring of the first American Indian tribal health liaison. This person is housed in the Office of Minority and Multicultural Health at MDH. In addition, in 2004, the Immunization Program worked with American Indian tribal nations and communities and conducted the following activities:
 - attended tribal health director meetings to keep abreast of immunization issues impacting Minnesota's tribes;

- presented information on vaccine safety to mothers in an American Indian Resource Center program, and after the presentation, all the mothers reported they intended to get their children vaccinated;
- coordinated a presentation on the Minnesota Immunization Information Connection (MIIC) to the tribal health directors of Minnesota's 12 tribal nations. As a result, all 12 tribal nations use MIIC to look up immunization data and four also use MIIC to input data; and
- coordinated a visit to the Upper Sioux and Lower Sioux tribal nations to work with them on MIIC, which they now use to find immunization documentation on their children.

Using MIIC helps tribes provide immunization outreach to families because it predicts which immunizations are needed. Providers can then send the family a reminder that their child's immunizations are due. Currently, all 12 of Minnesota's Indian tribes are using MIIC to look up immunization data and four of them (Cass Lake, Red Lake, White Earth, and Prairie Island) also input data into MIIC. (As noted earlier, White Earth and Red Lake are the two tribes whose immunization rates in 2-year-old children are higher than those in the surrounding counties.) Two other tribes, Bois Forte and Grand Portage, plan to begin inputting data into MIIC, and the Minneapolis Indian Health Board can also look up and input data into MIIC.

Finally, MDH's immunization program is currently working on an American Indian outreach program. In March 2008, MDH sent a variety of immunization materials to Minnesota Tribal nursing directors (Attachment M). The next step is to gather information on each tribe's use of the MnVFC program and to contact each tribe individually to ensure they are utilizing the program to its fullest.

Current Local Public Health Activities

1. **WIC (Women, Infant, and Children).** In 2000, a White House Executive Memorandum was issued directing the WIC program to screen the immunization records of all infants and children under the age of 2 at WIC certification visits. However, no funding was attached to the order. While the Immunization Program and the WIC program have held numerous discussions about collaboration, they currently have no formal connections. Many local WIC programs are, however, located in health departments so there is some coordination with the local immunization program.

One such local collaboration is in southwest Minnesota. Over the last 10 years, this region has integrated immunizations into the Child and Teen Check-up (C&TC) program and the WIC program. As a result, children in WIC have higher immunization rates than children not in WIC, which is not true for the rest of Minnesota. This integration has not been found to have any negative impact on WIC, e.g., by burdening staff with additional work.

2. **Child and Teen Check-up.** Child and Teen Check-ups (C&TC) is the name for Minnesota's Early and Periodic Screening, Diagnosis and Treatment (EPSDT) Program. C&TC is a com-

prehensive child health program provided to children and teens from newborn through the age of 20 who are enrolled in Medical Assistance (MA) or MinnesotaCare. It is coordinated through the Department of Human Services (DHS). The program is intended to 1) to identify potential health problems or handicapping conditions, 2) provide diagnosis and treatment of those health problems or conditions; and 3) encourage the development of good health habits. Immunizations are just one part of the screening process. If children are not up to date on their immunizations, vaccinations will be covered through MnVFC, MA, or MnCare.

- 3. Baby Tracks.** Baby Tracks is an immunization tracking program in Hennepin County for children up to 2 years of age. It is a county-funded partnership between the County, hospitals, community agencies, and providers to help improve immunization rates. Baby Tracks began in 1995 after a Minnesota Department of Health study showed only 62 percent of 2-year olds in Hennepin County and only 47 percent of Minneapolis 2-year olds were fully immunized. The study also showed that some inner-city neighborhoods with significant numbers of low-income families and populations of color had immunization rates that were as low as 34 percent.

Baby Tracks helps families by sending postcards to remind parents when shots are due, maintaining a current shot record that can be used for childcare, school or if the family changes health care clinics, helping families find low-cost clinics and connecting them with community agencies. Bi-lingual staff are also available to answer questions about immunizations and case management services are provided to families if a baby falls behind on shots. Baby Tracks regularly sends MDH immunization information so that MDH can input the information into MIIC.

Baby Tracks now serves about 15,000 families, and about 92 percent of children targeted by the program are up-to-date with their immunizations by the age of 2 - an increase of 30 percent since 1995.

State and Community Partners and Activities

- 1. Minnesota Immunization Networking Initiative.** MDH has partnered with the Minnesota Faith Health Coalition on the Minnesota Immunization Networking Initiative (MINI) project since 2006. This project provides free influenza immunizations for children and adults through churches and community organizations; it specifically targets organizations that serve large Populations of Color. MDH provided an immunization consultant and doses of the influenza vaccine to the MINI project.

The project provided a total of 4,500 free influenza immunizations during the 2007-08 flu season and almost 5,000 free influenza immunization during the 2006-07 flu season. The MINI project received an award at the National Influenza Summit in 2007. The director of the project also gave a presentation at the White House Faith-Based and Community Initiative Compassion in Action Roundtable in October 2008. The theme for the event was "Community-Based Solutions for Health Needs. It showcased successful partnerships and innovative efforts in communities across the country. MDH plans to continue this partnership.

- 2. Minnesota Department of Education (MDE).** MDE administers the Early Childhood Screening (ECS) Program in conjunction with local public health and school districts. There is a state interagency screening team that collaborates on policies, standards, and coordination at the local levels. This program requires that all children receive a health and developmental screening prior to school enrollment. Immunizations are just one part of this screening.
- 3. Performance Improvement Project (PIP).** Currently, MDH is partnering with DHS and the Minnesota Council of Health Plans, which is made up of eight licensed nonprofit health care organizations, to promote human papillomavirus (HPV) vaccination among low-income females ages 11 to 26 years who participate in Minnesota Health Care Programs (MHCP).



RECOMMENDATIONS

Any strategies undertaken to increase immunization rates must be comprehensive and multifaceted.

Even though overall immunization levels in Minnesota are at an all-time high and immunization disparities by race/ethnicity have decreased, they still exist. Disparities in immunizations are a crucial public health issue because immunization rates are an important measure of preventive care and overall public health. In addition, lower immunization rates are closely linked with health insurance status, access to a primary care provider, poverty, and other social characteristics.

The problem of disparities in immunization rates is complex. As national and state surveys highlight, poverty appears to be one of the biggest factors correlated with racial/ethnic disparities. In addition, access to care, health insurance coverage, geographic location, clinic practices, and other social and environmental characteristics all influence immunization rates. Thus, any strategies undertaken to increase immunization rates must be comprehensive and multifaceted. The following recommendations address actions that the state should take to raise immunization rates among Populations of Color.

MDH recommends the following to reduce disparities in immunization rates across racial/ethnic groups in Minnesota.

- **Ensure that all children have access to high quality primary care beginning at birth.** Currently, the MnVFC program, which is federally funded, covers immunization costs for uninsured and underinsured children, helping to eliminate cost as a barrier to immunization. However, if a person does not have access to a primary care provider their immunization rates are lower.
- **Continue collaborating with partners who work with low-income people and Populations of Color to enhance and coordinate activities to raise immunization rates.** MDH should continue and further enhance its work with DHS, WIC, tribal health, and faith-based and community organizations. MDH should specifically target programs and organizations in zip codes which have had low immunization rates. As mentioned earlier in this report, poverty is one of the factors that results in lower immunization rates. Interventions should include the following:
 - > Supporting and promoting the Minnesota Vaccines for Children Program (VFC) to ensure that people are aware that cost need not be a barrier to receiving immunizations. This includes:
 - Ensuring program materials are translated and accessible to populations of color;
 - Providing the fact sheet “How to pay for your kids shots,” in multiple languages to organizations that work with low-income Minnesotans and people of color;
 - Ensuring that clinics who work with low income families and Populations of Color post and distribute MnVFC materials in their offices; and

- Working with schools, especially those with large number of Children of Color, to get information to parents about MnVFC.
- > Addressing maternal concerns when developing public health interventions because most mothers play an important role in their children’s vaccination. Encouraging eligible women and their children to participate in the WIC program and providing support and encouragement for immunization to mothers should improve early childhood vaccination.
- > Coordinating with the Women, Infants, and Children’s (WIC) program. This includes both at the state (within MDH) and local level. This would include promoting MnVFC to WIC clients, comparing WIC records with data in the MIIC system, ensuring that WIC participants are up to date on their immunizations, and educating local WIC staff on national immunization recommendations and the MnVFC program.
- > Increasing promotion of adult immunizations by working with providers and organizations who specifically work with older Minnesotans, especially those that work with Populations of Color. This could include churches, community health clinics, and advocate groups like the AARP and the Minnesota Senior Federation.
- > Ensuring that adult vaccinations are offered in more local venues, such as pharmacies.
- > Supporting policies and programs that provide support services, such as transportation, to individuals and families to ensure they can see a health care provider.
- **Collaborate with health care providers/clinics who work with low-income people and Populations of Color to enhance and coordinate activities to raise immunization rates,**
 - > Encouraging providers to use a reminder/recall system and reducing missed opportunities for vaccination by checking immunization status at each visit. Children who receive immunizations on time are more likely to be up to date on their recommended immunizations by age 2. Specifically, MDH is working with providers who serve patients in areas with high “pockets of need” on finding the best way to send out reminder/recall notices.
 - > Improving patient-provider communication on topics, such as vaccine safety, by providing materials and talking points. Even though vaccine safety has not been a big concern in the past in Populations of Color, it continues to be a growing issue. Addressing it now may help avoid issues later.
 - > Encouraging clinics to collect race/ethnic data on patients so that data entered into MIIC is more reliable and allow better follow up.
- **Improve immunization data collection in Minnesota**
 - > Increasing participation in MIIC and updating patients’ MIIC records by imputing historical immunization data into the system. Improving available data collection will assist MDH in understanding where there are pockets of need and where health disparities exist. Specifically, in 2009, MDH will be aggressively working with health plans and pro-

viders to input historical immunization data on their patients into MIIC and ensure MIIC is integrated into the clinic's EMR system.

For example, MDH is currently working with a large, metro health center to enter historical immunization data. The clinic will submit paper immunization records to MDH and staff will manually enter the data into the system. MDH plans to do this with other clinics; however, how quickly this will be done depends on the resources available. In addition, MDH is working with two large health systems to electronically integrate their immunization data into MIIC. MDH plans to expand this endeavor. As mentioned above, MDH is working with providers on the best way to send out reminder/recall notices. This will not only ensure children remain up to date on their immunizations, but also ensure that historical information gets into MIIC. If a parent receives a reminder letter but their child is already up to date, we will be able to get the historical information into the system.

Finally, requiring data on race/ethnicity to be entered into MIIC for all patients would assist MDH in attaining better information on race/ethnicity and disparities.

- > Expanding the BRFSS to a sample size that allows for analysis of data by racial/ethnic group for all adults, including adults over 65 years old. This would allow analysis of influenza and potentially pneumococcal vaccine rates for Populations of Color, which is not currently possible given the sample size for the BRFSS program.
- **Support policies that reimburse providers for all vaccine costs.** This will help ensure that providers do not stop giving vaccines, especially in rural areas, which could lead to fragmented care and patients not getting vaccinated.

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Comparison of Maximum and Current Reported Morbidity of Vaccine-Preventable Diseases -- Minnesota, 2007			
	Maximum Cases (year)	2007	Decrease in Cases Per Year
Diphtheria	5,012 (1910)	0	100%
Measles	29,759 (1935)	1	99.9%
Mumps	2,080 (1955)	28	98.7%
Pertussis	5,272 (1933)	393	92.6%
Polio	3,926 (1952)	0	100%
Rubella	3,232 (1964)	0	100%
Tetanus	40 (1923)	1	97.5%

Recommended Immunization Schedule for Minnesota 2008

****Chart must be used with guidelines below****

Vaccine ↓	Age ⇒	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19-23 months	2-3 years	4-6 years
Hepatitis B ¹	HepB	HepB	HepB	see footnote 1	HepB (3 doses)	HepB (3 doses)						
Rotavirus ²			Rota	Rota	Rota							
Diphtheria, Tetanus, Pertussis ³			DTaP	DTaP	DTaP		DTaP					DTaP
<i>Haemophilus influenzae</i> type b ⁴			Hib	Hib	Hib ⁴	Hib			Hib			
Pneumococcal ⁵			PCV	PCV	PCV	PCV					PCV PPV	
Inactivated Poliovirus			IPV	IPV		IPV						IPV
Influenza ⁶							Influenza (yearly)					
Measles, Mumps, Rubella ⁷							MMR					MMR
Varicella ⁸							Varicella					Varicella
Hepatitis A ⁹							HepA (2 doses)				HepA (2 doses)	
Meningococcal ¹⁰											MCV4	

Range of recommended ages
Catch-up vaccination
Certain high-risk groups

This schedule indicates the recommended ages for routine administration of currently licensed childhood vaccines, as of December 1, 2007, for children through age 6 years. For additional information see www.cdc.gov/vaccines/recs/schedules/default.htm. Any dose not administered at the recommended age should be administered at any subsequent visit when indicated and feasible. Additional vaccines may be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of

the combination are indicated and other components of the vaccine are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult the respective ACIP statement for detailed recommendations. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at www.vaers.hhs.gov or by telephone, 800-822-7967.

1. Hepatitis B vaccine (HepB). Minimum age: birth.

At birth:

- Administer monovalent HepB to all newborns within 12 hours of birth.
- If mother is HBsAg-positive, give newborn HepB and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth.
- If mother's HBsAg status is unknown, give newborn HepB within 12 hours of birth. Determine newborn's HBsAg status as soon as possible and if HBsAg-positive, administer HBIG within 24 hours.
- If mother is HBsAg-negative, the birth dose can only be delayed by physician's order and by including a copy of the mother's negative HBsAg laboratory report in the newborn's medical record.

Following the birth dose:

- Complete HepB series with either monovalent HepB or a combination vaccine containing HepB. Administer second dose at age 1–2 months and final dose at age ≥24 weeks. Note: Combination vaccines are not indicated before age 6 weeks.
- Test infants born to HBsAg-positive mothers for HBsAg and antibody to HBsAg after completion of 3 or more doses in HepB series, at age 9–18 months (generally at the next well-child visit).
- It is permissible to administer 4 doses of HepB when combination vaccines are given after the birth dose.
- If monovalent HepB is used for doses after the birth dose, a dose at age 4 months is not needed.

2. Rotavirus vaccine (Rota). Minimum age: 6 weeks.

- Administer first dose between 6 and 12 weeks of age. Do not start the series after age 12 weeks.
- Administer final dose by 32 weeks of age. Do not administer a dose after age 32 weeks.
- There are insufficient data on safety and efficacy outside of these age ranges.

3. Diphtheria, tetanus, and acellular pertussis vaccine (DTaP). Minimum age: 6 weeks.

- Fourth dose may be administered as early as age 12 months, provided 6 months have elapsed since third dose.
- Administer final dose at age 4–6 years.

4. *Haemophilus influenzae* type b conjugate vaccine (Hib). Minimum age: 6 weeks.

- If PRP-OMP (PedvaxHIB or ComVax by Merck) is administered at age 2 and 4 months, a dose at age 6 months is not required.
- TriHibit (DTaP/Hib) should not be used for primary immunization but can be used as a booster following any Hib vaccine in children age ≥12 months.

5. Pneumococcal vaccine. Minimum age: 6 weeks for pneumococcal conjugate vaccine (PCV); 2 years for pneumococcal polysaccharide vaccine (PPV).

- Administer 1 dose of PCV to any unvaccinated child age 24–59 months. If they are at risk for invasive disease give a second dose 2 months after first dose.
- Administer PPV to certain high-risk groups age ≥2 years. See MMWR 2000; 49(RR-9):1-35.

6. Influenza vaccine. Minimum age: 6 months for trivalent inactivated influenza vaccine (TIV); 2 years for live, attenuated influenza vaccine (LAIV).

- Administer annually to all children age 6–59 months and to close contacts of children age 0 to 5 years.
- Administer annually to children age ≥5 years with risk factors, as well as other persons (including household members) in close contact with persons in groups at high risk. See MMWR 2006; 55(RR-10):1-41.
- For healthy persons age 2–49 years, use either LAIV or TIV.
- Children receiving TIV should receive 0.25 mL if age 6–35 months or 0.5 mL if age ≥3 years.
- Children age <9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time last season and only received 1 dose, should receive 2 doses separated by ≥4 weeks.

7. Measles, mumps, and rubella vaccine (MMR). Minimum age: 12 months.

- First dose must be given on or after first birthday.
- Second dose may be given before age 4–6 years, provided ≥4 weeks have elapsed since first dose.

8. Varicella vaccine. Minimum age: 12 months.

- First dose must be given on or after first birthday.
- Second dose may be given before age 4–6 years, provided that ≥3 months have elapsed since first dose. If second dose was administered ≥28 days after the first dose, it does not need to be repeated.

9. Hepatitis A vaccine (HepA). Minimum age: 12 months.

- Recommended for all children at 1 year of age (i.e., 12–23 months). Give second dose at least 6 months from first dose.
- Children not fully vaccinated by age 2 years can be vaccinated at a subsequent visit.
- Consider 2-dose catch-up vaccination for children through age 18.

10. Meningococcal conjugate vaccine (MCV4). Minimum age: 2 years.

- Administer MCV4 to children age 2–10 years with terminal complement deficiencies or anatomic or functional asplenia and those traveling to endemic areas. See MMWR 2007;56(48):1265-1266.

CDC's National Immunization Hotline (in English and Spanish):
800-CDC-INFO (1-800-232-4636), TTY 888-232-6348

www.health.state.mn.us/immunize
Minnesota Department of Health, IC#141-0188

Recommended Immunization Schedule for Minnesota 2008

****Chart must be used with guidelines below****

Vaccine ↓	Age ⇒	7–10 years	11–12 years	13–18 years
Diphtheria, Tetanus, Pertussis ¹		see footnote 1	Tdap	Tdap
Human Papillomavirus ²		see footnote 2	HPV (3 doses)	HPV (3 doses)
Meningococcal ³		MCV4	MCV4	MCV4 ³
Pneumococcal ⁴		PPV		
Influenza ⁵		Influenza (yearly)		
Hepatitis A ⁶		HepA (2 doses)		
Hepatitis B ⁷		HepB (2 or 3 doses)		
Inactivated Poliovirus ⁸		IPV Series (3 doses) ⁸		
Measles, Mumps, Rubella ⁹		MMR (2 doses)		
Varicella ¹⁰		Varicella (2 doses)		

Range of recommended ages
Catch-up vaccination
Certain high-risk groups

This schedule indicates the recommended ages for routine administration of currently licensed childhood vaccines, as of December 1, 2007, for children aged 7–18 years. For additional information see www.cdc.gov/vaccines/recs/schedules/default.htm. Any dose not administered at the recommended earlier age should be administered at any subsequent visit when indicated and feasible. Additional vaccines may be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of the combination are indicated and other components of the vaccine

are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult the respective ACIP statement for detailed recommendations. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at www.vaers.hhs.gov or by telephone, 800-822-7967.

1. Tetanus, diphtheria, and acellular pertussis vaccine (Tdap). *Minimum ages: 10 years for Boostrix and 11 years for Adacel.*

- Administer at age 11–12 years for those who have completed the recommended childhood DTP/DTaP series but have not received a Td booster dose.
- Adolescents 13–18 years who missed the 11–12 year Td/Tdap booster dose should also receive a single dose of Tdap if they have completed the recommended childhood DTP/DTaP series.

2. Human papillomavirus vaccine (HPV). *Minimum age: 9 years.*

- Administer HPV vaccine series to females at age 11–12 years.
- Administer the HPV vaccine series to females at age 13–18 years if not previously vaccinated.
- Administer second dose 2 months after first dose and third dose 6 months after first dose.
- If indicated, HPV vaccine may be given as young as age 9 years.

3. Meningococcal vaccine. *Minimum age: 2 years for both meningococcal conjugate vaccine (MCV4) and meningococcal polysaccharide vaccine (MPSV4).*

- Administer MCV4 at age 11–12 years and to previously unvaccinated adolescents age 13–18 years including previously unvaccinated college freshmen living in dormitories.
- Vaccination against invasive meningococcal disease is recommended for children and adolescents age ≥2 years with terminal complement deficiencies or anatomic or functional asplenia and to certain other high risk groups. See MMWR 2005;54 (RR-7):1-21.

4. Pneumococcal polysaccharide vaccine (PPV). *Minimum age: 2 years.*

- Administer to certain high risk groups. See MMWR 1997; 46(RR-08):1–24 and MMWR 2000; 49(RR-9):1–35.

5. Influenza vaccine. *Minimum age: 6 months for trivalent inactivated influenza vaccine (TIV); 2 years for live, attenuated influenza vaccine (LAIV).*

- Administer annually to children age ≥5 years with risk factors, as well as other persons (including household members) in close contact with persons in groups at high risk. See MMWR 2006; 55(RR-10):1–41.
- For healthy persons age 2–49 years, use either LAIV or TIV.

- Children age <9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time last season and only received 1 dose, should receive 2 doses separated by ≥4 weeks.

6. Hepatitis A vaccine (HepA). *Minimum age: 12 months.*

- Administer the 2 doses in the series at least 6 months apart.
- Consider 2-dose catch-up vaccination for children through age 18.

7. Hepatitis B vaccine (HepB). *Minimum age: birth.*

- Administer the series to those not previously vaccinated.

8. Inactivated poliovirus vaccine (IPV). *Minimum age: 6 weeks.*

- Children age 7–18 years, not previously vaccinated, should receive 3 doses of IPV. See catch-up schedule.
- If both OPV and IPV were administered as part of a series, a total of 4 doses should be given, regardless of child's current age.
- IPV is not routinely recommended for persons age 18 years and older.

9. Measles, mumps, and rubella vaccine (MMR). *Minimum age: 12 months.*

- If child was not previously vaccinated, administer 2 doses of MMR during any visit with ≥4 weeks between doses.

10. Varicella vaccine. *Minimum age: 12 months.*

- Administer 2 doses to persons without evidence of immunity.
- For persons age <13 years give 2 doses at least 3 months apart. Do not repeat second dose if administered ≥28 days after first dose.
- For persons age ≥13 years give 2 doses at least 4 weeks apart.





Recommended Adult Immunization Schedule

****Chart must be used with footnotes below****

Vaccine ↓	Age ⇒	19-49 years	50-64 years	≥65 years
Tetanus, Diphtheria, Pertussis ^{1*}		Booster every 10 years Substitute 1 dose of Tdap for Td		
Measles, Mumps, Rubella ^{2*}		1 or 2 doses		
Varicella ^{3*}		2 doses (0, 4-8 weeks)		
Human Papillomavirus ^{4*}		3 doses Females (0, 2, 6 months)		
Influenza ^{5*}		1 dose annually	1 dose annually	
Zoster ⁶				1 dose
Pneumococcal (polysaccharide) ⁷		1-2 doses		1 dose
Hepatitis A ^{8*}		2 doses (0, 6 months)		
Hepatitis B ^{9*}		3 doses (0, 1-2, 4-6 months)		
Meningococcal ^{10*}		1 or more doses		

*Covered by the Vaccine Injury Compensation Program (see back for more information)

 Recommended for all persons who meet the age requirements and who lack evidence of immunity (e.g., no documented vaccination or no evidence of prior infection)

 Recommended if some other risk factor is present (e.g., based on medical, occupational, lifestyle, or other indications)

Minnesota Department of Health

January 2007

The Minnesota Vaccines for Children Program (MnVFC)

What is the MNVFC program?

The Minnesota Vaccines for Children (MnVFC) program is an enhanced version of the federally funded Vaccines for Children program. MnVFC ensures that any Minnesota child whose family cannot afford immunizations can be vaccinated.

The MnVFC program at the Minnesota Department of Health (MDH) distributes \$15 million worth of vaccines annually.

Why was the program created?

Many parents cannot afford to pay for vaccines on their own. When large groups of children go without vaccines, it leaves them unprotected and vulnerable to disease and disease outbreaks can happen. This program eliminates cost as barrier to children getting their vaccines on time.

How does it work?

The program provides federally purchased vaccine for eligible children at no charge to MnVFC-enrolled public and private providers. It covers vaccines recommended and subsequently approved for the program by the federal Advisory Committee on Immunization Practices (ACIP).

Providers can charge a small administrative fee, which is set by federal law for each state, but providers cannot refuse to administer the vaccine due to a patient's inability to pay the fee. Providers screen patients for MnVFC eligibility at their clinics.

Who is eligible to participate?

Children from birth through 18 years of age who meet at least one of the following criteria:

- Medicaid eligible
- Uninsured
- American Indian or Alaska Native

- Underinsured (Note: the federal VFC program only allows these children to receive VFC vaccines at federally qualified health centers (FQHC) and rural health clinics (RHC). However, Minnesota uses other sources of funding to allow eligible children to get their vaccinations from their own medical provider.)

Is the MnVFC program the same as the federal VFC program?

Not exactly. The MnVFC program supplements the federal program with approximately \$ 3.5 million of discretionary federal 317 vaccine funds to expand eligibility for who can receive vaccine.

The federal VFC program is an entitlement program.

What are 317 funds?

The state receives federal money from section 317 of the federal Public Health Act. These are discretionary federal funds that must be specifically used to support the state's immunization program including the purchase of vaccine.

These 317 funds have allowed MDH to extend vaccine coverage to ensure that cost is not a barrier to all children being immunized. This includes:

- underinsured children under 18 years of age within their medical home
- college students requiring immunizations for college entrance in a Minnesota school
- newly arriving refugees
- uninsured immigrants applying for U.S. citizenship.

This 317 federal funding has remained level for about five years, despite growing costs as new vaccines are recommended and added to the immunization schedule. As a result, MDH has had to consider narrowing the criteria for who can receive vaccines purchased using 317 dollars.



Immunization Program
P.O. Box 64975
St. Paul, MN 55164-0975
651-201-5414
<http://www.health.state.mn.us/immunize>

MnVFC Program Continued – page 2

Additionally, in the future, this funding squeeze may mean that some uninsured persons may need to seek a FQHC or RHC in order to obtain certain vaccines, which is a barrier to immunizations for many, since these clinics are widely spaced geographically.

How does MnVFC interact with Medicaid and other Minnesota Health Care Programs?

- Medicaid is federally mandated to cover VFC-recommended vaccines for the Medicaid population.
- In addition, Minnesota law requires that all Minnesota Health Care Program providers who administer pediatric vaccines be enrolled in the MnVFC program. Minnesota Health Care Programs include Medical Assistance (MA), MinnesotaCare, General Assistance Medical Care (GAMC), and Prepaid Medical Assistance Programs (PMAP).
- The Department of Human Services (DHS) reimburses the MnVFC program for immunizations supplied by MnVFC for adults age 19 and older who are enrolled in a Minnesota Health Care program.

What are the benefits to parents, children, providers and the community?

- The MnVFC program saves parents and enrolled providers expenses for vaccine because providers receive public-purchased vaccines covered under this program;
- The program eliminates or reduces vaccine cost as a barrier to vaccinating eligible children;
- The program enables eligible children to receive immunizations in their medical home as part of their comprehensive health care rather than requiring them to seek immunizations from specified public clinics;
- The program makes it more likely that providers don't miss opportunities to vaccinate, so children are more likely to be fully immunized on time;
- MnVFC provides technical assistance to clinics to help improve their vaccination rates and overall immunization practices.

Additional goals of the program

While the primary goal of the program is to prevent disease by increasing immunization coverage in Minnesotans, it also focuses on safeguarding the viability of vaccines, which are very temperature and time sensitive. Therefore, a secondary goal of ensuring appropriate storage and handling will:

- ensure the efficacy of vaccines administered to patients, and
- prevent loss of valuable VFC vaccines through spoilage.

Who can I contact for more information?

For more information about immunizations in Minnesota, contact MDH's Immunization Program at 651-201-5503, toll-free 1-800-657-3970, or visit the Web site for the Immunization Program at <http://www.health.state.mn.us/immunize>.

The following is a brief description, including the strengths and weaknesses, of the different data sources for determining immunization rates.

1. The National Immunization Surveys (NIS): Child, Teen, and Adult

NIS-Childhood

The NIS-childhood survey was established in 1993 to provide an ongoing, consistent data set for analyzing vaccination levels among young children in the United States. This telephone survey of parents is conducted jointly by the National Center for Immunization and Respiratory Diseases (NCIR) and the National Center for Health Statistics (NCHS), both of which are within the Centers for Disease Control and Prevention (CDC).

The NIS looks at rates of being up to date with the national childhood Immunization Schedule, which is the doses of vaccines recommended by the ACIP.ⁱ For example, a child is up to date for DTaP if they have received four shots by 18 months of age.

Strengths:

- The survey uses a nationally representative sample (approximately 30,000 children) and provides estimates of coverage that are weighted to represent the entire population. This large sample size allows the NIS to stratify the data and examine vaccination rates among different groups, for instance, by income level, race, education level of mother, and other factors.
- The immunization information obtained is quite accurate because the survey follows up with a child's provider to verify the parent's response.

Weaknesses:

- The sample size for each state is not large, so the survey can only provide data on statewide immunization coverage, not community specific rates. This means the survey cannot breakdown race/ethnicity data by state. For example, in Minnesota, the NIS contacts 400 people for the survey, but usually fewer than 60 percent respond.
- The NIS only measures the "number of doses" a child receives by a certain age; it does not look to see if the doses were all valid – meaning that they were given at the appropriate age and time interval. A recent study found that when data from the NIS was evaluated relative to ACIP's nationally recommended schedule of childhood immunizations, not just the number of doses overall, 28 percent of children were not in compliance with the official vaccination recommendations. The study found that if the NIS could measure compliance with all ACIP recommendations, it would improve its value as a tool to assess and improve the quality of health care delivery and ensure children and communities are "optimally protected from vaccine-preventable diseases."ⁱⁱ

NIS-Teen

The NIS-Teen survey is very new and relatively small. The first survey was conducted in 2007 and only sampled 5,408 parents/guardians of teens ages 13 through 17 years. This survey asks questions similar to the NIS-childhood about vaccinations received during

adolescence. Like the NIS-childhood, the NIS-teen includes a request for the parent/guardian's permission to contact the medical providers who may have given vaccinations to the children to obtain shot-date information. The 2007 results provided no state-specific information. However, the 2008 teen survey will be much larger and will produce state-level immunization estimates as well as national estimates by race/ethnicity.

NIS-Adult

In 2003 and 2004, in conjunction with the NIS-childhood, CDC conducted the NIS-adult survey, which asked persons 18 and older about their recent experiences with and opinions about vaccinations for influenza, pneumococcal, human papillomavirus (HPV), tetanus/diphtheria (Td), tetanus/diphtheria/pertussis (Tdap), shingles, hepatitis B, and hepatitis A. In 2007, CDC conducted a smaller NIS-adult survey independent of the NIS-childhood one. The study was small and the results have not yet been published.

The strengths and weaknesses of the adult- and teen NIS survey are similar to the childhood-NIS survey.

2. The National Health Interview Survey

The National Health Interview Survey (NHIS) began in 1957 and has collected information on a variety of health issues from households in the United States. A child and adult immunization supplement has been included since 1991, with only a few questions on childhood immunization and only one question on influenza vaccination for adults. Since 1994, the information collected from households with children 12 to 35 months of age has been supplemented with information from health care provider records.

Strengths:

- It provides ongoing data collection and availability.
- It provides a historical perspective because it spans over 50 years.

Weakness:

- It cannot obtain state estimates of immunization coverage in children because of its limited sample size and because not all households surveyed contain eligible children, which means it also cannot collect state race/ethnic immunization data.
- It has a large sampling error on estimates for population sub-groups as well as a two-to five-year delay in data availability.
- Because the survey's main focus is overall health, not immunization rates, it offers only limited immunization information.

3. The Behavioral Risk Factor Surveillance Survey

The Behavioral Risk Factor Surveillance Survey (BRFSS) is a telephone survey that began in 1984 and is conducted by each state health department with technical assistance from the National Centers for Chronic Disease Prevention.

Strength:

- It provides states, and the nation, with a variety of information on emerging health problems, and it assists in establishing and tracking health objectives and developing, implementing, and evaluating an array of disease prevention activities.

Weaknesses:

- Few of the survey questions focus on immunizations.
- The sample size in Minnesota is not large enough to allow analysis by race/ethnicity. It should be noted that most other states collect race data.

4. Minnesota Retrospective Kindergarten Survey

Between 1989 and 2001, the Minnesota Department of Health (MDH) conducted a series of retrospective kindergarten surveys to determine the immunization status of 2-year-olds in the state based on their school immunization records. The survey only evaluated immunizations required for school entry at kindergarten. There were three comprehensive surveys examining records of all kindergartners in the state ($n \cong 67,000$), during the 1992-93, 1996-97, and 2001-02 school years. All three of these surveys collected race/ethnic data. Smaller surveys involving random samples of schools throughout the state were conducted in between the comprehensive surveys. These smaller surveys did not collect race/ethnic data.

The purpose of these retrospective surveys were to measure statewide progress toward Minnesota's year 2000 and 2010 immunization goals, which are to create a system that ensures that all geographic areas, racial and ethnic groups, and socio-economic strata receive age-appropriate immunizations such that 90 percent of children are up to date when assessed within two months of the date(s) on which they were to be vaccinated. These surveys provided an unprecedented level of immunization coverage data, down to the zip code level.

Strengths:

- The retrospective survey capitalized on existing infrastructure, in that schools are required by law to keep immunization records on every student, so a high percentage of records were available.
- These types of surveys have high completion rates. Even during the years when MDH conducted smaller surveys, we were able to get a representative sample of Minnesota children. Although the child's demographic and immunization information was recorded from school records and not verified by parents or providers, an MDH audit of provider records after completion of the survey found the immunization information to be reliable.

Weakness:

- It is not timely data, as the data collected are five years old.
- These types of surveys are very labor intensive, especially for school nurses and local public health officials.

The Minnesota Department of Health stopped conducting these surveys, in part, because they were a burden on local public health and schools, requiring high cost and staff time.

In addition, MDH had planned on using data from the Minnesota Immunization Information Connection (MIIC) (an immunization registry) for this type of survey. However, MIIC has not been able to fill this role as quickly as hoped. (See MIIC discussion below.) Further, despite gradually increasing rates, MDH continued seeing the same pattern of immunization rates on each of the surveys so it did not seem useful to continue conducting them.

5. Annual School and Child Care Immunization Status Reports

The Minnesota School Immunization Law, Minnesota Statutes, Section 121A.15, subd. 8, requires schools and child care facilities to annually report immunization information. These reports offer an aggregate picture of what is happening with immunization rates across the state.

The school report is called the Annual Immunization Survey Report (AISR) and covers kindergarten through 12th grade. The report includes information on the number of students enrolled in the school, the percentage of students vaccinated against each disease, and the number of students who exempt out of each vaccine. The survey collects information in the aggregate and does not collect race/ethnic data. MDH collects this information in the late fall and reports it to the Centers for Disease Control and Prevention (CDC) by April of the following year.

By law, child care facilities must also annually report immunization information to MDH. They must report the number of children enrolled in the facility, the number with no immunizations, the number who received an exemption, and the number with partial or full immunization histories. The report does not collect information on race/ethnicity. The CDC does not require states to report child care immunization information to them.

Strength:

- The surveys collect aggregate data on immunization coverage from every school and every licensed child care center in the state.

Weakness:

- They do not collect any individual immunization data on students or children enrolled in a child care center, thus there is no racial/ethnic data collected.

6. Minnesota Immunization Information Connection (MIIC)

The Minnesota Immunization Information Connection (MIIC) is an information system used by health care providers, public health agencies, and schools. MIIC is a confidential, computerized information system that contains a record of a person's immunizations no matter where they got their shots.

Strengths:

- All immunization records are available in a single location, regardless of where the patients received care or where they live in Minnesota.
- Data on children reflect the person's current status (allowing 30 days for data to get into MIIC) as opposed to the data from the retrospective kindergarten surveys that can be up to five years old.

Weaknesses:

- Although MIIC does contain Minnesota birth records, it does not yet contain every Minnesotan's immunization record. About 93 percent of all Minnesota children ages 0 to 6 years have two or more shots in their record in MIIC; however, there are fewer adult immunization records in the system. For instance, data on influenza vaccination is not as complete as other vaccines in MIIC because it is burdensome for clinics to enter it manually due to the volume of influenza vaccinations given each year. Also, MIIC data is entered either electronically from billing systems or by direct data entry. Since data from billing systems usually contain only those shots administered by the clinic, any historical shots noted on a patient's paper medical record need to be entered manually into MIIC. Thus, data can be incomplete in some instances. This includes any historical data for children who have not been in the system since birth, including information on race/ethnicity. These problems will get better as MIIC becomes more incorporated with other electronic medical records (EMR) systems. This problem is similar to other issues for health systems transitioning to an EMR system; it is not unique to MIIC. In addition, in 2009, MDH will be aggressively working with health plans and providers to input historical immunization data on their patients into MIIC. MDH is also working with the Department of Human Services to upload immunization data on Medicaid patients into MIIC.
- Not all providers participate in MIIC. Even though a majority of clinics that serve children participate in MIIC, not all of them do. Eighty-seven percent of Minnesota Vaccines For Children (MnVFC) providers are enrolled in MIIC. MDH does not have good data on the number of providers that work with adults, such as internists and OB/GYNs, participating in MIIC.
- MIIC uses the mother's race on the birth certificate to identify the race/ethnicity of the child in MIIC. Some people feel that this may not be completely accurate. In addition, MIIC may not contain information on a person's race/ethnicity if they were not born in Minnesota because it is not a required field in MIIC.

ⁱ Vaccinations included in the NIS-childhood survey are: diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP); poliovirus vaccine (polio); measles-containing vaccine (MCV); *Haemophilus influenzae* type b vaccine (Hib); hepatitis B vaccine (hep B); varicella zoster vaccine, pneumococcal conjugate vaccine (PCV), hepatitis A vaccine (hep A), and influenza vaccine.

ⁱⁱ Luman ET, Shaw KM, Stokley SK. Compliance with vaccination recommendations for U.S. children. *Am J Prev Med* 2008 June;34(6):463-470.

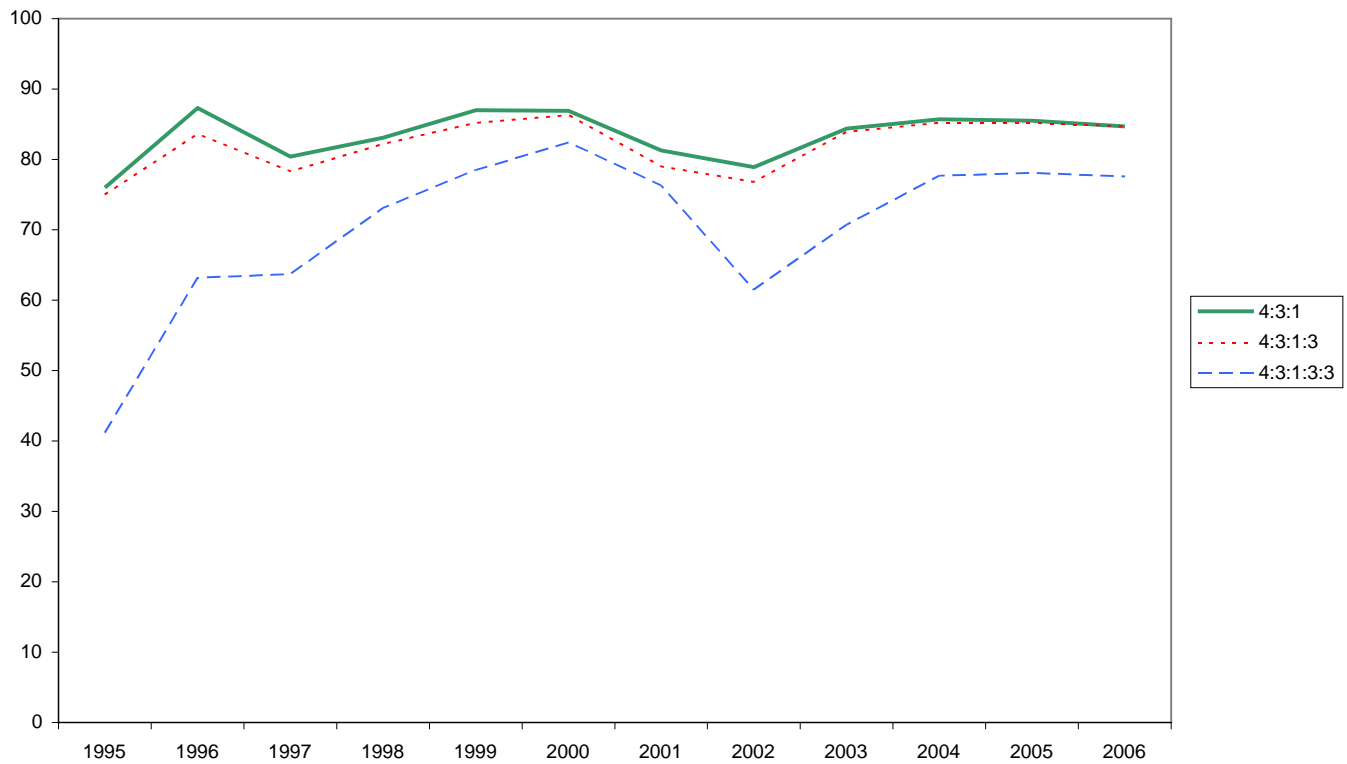
**Eliminating Health Disparities Initiative (EHDI) Baseline
for Disparities in Child Immunization Rates**

**2001-2002 Immunization Levels for Primary Series (Percent Up to Date)
by Race/Ethnicity and Age in Months**

Race (Number of Children)	4 Mo	6 Mo	8 Mo	17 Mo	20 Mo	24 Mo
White, non Hispanic (48,317)	95%	91%	86%	81%	80%	85%
American Indian (1,072)	91%	80%	67%	71%	65%	73%
Asian/Pacific Islander (3,331)	82%	69%	59%	65%	58%	66%
Hispanic/Latino (3,079)	87%	79%	70%	66%	58%	65%
African American, non-Hispanic/Latino (4,599)	78%	68%	58%	61%	55%	62%

Source: 2001 Minnesota Retrospective Kindergarten Survey

Estimated Vaccination Coverage with Selected Vaccination Series Among Children 19-35 Months of Age in Minnesota



National Immunization Survey,
<http://www.cdc.gov/vaccines/stats-surv/imz-coverage.htm#nis>



VACCINES FOR CHILDREN PROGRAM

WHAT IS THE PUBLIC HEALTH ISSUE?

In the past, private providers referred children to public health department clinics for vaccinations when the children lacked health insurance or their health insurance did not cover vaccinations. Since 1994, the Vaccines for Children (VFC) program, established by Section 1928 of the *Social Security Act*, has allowed children to receive vaccinations as part of routine care, supporting the reintegration of vaccination and primary care. The VFC program serves children through 18 years of age, without insurance, those eligible for Medicaid, American Indian/Alaska Native children, and underinsured children who receive care through Federally Qualified Health Centers (FQHCs) or Rural Health Centers (RHCs). To potentially reach all eligible children under the VFC program, federally purchased vaccines are distributed to public health clinics and enrolled private providers. CDC provides funding to 61 state, local, and territorial immunization programs to support program operations and provide vaccines to participating providers.

Because pediatric vaccine shortages place children and adolescents at an increased risk of preventable infectious diseases, an emergency reserve of vaccine is needed. Therefore, CDC through the VFC program is in the process of building a six-month stockpile of all routinely recommended childhood immunizations to ameliorate short-term supply disruptions or outbreaks of diseases that could be treated with the vaccines held in the stockpile.

WHAT HAS CDC ACCOMPLISHED?

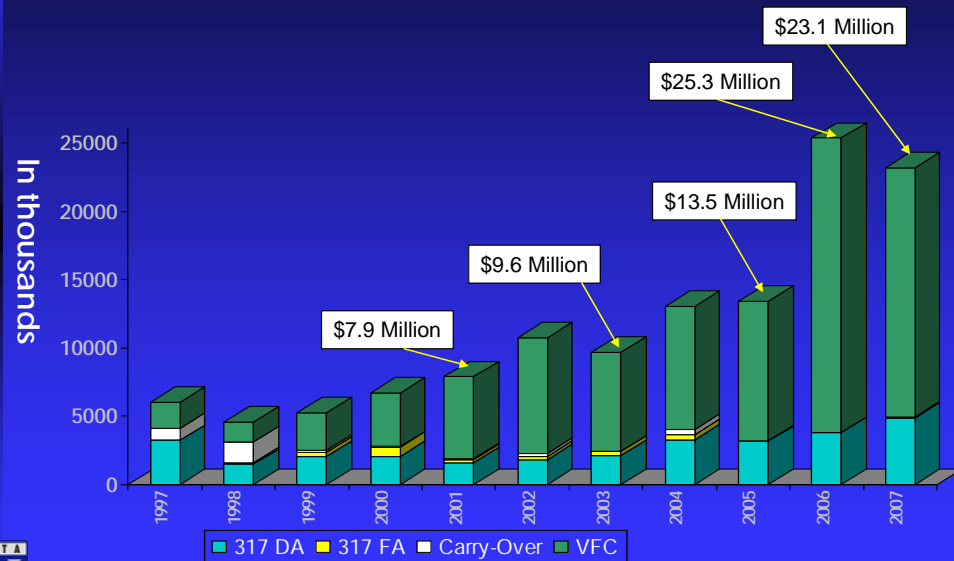
The VFC program is CDC's largest public-private partnership. The VFC program provides publicly purchased vaccines for use by all participating providers. These vaccines are given to eligible children without cost for the vaccines to the provider or the parent. In 2006, the VFC program purchased approximately 62 million doses of routinely recommended pediatric and adolescent vaccines for distribution in the United States. In FY 2006, CDC provided approximately \$1.7 billion in VFC funds to state, local, and territorial public health agencies for the purchase of routinely recommended vaccines. Additional funds support some program operations related to the VFC program (vaccine ordering and distribution as well as quality assurance activities with VFC providers) and the establishment of a pediatric vaccine stockpile. VFC funds also support the Vaccine Management Business Improvement Project (VMBIP), a comprehensive review and update of the public pediatric vaccine supply chain from the distribution of vaccine through a central distributor directly to the point of administration (either public clinic or private provider's office). The goals of VMBIP are to achieve efficiencies of scale, improve the visibility of vaccine inventory and achieve potential savings in distribution costs.

By decreasing referrals to public health departments, the VFC program has improved the continuity of care, promoted the "medical home" concept, and contributed to high vaccination coverage levels for young children. In addition, because the VFC program entitles all eligible children to the benefits of newly recommended vaccines, the program provides access to newly recommended vaccines for children in low-income and uninsured families so they do not lag behind children in middle- and upper-income families. As a result of this increased access to recommended vaccines, community immunity levels are strengthened, and children have decreased risks of serious illness and death from vaccine-preventable diseases.

The nation's childhood immunization coverage rates are at record high levels for every vaccine and for all vaccination series measures. As childhood immunization coverage rates increase, cases of vaccine preventable diseases decline significantly. Vaccination coverage has increased greatly for new vaccines such as pneumococcal conjugate vaccine (PCV); coverage for three or more doses in 2005 was 83 percent, a 10 percent increase over 2004 coverage levels. Eliminating health disparities among racial and ethnic populations in the United States is a major public health goal. According to 2005 National Immunization Survey data, there is no statistically significant difference in immunization rates between black and white children nationwide, although pockets of low coverage continue to exist.

The VFC Program provides approximately 43% of all routinely recommended childhood vaccines in the United States. Vaccines

History of Federal Vaccine Awards Minnesota, 1997 - 2007



History of the Minnesota School Immunization Law

In 1967, the Minnesota Legislature enacted the Minnesota School Immunization Law (Minnesota Statutes, section 121A.15). At that time, many states were encouraged to enact measles requirements as part of a national effort to improve measles control. In the late 1960s and early 1970s, measles was a disease primarily of unvaccinated school-age children. In studies of states without measles immunization requirements, measles incidence rates were from 1.7 to 2.0 higher than states that had school immunization laws.

Minnesota's School Immunization Law has been amended numerous times to remain consistent with current immunization recommendations and to address gaps identified through enforcement. Specifically, these amendments made the law consistent with recommendations of the American Academy of Pediatrics, the American Academy of Family Physicians, the U.S. Public Health Service's Advisory Committee on Immunization Practices, and the Immunization Practices Task Force of the Minnesota Department of Health.

The school law has always allowed exemptions for medical and religious reasons.

Below is a summary of the various provisions of the law and the year they became effective.

- | | |
|------|--|
| 1967 | <ul style="list-style-type: none"> Required measles immunization prior to kindergarten. |
| 1973 | <ul style="list-style-type: none"> Added rubella for kindergarten and included child care enrollees and nursery schools. |
| 1978 | <ul style="list-style-type: none"> Added polio; diphtheria, tetanus, pertussis (DTP); and mumps. Changed the religious exemption to "conscientiously held beliefs" of parent/guardian. |
| 1980 | <ul style="list-style-type: none"> Expanded law to include all grades, kindergarten through 12 "in order to enroll or remain enrolled." Set the minimum age for measles immunization at 11 months, 15 days. |
| 1988 | <ul style="list-style-type: none"> Increased the minimum age for a child to have received measles vaccine to 12 months. Removed the exemption for mumps immunization for students 7 years of age and older. Removed the exemption for rubella immunization for girls 12 years of age and older. |
| 1989 | <ul style="list-style-type: none"> Expanded law to include Early Childhood Special Education (ECSE) children. Required that documentation of immunizations administered after 1/1/90 indicate month, day, and year. Required the transfer of immunization information from high school records |

to a post-secondary educational institution.

- Enacted the **College Immunization Law**, Minnesota Statutes, section 135.14. This statute covers all private and public two- and four-year colleges, universities, and other post-secondary institutions (e.g., private vocational schools).
- 1992
- Added the **second dose of measles, mumps, and rubella** to seventh and 12th grades and by 1996-97 to seventh *through* 12th grades.
 - Added **Hib** (*Haemophilus influenza* type b disease, which is a major cause of meningitis in young children) for children in child care and ECSE.
- 1996
- Added **tetanus/diphtheria (Td) booster** for seventh and 12th grades, and by 1998-99 for seventh *through* 12th grades.
- 1997
- Added language to give elementary and secondary schools the flexibility to grant temporary exemptions of up to 30 days for **transfer students**.
 - Added an exemption of up to five days for children placed in a **crisis nursery**.
- 2000
- Added **hepatitis B for kindergarten**.
- 2001
- Expanded **hepatitis B for seventh grade**.
 - Required all post-secondary educational institutions to provide information on the transmission, treatment, and prevention of **hepatitis A, B, and C** to all persons who are first-time enrollees.
- 2003
- Shortened the **grace period** that school-age children can complete a required vaccine series from 18 to 8 months.
 - Allowed vaccine doses administered four or fewer days before the **minimum age** required in law to be considered valid.
 - Required post-secondary educational institutions to provide information on the risk of **meningococcal disease** and the availability of an effective vaccine to each individual who is a first-time enrollee and resides in on-campus housing.
- 2004
- Added **chickenpox** (varicella) to kindergarten and seventh grade.
 - Added **pneumococcal** conjugate for child-care enrollees who are 2 months or older but less than 24 months.
 - Moved the **second dose of measles, mumps, and rubella** to kindergarten.
 - Eliminated the **second dose of measles, mumps, and rubella** for seventh through 12th grades after the 2011-2012 school year.

EHDI GRANTEES WITH IMMUNIZATION AS PART OF THEIR PROGRAM

Organization	Geographic Area	Project Summary
Center for Asian and Pacific Islanders	Twin Cities metro area	To educate the targeted communities' populations to better understand their health and preventions; to help them navigate the health care system in this country; and to help them understand the importance of immunizations. Oftentimes our clients think that immunizations are for children only and that prevention is not that important.
Centro Campesino	Steele, Le Sueur, Rice, Waseca, Dodge, and Mower counties	Empowering migrant agricultural workers and rural Latino/as to become leaders in the promotion of community physical, economic and social health and towards eliminating health disparities between Latino/as and whites in Minnesota. Specific areas of focus are improved access to medical services and health information; increased adult farmworker and rural Latino/a access to tetanus vaccine; increased early detection and treatment of breast and cervical cancer; diabetes prevention and improved diet and lifestyle of Latino/as with type 2 diabetes; and HIV/AIDS/STD prevention within the migrant agricultural worker and rural Latino/a communities of this region.
Council on Crime and Justice	Twin Cities Metro Area & Correctional facilities	Reducing the rate of HIV, Hepatitis C, and other STD's among offenders and ex-offenders of color in Minnesota by increasing the capacity of this population to advocate for their own health care and increasing pro-activeness in seeking health resources. The project emphasizes immunizations as well as activities that prevent infant mortality and violence prevention
Dar Al-Hijrah Cultural Center	Twin Cities Metro Area	To open a health-screening center staffed by Somali health professionals to provide culturally and linguistically competent services. The focuses are on: Immunization for adults and children, Cardiovascular, Diabetes, and Breast and Cervical Cancer.
Mille Lacs Reservation	Mille Lacs Band of Ojibwe Tribal Lands	To work with the people of the Mille Lacs Band of Ojibwe to define strengths, provide needs assessments, evaluate resources, develop programs that will meet the needs of the people, provide referrals, coordinate services with other providers, provide education and training and honor the culture and traditions of the people.
Olmsted County Public Health Services	Olmsted county	Diabetes and cardiovascular disease prevention through community based health promotion activities. We will also do limited health promotion activities focusing on childhood immunizations with our community partners. Examples include: Health Education classes and presentations to School age youth, Health Fairs, Group Health Promotion Activities, Media Campaigns, and Screening Events.
Stairstep Foundation	Twin Cities metro area	A unique model that uses the community of faith to raise awareness, increase collaboration, and build capacity while empowering congregations and individuals to take charge of their health. Through this initiative pastors and elders of different denominations have established relationships to restore community health. We have also established relationships with health professionals and agencies to bring resources and screening to the church sites.
The Storefront Group	Dakota, city of Bloomington	Bridges to Success is specifically designed to educate Somali parents about the importance of immunization and record keeping. The program also works as a bridge between schools and Somali families through collaboration with school nurses to insure school age children are fully immunized. In addition, the Bridge to Success program provides assistance and information to families to assist in navigating the health care system.



Protecting, maintaining and improving the health of all Minnesotans

MEMORANDUM

DATE: March 26, 2008
TO: Tribal Nursing Directors
FROM: Chris VanBergen, Health Educator
SUBJECT: Greetings from the Immunization, Tuberculosis, and International Health Section!

The Immunization, Tuberculosis, and International (Refugee) Health (ITIH) section at the Minnesota Department of Health wants to take this opportunity to share some of our information and resources with you. In this folder you will find the following items:

- *Got Your Shots? EXTRA* memo regarding the recent vaccine injury case in Georgia
 - including resources for more information
- Can I Get Free or Low-Cost Immunizations? Minnesota Vaccines for Children (MnVFC) fact sheet
- What is the Minnesota Immunization Information Connection (MIIC)? fact sheet
- Got Your Shots? NEWS for March 2008
 - See box at the end that includes a contact for subscribing to this monthly newsletter
- Reliable Sources for Immunization Information
- Immunization Materials for Professional Use order form
- Immunization Materials for Public Use order form
- Post-It Notes
- Who to call about vaccine storage mishaps magnet
- Pneumococcal Vaccination Pocket Guide
- Perinatal Hepatitis B Prevention Pocket Guide
- Keep Vaccines Safe! magnet
- Memo regarding Minnesota's 2008 Childhood/Adolescent and Adult Immunization Schedules
- HPV Addition/Correction for the 2008 Immunization Schedules
- Childhood/Adolescent Immunization Schedule
- Adult Immunization Schedule
- Contact information for the Tuberculosis (TB) program
- Mantoux Tuberculin Skin Test Models Kits information
- Save the Date – TB Intensive course information

I know this is a lot of materials, but we hope that all or most of it will be helpful to you in your work. Please feel free to contact Sharon Smith with any questions and she will pass them on to us or you can contact me directly at 651-201-5558 or Christine.vanbergen@health.state.mn.us.

*ITIH Section * P.O. Box 64975 * St. Paul, MN 55164-0975*

General Information: 651-201-5414, 1-877-676-5414 * TDD/TTY: (651) 201-5797 * Minnesota Relay Service: (800) 627-3529

For directions to any of the MDH locations, call (651) 201-5000 * An equal opportunity employer

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For more information, contact:
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