14

Immunization and Infectious Diseases

Lead Agency: Centers for Disease Control and Prevention

Contents

Goal

Prevent disease, disability, and death from infectious diseases, including vaccine-preventable diseases.

Overview

Infectious diseases remain major causes of illness, disability, and death. Moreover, new infectious agents and diseases are being detected, and some diseases considered under control have reemerged in recent years. In addition, antimicrobial resistance is evolving rapidly in a variety of hospital- and community-acquired infections. These trends suggest that many challenges still exist in the prevention and control of infectious diseases.

Issues

Between 1980 and 1992, the number of deaths from infectious diseases rose 58 percent in the United States.[1] Even when human immunodeficiency virus (HIV)-associated diagnoses are removed, deaths from infectious diseases still increased 22 percent during this period. (See Focus Area 13. HIV.) Considered as a group, three infectious diseases—pneumonia, influenza, and HIV infection—constituted the fifth leading cause of death in the United States in 1997.[1]

The direct and indirect costs of infectious diseases are significant. Every hospital-acquired infection adds an average of $2,100 to a hospital bill. Bloodstream infections result in an average of $3,517 in additional hospital charges per infected patient because the patient stay averages an additional 7 days. A typical case of Lyme disease diagnosed in the early stages incurs about $174 in direct medical treatment costs. Delayed diagnosis and treatment, however, can result in complications that cost from $2,228 to $6,724 per patient in direct medical costs in the first year alone.[2]

Infectious diseases also must be considered in a global context. Increases in international travel, importation of foods, inappropriate use of antibiotics on humans and animals, and environmental changes multiply the potential for worldwide epidemics of all types of infectious diseases. International cooperation and collaboration on disease surveillance, response, research, and training are essential to prevent or control these epidemics. Actions taken to improve health in one country affect the health of people worldwide.

Vaccines. Vaccines are biological substances that interact with the person's immune system to produce an immune response identical to that produced by the natural infection.

Vaccines can prevent the debilitating and, in some cases, fatal effects of infectious diseases. Vaccines help to eliminate the illness and disability of polio,[3] measles, and rubella.[4] However, the organisms that cause these diseases have not disappeared. Rather, they have receded and will reemerge if the vaccination coverage drops. The serious health burden of vaccine-preventable diseases (VPDs) is evident from the measles resurgence of 1989 to 1991, resulting in more than 55,000 cases, 11,000 hospitalizations, 120 deaths, and $100 million in direct medical care costs.[5, 6, 7, 8]

Vaccines protect more than the vaccinated individual. They also protect society. When vaccination levels in a community are high, the few who cannot be vaccinated—such as young children and persons with contraindications to vaccination—often are indirectly protected because of group immunity (in other words, they live among vaccinated persons who may offer protection from exposure to disease).

Vaccines provide significant cost benefits. Three childhood vaccines—diphtheria, tetanus toxoids, and acellular pertussis vaccine (DTaP); measles, mumps, and rubella vaccine (MMR); and *Haemophilus influenzae* type b (Hib) vaccine—result in substantial direct medical savings for each dollar spent to vaccinate children against these diseases. Varicella vaccine saves roughly 90 cents in direct medical costs for every dollar invested. Consideration of indirect savings—prevention of work loss by parents to care for ill children and prevention of death and therefore lost earnings from disability—shows that vaccines routinely recommended for children are highly cost saving. Savings range from $24 for every dollar spent on DTaP to $2 for the more recently approved Hib vaccine.[9]

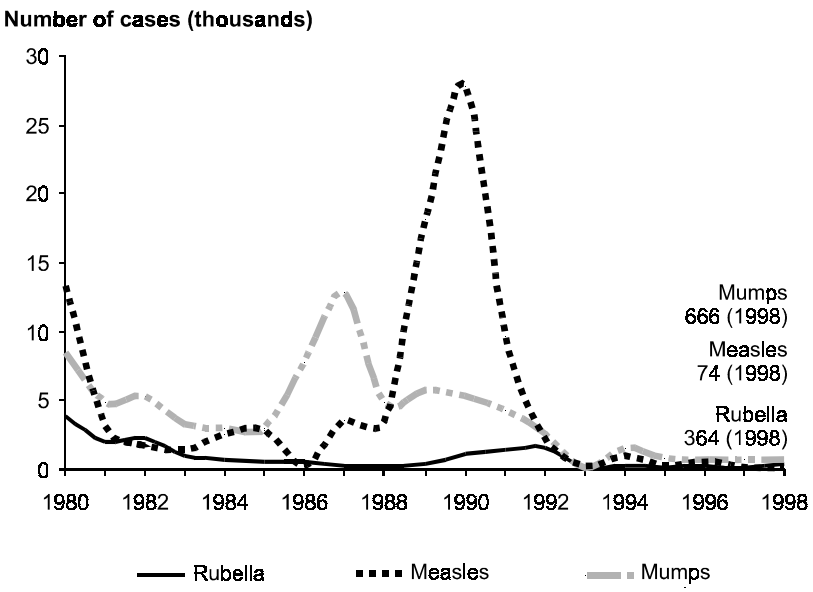
Trends

Significant progress has been made in reducing indigenous (not imported) cases of VPDs. The occurrence of many VPDs is at or near record-low levels. Most diseases have been reduced by more than 95 percent from peak prevaccine levels.[10]

In 1998, overall vaccination coverage for children aged 19 to 35 months was at record-high levels.[11] Antigen-specific rates have shown striking progress since 1992.[12] For example, coverage for three or more doses of polio vaccine increased from 72 percent to 91 percent, and coverage for three or more doses of Hib vaccine increased from 28 percent to 93 percent. Significant achievements were made among racial and ethnic groups in that most of the 1996 goals for the Childhood Immunization Initiative were met for individual vaccines.[13] Since 1989, vaccination requirements have been expanded for schools and day care settings.[12] As of the 1998–99 school year, all States required vaccination against diphtheria, measles, and polio. Similarly, all States and the District of Columbia now require vaccination for children in day care.[14]

In 1996, a vaccine against hepatitis A virus (HAV) was licensed that has the potential to reduce the health burden of this disease. The vaccine is now recom-

Vaccine-Preventable Diseases: Number of Cases of Rubella, Measles, and Mumps
(By year, United States, 1980–98)



Source: CDC, EPO. National Notifiable Diseases Surveillance System (NNDSS), 1980–98.

mended primarily for high-risk groups. To decrease HAV transmission, universal vaccination was recommended in 1999 for children who lived in States where the rate of new cases was greater than two times the national average.[15]

Financing for childhood vaccinations has improved significantly as a result of two initiatives—Vaccines for Children and the State Children's Health Insurance Program (SCHIP)—that cover children on Medicaid, uninsured children, and American Indian and Alaska Native children. Underinsured children who receive vaccinations at federally qualified health centers also are covered. Because they promote free vaccines for children, these programs eliminate vaccine cost as a barrier to childhood vaccination. Also, the Public Health Service Act, Section 317 immunization grant program and State funds provide free vaccines for children not covered by other programs.

Vaccination rates among persons aged 65 years and older continued to increase over the decade. Influenza vaccine coverage rates were up from 33 percent in 1989 to 64 percent in 1998, and pneumococcal vaccine coverage rates were up from 15 percent to 46 percent. Despite these increases, coverage rates for certain racial and ethnic groups remain substantially below the general population.[16]

Invasive diseases invade the bloodstream and cause distant infection. The most common types of invasive disease caused by Hib are meningitis, epiglottitis, pneumonia, certain types of arthritis, and cellulitis. Conjugate vaccines—licensed in 1990 for use beginning at age 2 months—are highly effective in protecting

against Hib meningitis and other invasive diseases caused by Hib. These vaccines also interrupt spread of the disease-causing organism by affecting the organism's nasopharyngeal colonization. New cases of Hib meningitis declined by 96 percent from 1987 to 1995.[17] During that period, bacterial meningitis caused by one of the five leading agents (*Haemophilus influenzae*, *Streptococcus pneumoniae*, *Neisseria meningitidis*, group B *Streptococcus* [GBS], and *Listeria monocytogenes*) fell by 55 percent. Bacterial meningitis was traditionally a disease of childhood, infecting children with a median age of 15 months in 1986.[18] Following the dramatic reduction in Hib meningitis, which primarily occurs among children under age 2 years, the median age of persons with the disease shifted to 25 years in 1995.[18] The success of conjugate vaccines against Hib disease has stimulated efforts to develop conjugate vaccines for other pathogens, including *Streptococcus pneumoniae*, *Neisseria meningitidis*, and GBS. A conjugate vaccine against *S. pneumoniae* has been licensed, and vaccines against the other two agents are being tested in clinical trials. The success of bacterial meningitis vaccines suggests comparable results may be achieved for other causes of meningitis, sepsis, and pneumonia as their conjugate vaccines become used more routinely in target populations.

Disparities

The updated *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century* focuses on certain emerging infectious disease issues and on particular groups of people at risk.[19] Historically, childhood vaccination rates have been lower in certain racial and ethnic populations, compared to the white population. Vaccination rates for preschool children in racial and ethnic groups with lower vaccination rates, however, have been increasing at a more rapid rate, significantly narrowing the gap.

Efforts need to be intensified, particularly to increase vaccination coverage for children living in poverty. Substantial numbers of undervaccinated children remain in some areas, particularly the large urban areas with traditionally underserved populations, creating great concern because of the potential for outbreaks of disease.

In addition to very young children, many adults are at increased risk for VPDs. Vaccination against pneumococcal infections and influenza among persons aged 65 years and older has increased slightly for African Americans and Hispanics. The coverage in these groups, however, remains substantially below the general population. For example, influenza vaccination rates for whites were 66 percent in 1997, while for African Americans and Hispanics, rates were only 45 percent and 53 percent, respectively. In September 1997, the U.S. Department of Health and Human Services approved a plan to improve adult vaccination rates and reduce disparities among racial and ethnic groups.[20] The elimination of disparities, however, may require further interventions in particular geographic, cultural, and racial and ethnic populations.

Opportunities

A coordinated strategy is necessary to understand, detect, control, and prevent infectious diseases. Such a strategy will protect the gains achieved in life expectancy in the 20th century from control and prevention of infectious diseases and ensure further improvements in the 21st century.

Priority issues include antimicrobial resistance, foodborne and waterborne diseases, vector-borne and zoonotic diseases, diseases transmitted through transfusion of blood or blood products, and vaccine development and use. Some of these diseases and pathogens were unknown 20 years ago. Others are reemergent problems once thought under control. At-risk populations include persons with impaired host defenses; pregnant women and newborns; travelers, immigrants, and refugees; older adults; and other persons identified by the Advisory Committee on Immunization Practices (ACIP).

The major strategies to protect people from VPDs are the following:[21]

- Improving the quality and quantity of vaccination delivery services.
- Minimizing financial burdens for needy persons.
- Increasing community participation, education, and partnership.
- Improving monitoring of disease and vaccination coverage.
- Developing new or improved vaccines and improving vaccine use.

These strategies include a broad range of interventions for children, such as entry requirements for school and promoting the Vaccines for Children and SCHIP initiatives, in which eligible children are vaccinated in their medical home. Assessment of vaccination coverage of persons served at individual clinics and provider offices with feedback of the results to the individual providers to guide them in improving performance also is important. The exchange of information on coverage assessment among colleagues stimulates a friendly competition to achieve better vaccination levels.[22] Populations at risk of undervaccination can be reached through linkages with other programs, including Women, Infants, and Children (WIC) services.[23] State and local registries that enroll children and record their vaccinations are valuable tools for helping parents and providers to identify immunization needs of individual children, assessing coverage in individual practices, and generating communitywide estimates.[24]

In the United States, most VPDs occur among adults. Pneumococcal disease and influenza account for more than 30,000 deaths annually, most of which occur in elderly persons. Studies have consistently shown that focusing efforts to improve coverage on health care providers, as well as health care systems, is the most effective means of raising vaccine coverage in adults. For example, all health care providers should assess routinely the vaccination status of their patients. Likewise, health plans should develop mechanisms for assessing the vaccination status of

their participants. Also, nursing home facilities and hospitals should ensure that policies exist to promote vaccination.

Because no vaccine is completely safe, vaccine safety research and monitoring are necessary to identify and minimize vaccine-related injuries. As programs continue to reduce the new cases of VPDs, concerns about vaccine adverse events have emerged, posing a threat to public acceptance of vaccines. Knowing the safety profile of vaccines is essential to assess accurately the risks and benefits, to formulate appropriate vaccine recommendations, and to address public concerns.

Interim Progress Toward Year 2000 Objectives

Significant progress has been made in reaching the Healthy People 2000 objectives. Reductions in indigenous cases of VPDs have been dramatic. For example, measles was reduced from a 1988 baseline of 3,396 indigenous cases to a total of only 74 in 1998. Substantial progress also has been made in reducing hepatitis B virus (HBV) transmission. The vaccine against hepatitis A provides the opportunity to reduce the burden of this disease. Achieving the year 2000 objective to reduce new cases of bacterial meningitis was entirely due to the introduction of Hib conjugate vaccines for infants.[25] In 1998, individual coverage levels for children aged 19 to 35 months were at record high levels. For example, individual coverage levels for three or more doses of polio, three or more doses of diphtheria/tetanus/acellular pertussis, one or more doses of measles/mumps/rubella, and three or more doses of Hib vaccines were each at or above 91 percent. Progress also has been made in expanding immunization requirements for schools and day care settings. Data for viral hepatitis indicate that targets for hepatitis B and C were met in the early 1990s.

Note: Unless otherwise noted, data are from the Centers for Disease Control and Prevention, National Center for Health Statistics, *Healthy People 2000 Review, 1998–99*.

Immunization and Infectious Diseases

Goal: Prevent disease, disability, and death from infectious diseases, including vaccine-preventable diseases.

Number	Objective Short Title
Diseases Preventable Through Universal Vaccination	
14-1	Vaccine-preventable diseases
14-2	Hepatitis B in infants and young children
14-3	Hepatitis B in adults and high-risk groups
14-4	Bacterial meningitis in young children
14-5	Invasive pneumococcal infections
Diseases Preventable Through Targeted Vaccination	
14-6	Hepatitis A
14-7	Meningococcal disease
14-8	Lyme disease
Infectious Diseases and Emerging Antimicrobial Resistance	
14-9	Hepatitis C
14-10	Identification of persons with chronic hepatitis C
14-11	Tuberculosis
14-12	Curative therapy for tuberculosis
14-13	Treatment for high-risk persons with latent tuberculosis infection
14-14	Timely laboratory confirmation of tuberculosis cases
14-15	Prevention services for international travelers
14-16	Invasive early onset group B streptococcal disease
14-17	Peptic ulcer hospitalizations
14-18	Antibiotics prescribed for ear infections
14-19	Antibiotics prescribed for common cold
14-20	Hospital-acquired infections
14-21	Antimicrobial use in intensive care units

Vaccination Coverage and Strategies

14-22 Universally recommended vaccination of children aged 19 to 35 months

14-23 Vaccination coverage for children in day care, kindergarten, and first grade

14-24 Fully immunized young children and adolescents

14-25 Providers who measure childhood vaccination coverage levels

14-26 Children participating in population-based immunization registries

14-27 Vaccination coverage among adolescents

14-28 Hepatitis B vaccination among high-risk groups

14-29 Influenza and pneumococcal vaccination of high-risk adults

Vaccine Safety

14-30 Adverse events from vaccinations

14-31 Active surveillance for vaccine safety

Diseases Preventable Through Universal Vaccination

14-1. Reduce or eliminate indigenous cases of vaccine-preventable diseases.

Target and baseline:

Objective	Reduction in Vaccine-Preventable Diseases	1998 Baseline	2010 Target
		Number of Cases	
14-1a.	Congenital rubella syndrome (children under age 1 year)	7	0
14-1b.	Diphtheria (persons under age 35 years)	1	0
14-1c.	*Haemophilus influenzae* type b* (children under age 5 years)	163	0
14-1d.	Hepatitis B (persons aged 2 to 18 years)	945†	9
14-1e.	Measles (persons of all ages)	74	0
14-1f.	Mumps (persons of all ages)	666	0
14-1g.	Pertussis (children under age 7 years)	3,417	2,000
14-1h.	Polio (wild-type virus) (persons of all ages)	0	0
14-1i.	Rubella (persons of all ages)	364	0
14-1j.	Tetanus (persons under age 35 years)	14	0
14-1k.	Varicella (chicken pox) (persons under age 18 years)	4 million‡	400,000

*Includes cases with type b and unknown serotype.

†Estimated hepatitis B cases for 1997.[26]

‡Data based on average from 1990–94 for persons of all ages.

Target setting method: Total elimination for congenital rubella syndrome, diphtheria, *Haemophilus influenzae* type b, measles, mumps, polio, rubella, and tetanus; 41 percent improvement for pertussis; 99 percent improvement for hepatitis B; and 99 percent improvement for varicella.

Data sources: National Notifiable Disease Surveillance System (NNDSS), CDC, EPO; National Congenital Rubella Syndrome Registry (NCRSR), CDC, NIP—congenital rubella syndrome; Active Bacterial Core Surveillance (ABCs),

Emerging Infections Programs, CDC, NCID—*Haemophilus influenzae* type b; National Health Interview Survey (NHIS), CDC, NCHS—varicella.

Highly effective vaccines are used routinely in childhood for prevention of measles, mumps, rubella, varicella, diphtheria, tetanus, pertussis, polio, hepatitis B, and invasive Hib disease.[27] Vaccinations for these diseases have reduced reported cases of most VPDs common in childhood to record-low levels.[11, 26, 28] Measles transmission probably was interrupted multiple times in the United States since 1993.[29, 30, 31] With a high level of coverage of two doses of measles, mumps, and rubella vaccine, interruption of the spread of both rubella and mumps is feasible.[32, 33] Recent outbreaks of rubella and a number of cases of congenital rubella syndrome, however, highlight the importance of ensuring rubella immunity, particularly in women of child-bearing age and foreign-born adults.[34] Polio has been eliminated in the United States due to high vaccination coverage. Although polio is expected to be eradicated globally, surveillance for cases of the disease will continue. Because of widespread vaccination, reported cases of diphtheria are near zero.[35, 36] Tetanus toxoid is highly effective, but with the absence of group immunity, all persons must be vaccinated to achieve the goal of zero cases.[37] Pertussis among children will be reduced by increasing vaccination coverage, but the disease will continue to occur because the organism circulates among older age groups, and the vaccine is not 100 percent effective.[38, 39]

Hepatitis B virus (HBV) infection will be reduced greatly as the age groups covered by universal infant and adolescent vaccination efforts enter young adulthood, a period when the risk of HBV infection increases.

Conjugate vaccines for prevention of Hib are highly effective and have led to near elimination of invasive Hib disease.[17, 40] Further reductions in new cases are anticipated as Hib vaccine coverage increases.

The licensure of new vaccines against common diseases that are not reportable diseases, such as varicella, has created new challenges for surveillance and evaluation. Without national reporting, documenting the impact of national and State vaccination programs and measuring progress for reducing indigenous cases of disease are difficult.[41] However, with an increase in vaccination coverage and a decline in the number of new cases, varicella is expected to become a reportable condition.

14-2. Reduce chronic hepatitis B virus infections in infants and young children (perinatal infections).

Target: 400 infections.

Baseline: 1,682 chronic hepatitis B virus infections in children under age 2 years were reported in 1995.

Target setting method: 76 percent improvement.

Data sources: Perinatal Hepatitis B Prevention Program, CDC, NCID; National Vital Statistics System (NVSS), CDC, NCHS; State Perinatal Hepatitis B Prevention Programs; State Vital Statistics Systems.

Each year, 16,000 to 18,000 children in the United States are born to mothers infected with HBV.[42] Without prevention programs, about 8,000 of these infants would become infected with HBV. Ninety-five percent of the infections, however, are preventable through appropriate maternal screening and infant care.[43]

Screening pregnant women during an early prenatal visit is essential to identify those who are infected. Women at high risk should be retested late in pregnancy. In 1997, 14 States had laws or regulations to ensure such screening.

To be maximally effective, steps to prevent transmission of HBV to infants born to mothers who are infected must begin as soon as the child is born. Such infants should receive a first dose of hepatitis B vaccine within 12 hours of birth, along with hepatitis B immune globulin (HBIG), and two more doses of vaccine by age 6 months. Children need to be tested between the ages of 12 and 15 months to ensure that they are not infected and have developed immunity to the virus.

14-3. Reduce hepatitis B.

Target and baseline:

Objective	Reduction in Hepatitis B	1997 Baseline	2010 Target
	Adults	*Rate per 100,000 Population*	
14-3a.	19 to 24 years	24.0	2.4
14-3b.	25 to 39 years	20.2	5.1
14-3c.	40 years and older	15.0	3.8
	High-risk groups	*Number of Cases*	
14-3d.	Injection drug users	7,232	1,808
14-3e.	Heterosexually active persons	15,225	1,240
14-3f.	Men who have sex with men	7,232	1,808
14-3g.	Occupationally exposed workers	249	62

Target setting method: Better than the best for 14-3a, 14-3b, and 14-3c; 75 percent improvement for 14-3d, 14-3f, and 14-3g; 92 percent improvement for 14-3e.

Data sources: National Notifiable Disease Surveillance System (NNDSS), CDC, EPO; Sentinel Counties Study of Viral Hepatitis, CDC, NCID.

Select Age Groups, 1997	Hepatitis B Cases		
	14-3a. Aged 19 to 24 Years	14-3b. Aged 25 to 39 Years	14-3c. Aged 40 Years and Older
	Rate per 100,000		
TOTAL	24.0	20.2	15.0
Race and ethnicity			
American Indian or Alaska Native	16.0	20.1	10.9
Asian or Pacific Islander	42.2	30.4	33.2
Asian	DNC	DNC	DNC
Native Hawaiian and other Pacific Islander	DNC	DNC	DNC
Black or African American	48.3	32.5	27.6
White	10.4	10.2	7.4
Hispanic or Latino	16.9	16.0	18.1
Not Hispanic or Latino	25.2	20.7	14.8
Black or African American	50.6	34.1	28.4
White	10.3	10.2	7.1
Gender			
Female	24.1	15.4	9.4
Male	22.5	24.1	20.8
Family income level			
Poor	DNC	DNC	DNC
Near poor	DNC	DNC	DNC
Middle/high income	DNC	DNC	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

To reduce HBV transmission in the United States by 2010, vaccination programs must be targeted to adolescents and adults in high-risk groups. The primary means of achieving high levels of vaccination coverage in groups with behavioral risk factors for HBV infection is to identify settings where these individuals can be vaccinated. Such sites include clinics that treat sexually transmitted diseases (STDs), correctional facilities (juvenile detention facilities, prisons, jails), drug treatment clinics, and community-based HIV prevention sites. The primary means of achieving high levels of vaccine coverage among household and sex contacts of the estimated 1.25 million persons in the United States with chronic HBV infection are programs that offer followup for all hepatitis B surface antigen (HBsAg)-positive persons reported to State and local health departments.

Routine infant vaccination eventually will produce a highly immune population sufficient to eliminate HBV transmission in the United States. However, high rates of acute hepatitis B continue to occur, with an estimated 65,000 cases in 1996. Most cases occur in young adult risk groups, including persons with a history of multiple sex partners, men who have sex with men, injection drug users, incarcerated persons, and household and sex contacts of persons with HBV infection. Investigation of reported cases of acute hepatitis B indicates that as many as 70 percent of these individuals previously had been seen in settings, such as drug treatment clinics, correctional facilities, or clinics for the treatment of STD, where they could have received vaccine.

14-4. Reduce bacterial meningitis in young children.

Target: 8.6 new cases per 100,000 children aged 1 through 23 months.

Baseline: 13.0 new cases of bacterial meningitis per 100,000 children aged 1 through 23 months were reported in 1998.

Target setting method: 34 percent improvement. (Better than the best will be used when data are available.)

Data source: Active Bacterial Core Surveillance (ABCs), CDC, NCID.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Children Aged 1 Through 23 Months, 1998	New Cases of Bacterial Meningitis
	Rate per 100,000
TOTAL	13.0
Race and ethnicity	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	25.9
White	11.0
Hispanic or Latino	DSU
Not Hispanic or Latino	DSU
Black or African American	DSU
White	DSU
Gender	
Female	13.0
Male	13.1

Children Aged 1 Through 23 Months, 1998	New Cases of Bacterial Meningitis
	Rate per 100,000
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

Children aged 1 month through 23 months have higher rates of meningitis than older children. New vaccines for pneumococcal disease, including pneumococcal meningitis, may help protect young children. Meningococcal conjugate vaccines are in clinical trials and may become available for widespread use before 2010, although it is not yet known whether they will be targeted to young children. Pneumococcal conjugate vaccines, modeled after the successful construction of Hib conjugate vaccines, are also in clinical trials. Before 2010, licensure and widespread use of these new products are expected.

14-5. Reduce invasive pneumococcal infections.

Target and baseline:

Objective	Reduction in Invasive Pneumococcal Infections	1997 Baseline	2010 Target
		Rate per 100,000	
	New invasive pneumococcal infections		
14-5a.	Children under age 5 years	76	46
14-5b.	Adults aged 65 years and older	62	42
	Invasive penicillin-resistant pneumococcal infections		
14-5c.	Children under age 5 years	16	6
14-5d.	Adults aged 65 years and older	9	7

Target setting method: Better than the best.

Data sources: Active Bacterial Core Surveillance (ABCs), CDC, NCID; Arctic Investigations Program (for data on pneumococcal disease rates among Alaska Natives), CDC.

Select Age Groups, 1997	New Cases of Invasive Pneumococcal Infections		New Cases of Invasive Penicillin-Resistant Pneumo-coccal Infections	
	14-5a. Under Age 5 Years	14-5b. Aged 65 Years and Older	14-5c. Under Age 5 Years	14-5d. Aged 65 Years and Older
	Rate per 100,000			
TOTAL	76	62	16	9
Race and ethnicity				
American Indian or Alaska Native	DSU	DSU	DSU	DSU
Asian or Pacific Islander	58	DSU	DSU	DSU
Asian	DSU	DSU	DSU	DSU
Native Hawaiian and other Pacific Islander	DSU	DSU	DSU	DSU
Black or African American	154	83	20	9
White	63	61	17	9
Hispanic or Latino	59	43	7	DSU
Not Hispanic or Latino	DSU	DSU	DSU	DSU
Black or African American	DSU	DSU	DSU	DSU
White	DNC	DNC	DNC	DNC
Gender				
Female	69	61	14	9
Male	84	62	17	9
Family income level				
Poor	DNC	DNC	DNC	DNC
Near poor	DNC	DNC	DNC	DNC
Middle/high income	DNC	DNC	DNC	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

The number of invasive penicillin-resistant pneumococcal infections can be reduced by lowering the proportion of invasive pneumococcal infections due to drug-resistant strains or by decreasing invasive pneumococcal infections in general. The objectives for specific age groups address the key age groups at risk for invasive pneumococcal infections. Among children under age 5 years, promoting judicious antibiotic use may reverse the current trends toward increasing proportions of infections being caused by drug-resistant strains. For adults aged 65 years and older, licensure and widespread use of pneumococcal conjugate vaccines by

2010 could reduce dramatically all invasive pneumococcal infections, and judicious antibiotic use may have some impact on the proportion of pneumococcal infections caused by drug-resistant strains. In this age group, a much greater impact potentially is achievable through improved use of licensed 23-valent pneumococcal polysaccharide vaccine for the prevention of invasive pneumococcal disease. Increasing the use of this vaccine for elderly persons could have a beneficial impact on the rate of drug-resistant invasive pneumococcal infections.

Diseases Preventable Through Targeted Vaccination

14-6. Reduce hepatitis A.

Target: 4.5 new cases per 100,000 population.

Baseline: 11.3 new cases of hepatitis A per 100,000 population were reported in 1997.

Target setting method: Better than the best.

Data source: National Notifiable Disease Surveillance System (NNDSS), CDC, EPO.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Total Population, 1997	New Hepatitis A Cases
	Rate per 100,000
TOTAL	11.3
Race and ethnicity	
American Indian or Alaska Native	23.1
Asian or Pacific Islander	4.6
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	6.0
White	8.1
Hispanic or Latino	24.2
Not Hispanic or Latino	9.8
Black or African American	6.3
White	7.3
Gender	
Female	8.1
Male	12.8

Total Population, 1997	New Hepatitis A Cases
	Rate per 100,000
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC
Sexual orientation	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

The health status objectives for hepatitis A virus (HAV) will not be achieved until a vaccination strategy is implemented that produces high levels of immunity in children. Children have the highest rates of hepatitis A and are a primary source for new infections in the community. In 1999, the Advisory Committee on Immunization Practices (ACIP) recommended routine hepatitis A vaccination for children living in States with consistently elevated rates of hepatitis A as the approach most likely to prevent and control transmission of HAV.[15] Hepatitis A vaccine is included in the Vaccines for Children program. Incorporation of hepatitis A vaccine into the routine childhood vaccination schedule would facilitate implementation of these recommendations, but data are needed to determine the appropriate dose and timing of vaccination in the first or second year of life. Implementation of the recommendations also would be enhanced by the development of vaccines that combine HAV antigen with other antigens.

Although routine immunization of children is the approach most likely to decrease significantly the overall rates of hepatitis A in a community, it may take some time before the impact of implementing these programs is measurable. In the interim, persons in groups at high risk of HAV infection should be vaccinated routinely. These groups include:

- Illicit drug users.
- Men who have sex with men.
- Persons traveling to HAV-endemic countries (see objective 14-15).
- Persons with occupational risk of infection—that is, persons who work with HAV-infected primates or with HAV in a research laboratory. No other occupational groups have been shown to be at increased risk of exposure.
- Persons with chronic liver disease.

14-7. Reduce meningococcal disease.

Target: 1.0 new cases per 100,000 population.

Baseline: 1.3 new cases of meningococcal disease per 100,000 population were reported in 1997.

Target setting method: Better than the best.

Data sources: Active Bacterial Core Surveillance (ABCs), Emerging Infections Program Network, CDC, NCID; National Notifiable Diseases Surveillance System (NNDSS), CDC, EPO.

Total Population, 1997	New Cases of Meningococcal Disease
	Rate per 100,000
TOTAL	1.3
Race and ethnicity	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	1.9
White	1.2
Hispanic or Latino	DSU
Not Hispanic or Latino	DNC
Black or African American	DNC
White	DNC
Gender	
Female	1.2
Male	1.3
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

The polysaccharide meningococcal vaccine currently available in the United States is recommended for certain high-risk groups (people with asplenia), for laboratory personnel routinely exposed to *Neisseria meningitidis*, and for travelers

to regions where meningococcal disease is hyperendemic or epidemic (the African "meningitis belt"). Routine vaccination of civilians is not recommended because of its relative ineffectiveness in children under age 2 years (among whom risk of endemic disease is highest) and its relatively short duration of protection. The vaccine is useful for controlling serogroup C meningococcal epidemics; these account, however, for less than 5 percent of the cases of meningococcal disease that occur each year in the United States. The vaccine provides no protection against serogroup B meningococci, which account for approximately one-third of the disease overall in the United States.

New meningococcal conjugate vaccines against serogroups C and Y, which account for two-thirds of current disease, now are undergoing clinical trials. Soon they should be available for incorporation into routine childhood immunization as well as for vaccination of high-risk groups, possibly including college students. Similar to Hib conjugate vaccines, new meningococcal conjugate vaccines are expected to be effective in children.

Development and licensing of new serogroup B meningococcal vaccines also will help reduce meningococcal disease.

14-8. Reduce Lyme disease.

Target: 9.7 new cases per 100,000 population in endemic States.

Baseline: 17.4 new cases of Lyme disease per 100,000 population were reported in 1992–96.

Target setting method: 44 percent improvement. (Better than the best will be used when data are available.)

Data source: National Notifiable Disease Surveillance System (NNDSS), CDC, EPO.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Total Population, 1992–96	New Cases of Lyme Disease
	Rate per 100,000
TOTAL	17.4
Race and ethnicity	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DSU
Black or African American	DSU
White	DSU

Total Population, 1992–96	New Cases of Lyme Disease
	Rate per 100,000
Hispanic or Latino	DSU
Not Hispanic or Latino	DSU
Black or African American	DSU
White	DSU
Gender	
Female	17.2*
Male	19.2*
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.
*Note: Data do not include Pennsylvania.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

In 1991, a standardized case definition for Lyme disease was adopted by the Council of State and Territorial Epidemiologists. Since then, the number of reported cases of Lyme disease has increased from 8,257 in 1993 to 16,455 in 1996 because of increased surveillance as well as a true increase in new cases. From 1992 through 1996, 92 percent of cases were reported from 10 endemic States. New initiatives to prevent Lyme disease include the implementation of community-based prevention programs, host-targeted acaricides to reduce the numbers of vector ticks, and appropriate use of Lyme disease vaccine.

Infectious Diseases and Emerging Antimicrobial Resistance

14-9. Reduce hepatitis C.

Target: 1 new case per 100,000 population.

Baseline: 2.4 new cases of hepatitis C per 100,000 population in selected counties were reported in 1996.

Target setting method: Better than the best.

Data source: Sentinel Counties Study of Viral Hepatitis, CDC, NCID.

Total Population, 1996	New Hepatitis C Cases
	Rate per 100,000
TOTAL	2.4
Race and ethnicity	
American Indian or Alaska Native	DNC
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	DSU
White	3.0
Hispanic or Latino	DSU
Not Hispanic or Latino	DSU
Black or African American	DSU
White	DSU
Gender	
Female	2.0
Male	2.8
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.
Note: Data represent rates based on estimates from selected counties.

Hepatitis C virus (HCV) is the most common chronic bloodborne viral infection in the United States.[44] This virus usually is transmitted through large or repeated percutaneous exposures to blood—for example, through sharing of equipment between injection drug users. HCV infects persons of all ages, but most new cases are among young adults aged 20 to 39 years. The highest proportion of new cases is among whites, but the highest rates of new cases are among nonwhite racial and ethnic groups.

14-10. (Developmental) Increase the proportion of persons with chronic hepatitis C infection identified by State and local health departments.

Potential data sources: State health department databases of persons with HCV infection; National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

An estimated 2.7 million persons in the United States are infected chronically with HCV. Although the annual number of newly acquired HCV infections has declined from an estimated 180,000 in the mid-1980s to an estimated 28,000 in 1995, this reservoir of chronically infected persons can transmit the virus to others, and all of them are at risk for the severe consequences of chronic liver disease. Because of the large number of people with chronic HCV infection, identification of these persons must be a major focus of a comprehensive prevention strategy. Identification of HCV-infected persons allows (1) counseling to prevent further HCV transmission, (2) vaccination against HAV and HBV to prevent additional liver damage, (3) evaluation for chronic liver disease, (4) possible antiviral therapy, and (5) counseling to avoid potential hepatotoxins, such as alcohol, that may increase the severity of HCV-related liver disease.

14-11. Reduce tuberculosis.

Target: 1.0 new case per 100,000 population.

Baseline: 6.8 new cases of tuberculosis per 100,000 population were reported in 1998.

Target setting method: Better than the best.

Data source: National TB Surveillance System, CDC, NCHSTP.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Total Population, 1998	New Tuberculosis Cases
	Rate per 100,000
TOTAL	6.8
Race and ethnicity	
American Indian or Alaska Native	11.2
Asian or Pacific Islander	34.9
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	17.4
White	3.8
Hispanic or Latino	13.6
Not Hispanic or Latino	5.9
Black or African American	17.8
White	2.3
Gender	
Female	5.0
Male	8.6

Total Population, 1998	New Tuberculosis Cases
	Rate per 100,000
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

The 1989 *Strategic Plan for the Elimination of TB in the United States*[45] set a tuberculosis elimination goal of reducing TB to 1 new case per million by 2010, with an interim goal of 3.5 cases per 100,000 population by 2000. However, in the mid-1980s the trend toward TB elimination was reversed, and drug-resistant strains emerged that were even more deadly. TB cases increased by 20 percent between 1985 and 1992. Renewed efforts to combat the resurgence included improving laboratories, strengthening surveillance and expanding directly observed therapy, and expediting investigation of close contacts of TB patients. From 1993 through 1998, new cases of TB again declined, although the resurgence and related outbreaks set back TB elimination efforts by about a decade. Elimination of TB depends on significant effort and cooperation between public and private health care providers and agencies at the Federal, State, and local levels.

14-12. Increase the proportion of all tuberculosis patients who complete curative therapy within 12 months.

Target: 90 percent of patients.

Baseline: 74 percent of those tuberculosis patients reported in 1996 and started on therapy completed therapy within 12 months.

Target setting method: Better than the best.

Data source: National TB Surveillance System, CDC, NCHSTP.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Tuberculosis Patients, 1996	Completed Curative Therapy Within 12 Months
	Percent
TOTAL	74
Race and ethnicity	
American Indian or Alaska Native	82
Asian or Pacific Islander	75
Asian	DNC

Tuberculosis Patients, 1996	Completed Curative Therapy Within 12 Months
	Percent
Native Hawaiian and other Pacific Islander	DNC
Black or African American	72
White	74
Hispanic or Latino	73
Not Hispanic or Latino	74
Black or African American	72
White	75
Gender	
Female	75
Male	73
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

The highest priority for TB control is to ensure that persons with the disease complete curative therapy. If treatment is not continued for a sufficient length of time, such persons often become ill and contagious again. Completion of therapy is essential to prevent transmission of the disease as well as to prevent outbreaks and the development and spread of drug-resistant TB.

Current therapy guidelines recommend that patients with drug-susceptible TB should complete a successful regimen within 12 months.[46] Multidrug-resistant TB presents difficult treatment problems, often requiring consultation with a TB specialist and longer treatment regimens. The measurement of completion of therapy is a long-accepted indicator of the effectiveness of community TB control efforts. Health departments traditionally have reported completion-of-therapy results to CDC and have used this information locally and statewide as an evaluation measure.

14-13. Increase the proportion of contacts and other high-risk persons with latent tuberculosis infection who complete a course of treatment.

Target: 85 percent.

Baseline: 62 percent of tuberculosis contacts and other high-risk persons who started on treatment for latent TB infection in 1997 completed treatment.

Target setting method: 27 percent improvement. (Better than the best will be used when data are available.)

Data source: Aggregate Reports for TB Reports Evaluation, CDC, NCHSTP.

Data for population groups currently are not collected.

Treatment for latent TB infection substantially reduces the risk that TB infection will progress to disease. Certain groups are at very high risk of developing TB disease once infected. Identifiable population groups at high risk for TB vary in time and geographic area, depending on unique and changing TB-related demographics.[47]

14-14. Reduce the average time for a laboratory to confirm and report tuberculosis cases.

Target: 2 days for 75 percent of cases.

Baseline: 21 days were needed for a laboratory to confirm and report 75 percent of TB cases in 1996.

Target setting method: 90 percent improvement.

Data source: Survey of State Public Health Laboratories, CDC, NCHSTP.

Commercially available nucleic acid amplification tests are capable of detecting *Mycobacterium tuberculosis* in a specimen within 48 hours of receipt. Concerns regarding sensitivity, cost, quality control, and special expertise requirements prevent widespread use of such tests. Upgrading TB laboratory capabilities and facilities, improving training in state-of-the-art mycobacteriology, and evaluating proficiency should better enable State public health laboratories to apply these new rapid tests to the diagnosis of TB.

14-15. (Developmental) Increase the proportion of international travelers who receive recommended preventive services when traveling in areas of risk for select infectious diseases: hepatitis A, malaria, and typhoid.

Potential data source: *Abstract of International Travel to and from the United States*, U.S. Department of Commerce.

The number of international travelers from the United States has increased an average of 3 percent a year for the past decade. The three diseases highlighted in this objective—hepatitis A, malaria, and typhoid—account for a large proportion of illness and disability for international travelers. Before embarking, some travelers go to a travel clinic, some visit primary care providers, and some receive no pretravel care.

An appropriate prescription of antimalarial prophylaxis medications constitutes recommended preventive services for this disease. Risk areas can be identified by referencing the malaria section in the most recent edition of *Health Information for International Travel*.

14-16. Reduce invasive early onset group B streptococcal disease.

Target: 0.5 new cases per 1,000 live births.

Baseline: 1.0 new case of invasive early onset group B streptococcal disease per 1,000 live births was reported in 1996.

Target setting method: Better than the best.

Data source: Active Bacterial Core Surveillance (ABCs), Emerging Infections Program Network, CDC, NCID.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Live Births, 1996	New Cases of Group B Streptococcal Disease
	Rate per 1,000
TOTAL	1.0
Race and ethnicity	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	1.5
White	1.0
Hispanic or Latino	DSU
Not Hispanic or Latino	DSU
Black or African American	DSU
White	DSU

Live Births, 1996	New Cases of Group B Streptococcal Disease
	Rate per 1,000
Gender	
Female	DNA
Male	DNA
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

The number of new cases of early onset group B streptococcal (GBS) disease in 1996 reflected a substantial decline from earlier years, before intervention became common practice. GBS causes bloodstream infections and meningitis in babies. Additional prevention is possible, because occurrence of the disease is more likely to reflect ineffective prevention efforts than antibiotic failures. In certain areas, rates approximating 0.5 per 1,000 births already have been achieved. Although these data may represent the background rate of nonpreventable cases, most geographic areas should be able to achieve the same low rates. The racial disparity in rates will be eliminated with more aggressive use of prevention protocols.

African Americans consistently have had higher rates of GBS diseases than other races. Implementation of GBS prevention policies is expected to eliminate the disparity. Thus, the target of 0.5 new cases per 1,000 births is one that can be obtained in all geographic areas and all racial and ethnic groups. By the year 2010, reductions in early onset disease might be the result of both improved use of intrapartum antibiotic prophylaxis and implementation of GBS conjugate vaccines currently in clinical trials.

14-17. Reduce hospitalizations caused by peptic ulcer disease in the United States.

Target: 46 hospitalizations per 100,000 population.

Baseline: 71 hospitalizations per 100,000 population occurred in 1998 (age adjusted to the year 2000 standard population).

Target setting method: Better than the best.

Data source: National Hospital Discharge Survey (NHDS), CDC, NCHS.

Total Population, 1998	Peptic Ulcer Hospitalizations
	Rate per 100,000
TOTAL	71
Race and ethnicity	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	80
White	52
Hispanic or Latino	DSU
Not Hispanic or Latino	DSU
Black or African American	DSU
White	DSU
Gender	
Female	64
Male	79
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.
Note: Age adjusted to the year 2000 standard population.

Peptic ulcer disease affects up to 25 million persons in the United States and causes up to 6,500 deaths each year. Until recently, peptic ulcers were thought to be caused by stress, spicy foods, and excess stomach acid. Most patients were treated with antacids or acid-reducing medications, and recurrences were the rule after therapy was discontinued. The discovery in the 1980s that a bacterial organism, *Helicobacter pylori (H. pylori)*, causes up to 90 percent of peptic ulcers has changed the way ulcers are evaluated and managed.[48, 49] Now appropriate antibiotic regimens successfully eradicate the infection and prevent recurrence and complications such as bleeding or perforation.

Despite extensive scientific data linking peptic ulcer disease to *H. pylori*, studies indicate that many health care providers and consumers are unaware of the relationship, and many persons with ulcers do not receive appropriate therapy.[50, 51] A campaign to educate health care providers and consumers about *H. pylori* and its link to peptic ulcer disease was initiated in 1997. The Centers for Disease Con-

trol and Prevention (CDC) and Partnership *H. pylori* Educational Campaign includes partners from academic institutions, government agencies, and industry.[52] The increased awareness of the link between *H. pylori* and ulcers among health care providers and consumers is expected to lead to the increased use of appropriate antibiotics. This improved treatment, if available to those who need it, should decrease hospitalization rates—an indicator for severe illness and disability—due to peptic ulcer disease and its complications.

14-18. Reduce the number of courses of antibiotics for ear infections for young children.

Target: 88 antibiotic courses per 100 children under age 5 years.

Baseline: 108 antibiotic courses for otitis media per 100 children under age 5 years were prescribed during 1996–97 (2-year average).

Target setting method: 19 percent improvement.

Data sources: National Ambulatory Medical Care Survey (NAMCS), CDC, NCHS; National Hospital Ambulatory Medical Care Survey (NHAMCS), CDC, NCHS.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Children Under Age 5 Years, 1996–97	Courses of Antibiotics for Ear Infections
	Rate per 100
TOTAL	108
Race and ethnicity	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	84
White	116
Hispanic or Latino	DSU
Not Hispanic or Latino	DSU
Black or African American	DSU
White	DSU

Children Under Age 5 Years, 1996–97	Courses of Antibiotics for Ear Infections
	Rate per 100
Gender	
Female	107
Male	109
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

Antibiotic courses for otitis media, commonly called ear infection, can be reduced through two methods. A portion of otitis media cases—otitis media with effusion rather than acute otitis media—do not require antimicrobial treatment. A national campaign for judicious antibiotic use aims to reduce inappropriate antibiotic treatment for this portion of otitis media.[53] The leading cause of otitis media is pneumococcus. Preventing pneumococcal otitis media is expected to be possible following licensure of pneumococcal conjugate vaccines. (See Focus Area 28. Vision and Hearing.)

14-19. Reduce the number of courses of antibiotics prescribed for the sole diagnosis of the common cold.

Target: 1,268 antibiotic courses per 100,000 population.

Baseline: 2,535 antibiotic courses per 100,000 population were prescribed for the sole diagnosis of the common cold, 1996–97.

Target setting method: 50 percent improvement.

Data sources: National Ambulatory Medical Care Survey (NAMCS), CDC, NCHS; National Hospital Ambulatory Medical Care Survey (NHAMCS), CDC, NCHS.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Total Population, 1996–97	Courses of Antibiotics for Common Cold
	Rate per 100,000
TOTAL	2,535
Race and ethnicity	
American Indian or Alaska Native	DSU

Total Population, 1996–97	Courses of Antibiotics for Common Cold
	Rate per 100,000
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	DSU
White	2,431
Hispanic or Latino	DSU
Not Hispanic or Latino	DSU
Black or African American	DSU
White	DSU
Gender	
Female	2,644
Male	2,421
Family income level	
Poor	DNC
Near poor	DNC
Middle/high income	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

The common cold does not require antimicrobial therapy. Inappropriate therapy for the common cold can be reduced by 50 percent by promoting judicious anti-microbial use, provided that caregivers and patients accept that antibiotics are ineffective in treating colds. Effective programs for the judicious use of antibiotics could help reduce the prescription of antibiotics for the common cold.

14-20. Reduce hospital-acquired infections in intensive care unit patients.

Target and baseline:

Objective	Reduction in Hospital-Acquired Infections in Intensive Care Units	1998 Baseline	2010 Target
		Infections per 1,000 Days' Use	
	Intensive care unit patients		
14-20a.	Catheter-associated urinary tract infection	5.9	5.3
14-20b.	Central line-associated blood-stream infection	5.3	4.8
14-20c.	Ventilator-associated pneumonia	11.1	10.0
	Infants weighing 1,000 grams or less at birth in intensive care		
14-20d.	Central line-associated blood-stream infection	12.2	11.0
14-20e.	Ventilator-associated pneumonia	4.9	4.4

Target setting method: 10 percent improvement. (Better than the best will be used when data are available.)

Data source: National Nosocomial Infections Surveillance System (NNIS), CDC, NCID.

Data for population groups currently are not collected.

Hospital-acquired infections are a leading cause of illness and death in the United States. Each year, 36 million patients are admitted to U.S. hospitals.[54] Annually, more than 500,000 of the nearly 2 million patients stricken with a hospital-acquired infection are intensive care patients. Of the total, nearly 90,000 die. The annual cost of hospital-acquired infections is approximately $4.5 billion a year. In the past 20 years, the rate of hospital-acquired infections has increased 36 percent.

The rate of hospital-acquired infections has increased largely because hospital patients of the late 1990s on average were older and sicker than those of 20 years earlier and thus more susceptible to infection, and also because medical advances that can save or prolong lives may carry risks for infections. Because both trends are expected to continue, only a modest reduction in the number of new cases of infections can be expected; however, a small reduction will save thousands of lives.

14-21. Reduce antimicrobial use among intensive care unit patients.

Target: 120 daily doses per 1,000 patient days.

Baseline: 150 daily doses of antimicrobials per 1,000 patient days were used among intensive care unit patients in 1995.

Target setting method: 20 percent improvement.

Data source: National Nosocomial Infections Surveillance System (NNIS), CDC, NCID.

Hospital-acquired infections caused by antimicrobial-resistant pathogens can be virtually untreatable. Further, antimicrobial resistance that develops in the hospital can spread into the community and has the potential to cause a public health disaster. Excessive or inappropriate use of antimicrobials or both, which occur most frequently in intensive care units (ICUs), is the major cause of antimicrobial resistance. Research indicates that antibiotics are being used more often than hospital prescription guidelines recommend. For example, one study in the late 1990s indicated that as much as 60 percent of the hospital prescriptions for vancomycin are not in accordance with the guidelines. Decreasing the use of antimicrobials, especially in ICUs, is the critical step in reducing the public threat of antimicrobial resistance. Studies have shown that interventions in individual hospitals have achieved reductions of 20 percent or more in antimicrobial use.

Vaccination Coverage and Strategies

14-22. Achieve and maintain effective vaccination coverage levels for universally recommended vaccines among young children.

Target and baseline:

Objective	Increase in and Maintenance of Vaccination Coverage Levels Among Children Aged 19 to 35 Months	1998 Baseline	2010 Target
		Percent	
14-22a.	4 doses diphtheria-tetanus-acellular pertussis (DTaP) vaccine	84	90
14-22b.	3 doses *Haemophilus influenzae* type b (Hib) vaccine	93	90
14-22c.	3 doses hepatitis B (hep B) vaccine	87	90
14-22d.	1 dose measles-mumps-rubella (MMR) vaccine	92	90
14-22e.	3 doses polio vaccine	91	90
14-22f.	1 dose varicella vaccine	43	90

Target setting method: Consistent with the Childhood Immunization Initiative.

Data source: National Immunization Survey (NIS), CDC, NCHS and NIP.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Children Aged 19 to 35 Months, 1998	Vaccination Coverage					
	14-22a. 4 Doses DTaP	14-22b. 3 Doses Hib	14-22c. 3 Doses Hep B	14-22d. 1 Dose MMR	14-22e. 3 Doses Polio	14-22f. 1 Dose Vari-cella
	Percent					
TOTAL	84	93	87	92	91	43
Race and ethnicity						
American Indian or Alaska Native	78	92	80	86	83	33
Asian or Pacific Islander	87	93	90	93	94	57
Asian	DNC	DNC	DNC	DNC	DNC	DNC
Native Hawaiian and other Pacific Islander	DNC	DNC	DNC	DNC	DNC	DNC
Black or African American	77	90	84	89	88	43
White	86	94	88	93	92	43
Hispanic or Latino	80	92	86	91	89	47
Not Hispanic or Latino	85	94	87	92	91	42
Black or African American	77	90	84	89	88	42
White	87	95	88	93	92	42
Gender						
Female	84	94	87	92	91	43
Male	84	93	87	92	90	43
Family income level						
Poor	81	92	86	91	90	46
Near poor	83	92	87	91	91	42
Middle/high income	89	96	89	94	92	49

Children Aged 19 to 35 Months, 1998	Vaccination Coverage					
	14-22a. 4 Doses DTaP	14-22b. 3 Doses Hib	14-22c. 3 Doses Hep B	14-22d. 1 Dose MMR	14-22e. 3 Doses Polio	14-22f. 1 Dose Vari-cella
	Percent					
Disability status						
Persons with disabilities	DNC	DNC	DNC	DNC	DNC	DNC
Persons without disabilities	DNC	DNC	DNC	DNC	DNC	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

Vaccination coverage levels of 90 percent are, in general, sufficient to prevent circulation of viruses and bacteria-causing vaccine-preventable diseases.[55, 56] Maintenance of high vaccination coverage levels in early childhood is the best way to prevent the spread of VPDs in childhood and to provide the foundation for controlling VPDs among adults. Diseases that affect humans only may eventually be eradicated or at least eliminated through high vaccination coverage levels.[57] These diseases include polio and measles in the near future and possibly hepatitis B later on. Although polio eradication is expected to be certified by the year 2005, vaccine coverage levels will continue to be assessed until vaccination is no longer recommended. The measles epidemic of 1989–91 demonstrated that achievement of high coverage levels at the time of school entry was insufficient to control VPD outbreaks. Although coverage levels currently are the highest ever recorded, the United States must continue to ensure that each new cohort of children is fully vaccinated with all recommended vaccine doses; as of June 22, 2000, 20 to 24 vaccine doses are recommended through age 16 years, with 16 to 20 doses by age 2 years. Any new universally recommended vaccine should be at a 90 percent coverage level within 5 years of the recommendation.

Although national coverage levels may exceed 90 percent, variation in the level of coverage among smaller areas may include subgroups of the population at substantially lower levels of protection. These subgroups or pockets of undervaccinated persons make the population vulnerable to major outbreaks of VPDs. Monitoring of coverage at smaller geographic levels within the United States helps ensure that these potential pockets of children are identified to target interventions and reduce the risk of future disease outbreaks. In addition, each State and major urban area should aim to achieve 90 percent coverage to ensure uniformly high vaccination coverage.

14-23. Maintain vaccination coverage levels for children in licensed day care facilities and children in kindergarten through the first grade.

Target and baseline:

Objective	Maintenance of Vaccination Coverage Levels for Children	1997–98 Baseline*	2010 Target
		Percent	
	Children in day care		
14-23a.	Diphtheria-tetanus-acellular pertussis (DTaP) vaccine	96	95
14-23b.	Measles/mumps/rubella vaccines	89	95
14-23c.	Polio vaccine	96	95
14-23d.	Hepatitis B vaccine	Developmental	
14-23e.	Varicella vaccine	Developmental	
	Children in K through 1st grade		
14-23f.	Diphtheria-tetanus-acellular pertussis (DTaP) vaccine	97	95
14-23g.	Measles/mumps/rubella vaccines	96	95
14-23h.	Polio vaccine	97	95
14-23i.	Hepatitis B vaccine	Developmental	
14-23j.	Varicella vaccine	Developmental	

*Weighted means.

Target setting method: Consistent with year 2000 target. (Better than the best will be used when data are available.)

Data source: Immunization Program Annual Reports, CDC, NIP.

Data for population groups currently are not collected.

Uniformly high coverage levels are required to prevent circulation of the viruses and bacteria that cause VPDs. The target level was set to be consistent with the Healthy People 2000 objective because the achievement of that objective has resulted in the prevention of disease spread, and this objective seeks to maintain the high coverage achieved in these settings.

Entry requirements for school and day care are one of the most effective interventions the States have at their disposal to ensure that children are appropriately vaccinated. The impact of entry requirements for school and day care has been profound—more than 95 percent of children are vaccinated. Several studies support the role of entry requirements in increasing vaccination rates and decreasing the rate of new cases of measles. Strict enforcement of school vaccination requirements has been shown to play a determining role in lowering new cases of measles.[58]

14-24. Increase the proportion of young children and adolescents who receive all vaccines that have been recommended for universal administration for at least 5 years.

Target and baseline:

Objective	Increase in Coverage Levels of Universally Recommended Vaccines	1998 Baseline	2010 Target
		Percent	
14-24a.	Children aged 19 to 35 months who receive the recommended vaccines (4DTaP, 3 polio, 1 MMR, 3 Hib, 3 hep B)	73	80
14-24b.	Adolescents aged 13 to 15 years who receive the recommended vaccines	Developmental	

Target setting method: Better than the best.

Data source: National Immunization Survey (NIS), CDC, NCHS and NIP; National Health Interview Survey (NHIS), CDC, NCHS.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Children Aged 19 to 35 Months, 1998	Vaccinations	
	14-24a. 4 DTaP, 3 Polio, 1 MMR, 3 Hib, 3 Hep B	**4 DTaP, 3 Polio, 1 MMR***
	Percent	
TOTAL	73	81
Race and ethnicity		
American Indian or Alaska Native	65	75
Asian or Pacific Islander	73	82
Asian	DNC	DNC
Native Hawaiian and other Pacific Islander	DNC	DNC
Black or African American	66	74
White	74	82
Hispanic or Latino	69	77
Not Hispanic or Latino	74	81
Black or African American	67	74
White	76	83
Gender		
Female	72	81
Male	73	81

Children Aged 19 to 35 Months, 1998	Vaccinations	
	14-24a. 4 DTaP, 3 Polio, 1 MMR, 3 Hib, 3 Hep B	4 DTaP, 3 Polio, 1 MMR*
	Percent	
Family income level		
Poor	70	78
Near poor	72	80
Middle/high income	77	85
Disability status		
Persons with disabilities	DNC	DNC
Persons without disabilities	DNC	DNC

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.
*Data for 4 DTaP, 3 polio, and 1 MMR are displayed to further characterize the issue.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

Determining whether the population is protected against a VPD is best evaluated by examining the coverage level of individual vaccines (see objective 14-22). It is also important to ensure that the health care system fully vaccinates individual children, providing vaccines that have been universally recommended for at least 5 years and that are currently recommended. Changes in the immunization schedule will occur as new vaccines are added to the list of recommended vaccines and as vaccines for eradicated diseases are removed from the list.[59] For example, polio virus vaccine is not expected to be recommended by the year 2010. Although monitoring the proportion of children who have received the combination of four DTaP, three polio, and one MMR will continue for historical comparison, attention should be focused on the combination of all universally recommended vaccines.

14-25. Increase the proportion of providers who have measured the vaccination coverage levels among children in their practice population within the past 2 years.

Target and baseline:

Objective	Increase in Providers Measuring Vaccination Levels	1997 Baseline	2010 Target
		Percent	
14-25a.	Public health providers	66	90
14-25b.	Private providers	6	90

Target setting method: 36 percent improvement for public health providers; 1,400 percent improvement for private providers.

Data source: Immunization Program Annual Reports, CDC, NIP.

In 1997, 66 percent of public health department providers assessed their vaccination levels.[60] State immunization programs are collaborating with private providers to extend provider-based assessments to the private sector. With the increasing role of managed care and Health Plan Employer Data and Information Set (HEDIS) measures, private providers should have additional occasions to examine their coverage levels.

Most providers (public and private) overestimate the vaccination coverage level they are achieving with their clients.[61] Assessment of practice-based coverage levels and feedback of those data to the providers have been an effective strategy for increasing vaccination of children served by a given practice.[62, 63]Managed care organizations have begun reporting vaccination coverage levels using the HEDIS criteria as a way of evaluating quality of care.[64] Practice-based assessment also has been recommended by ACIP,[65] the National Vaccine Advisory Committee, the American Academy of Pediatrics, and the American Academy of Family Physicians,[66] as well as the Task Force for Community Preventive Services.[67] The Clinic Assessment Software Application provides a mechanism for assessing levels of vaccination coverage in a practice and could be used for tracking patients.

14-26. Increase the proportion of children who participate in fully operational population-based immunization registries.

Target: 95 percent of children under age 6 years.

Baseline: 32 percent of children under age 6 years participated in an immunization registry in 1999.

Target setting method: 197 percent improvement. (Better than the best will be used when data are available.)

Data source: Immunization Program Annual Reports, CDC, NIP.

Data for population groups currently are not collected.

A fully operational population-based registry includes capabilities to (1) protect confidential information, (2) enroll all children at the State or community level automatically at birth, (3) give providers access to complete vaccination history, (4) recommend needed vaccinations, (5) notify children who are due and overdue for vaccinations, (6) assess practice and geographic-level coverage, and (7) produce authorized immunization records. Registries may provide other important functions such as assisting in the evaluation of vaccine safety. Registries may serve other purposes as well, including VPD surveillance, vaccine efficacy monitoring, and vaccine inventory management.

Population-based immunization registries will be a cornerstone of the Nation's immunization system by 2010. Responsibility for registry development rests with State and local communities, with assistance from Federal agencies and private partners. Registries facilitate the timely vaccination of children by ensuring that the child's complete vaccination history is available to the health care provider. Registries are valuable given the mobile nature of today's population and that many persons do not see the same provider consistently. Registries also can be used to monitor the vaccination status of populations that are low income, uninsured, and at greater risk for incomplete vaccination.

Few population-based immunization registries existed at the State or community level before 1992, and limited data are available regarding their implementation. A 1999 CDC survey showed immunization registries are being developed in all States.[68] Additional efforts are under way to establish registry links between private providers and immunization partners such as managed care organizations and WIC programs. Issues such as privacy, confidentiality, and access of registry data are being addressed as registries are developed.

Participation in immunization registries will continue to increase. The development of childhood immunization registries has widespread support among parents and providers,[69] and the required technology is becoming less expensive and simpler. Registries are part of the current trend to computerize medical data in the United States. To be successful, registries must be integrated seamlessly into the current provider environment and create no additional burdens.

14-27. Increase routine vaccination coverage levels for adolescents.

Target and baseline:

Objective	Increase in Vaccination Coverage Levels for Adolescents Aged 13 to 15 Years	1997 Baseline*	2010 Target
		Percent	
14-27a.	3 or more doses of hepatitis B	48	90
14-27b.	2 or more doses of measles, mumps, rubella	89	90
14-27c.	1 or more doses of tetanus-diphtheria booster	93	90
14-27d.	1 or more doses of varicella (excluding children who have had varicella)	45	90

*Data primarily are based on parental recall; provider verification has not occurred.

Target setting method: Consistent with target levels established under Childhood Immunization Initiative.

Data source: National Health Interview Survey (NHIS), CDC, NCHS.

Adolescents Aged 13 Through 15 Years, 1997	14-27a. 3 or More Doses Hep B	14-27b. 2 or More Doses MMR	14-27c. 1 or More Doses Tetanus-Diphthe-ria Booster	14-27d. 1 or More Doses Varicella
	Percent			
TOTAL	48	89	93	45
Race and ethnicity				
American Indian or Alaska Native	DSU	DSU	DSU	DSU
Asian or Pacific Islander	46	90	92	DSU
Asian	DSU	87	90	DSU
Native Hawaiian and other Pacific Islander	DSU	DSU	DSU	DSU
Black or African American	59	88	93	49
White	46	89	93	44
Hispanic or Latino	55	88	91	58
Not Hispanic or Latino	47	89	93	42
Black or African American	59	88	93	49
White	44	89	93	40
Gender				
Female	49	91	94	41
Male	47	88	91	49
Family income level				
Poor	52	87	93	43
Near poor	48	90	91	52
Middle/high income	43	89	93	45
Geographic location				
Urban	50	90	94	46
Rural	43	87	90	43
Disability status				
Persons with disabilities	DNA	DNA	DNA	DNA
Persons without disabilities	DNA	DNA	DNA	DNA

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

Illness and disability caused by vaccine-preventable diseases, such as hepatitis B, measles, and varicella, continue among adolescents.[26] While primary health care

providers are vital to ensuring that infants and younger children are up to date on their vaccinations, they have an equally important role in ensuring comprehensive vaccination for adolescents.[70] Any new universally recommended vaccine for adolescents should be at a 90 percent coverage level within 5 years of the recommendation. An estimated 79 percent of adolescents and children visit a health care provider annually.[71] Providers such as nurses, nurse practitioners, pediatricians, family physicians, general practitioners, and emergency medicine specialists deliver most of the primary health care received by adolescents.[72] Strategies should specifically target these providers to increase vaccination among adolescents, especially hard-to-reach and at-risk adolescents in urban and rural areas.

School entry requirements ensure high vaccination levels. Much of the experience to date in implementing adolescent vaccination comes from school-based hepatitis B demonstration projects.[73] To encourage school participation in an adolescent vaccination program, a partnership between schools and local health departments is essential.

Managed care organizations also have an increasingly important role in the delivery of health care services, including vaccinations, to adolescents. Measures for assessing immunization recommendations for adolescents have been incorporated into HEDIS 3.0.[64] Such standards should greatly assist in implementing immunization recommendations for adolescents in the managed care setting.

14-28. Increase hepatitis B vaccine coverage among high-risk groups.

Target and baseline:

Objective	Increase in Hepatitis B Vaccine Coverage in High-Risk Groups	1995 Baseline	2010 Target
		Percent	
14-28a.	Long-term hemodialysis patients	35	90
14-28b.	Men who have sex with men	9	60
14-28c.	Occupationally exposed workers	71	98

Target setting method: 157 percent improvement for long-term hemodialysis patients; 567 percent improvement for men who have sex with men; 38 percent improvement for occupationally exposed workers.

Data sources: Young Men's Survey, CDC, NCHSTP; Annual Survey of Chronic Hemodialysis Centers, CDC, NCID, and HCFA; periodic vaccine coverage surveys, CDC, NCID.

Hepatitis B vaccination has been recommended for persons with risk factors for hepatitis B virus infection since the vaccine was first licensed in 1981. These risk groups include the following: hemodialysis patients, men who have sex with men, incarcerated persons, health care and public safety workers who have exposure to blood in the workplace, persons with a history of sexually transmitted diseases or

multiple sex partners, injection drug users, and household and sex contacts of HBV-infected persons. While data currently are not collected for inmates in long-term correctional facilities, it is recommended that prison officials should consider undertaking screening and vaccination programs directed at inmates with histories of high-risk behaviors.

14-29. Increase the proportion of adults who are vaccinated annually against influenza and ever vaccinated against pneumococcal disease.

Target and baseline:

Objective	Increase in Adults Vaccinated	1998* Baseline (unless noted)	2010 Target
		Percent	
	Noninstitutionalized adults aged 65 years and older		
14-29a.	Influenza vaccine	64	90
14-29b.	Pneumococcal vaccine	46	90
	Noninstitutionalized high-risk adults aged 18 to 64 years		
14-29c.	Influenza vaccine	26	60
14-29d.	Pneumococcal vaccine	13	60
	Institutionalized adults (persons in long-term or nursing homes)†		
14-29e.	Influenza vaccine	59 (1997)	90
14-29f.	Pneumococcal vaccine	25 (1997)	90

*Age adjusted to the year 2000 standard population.

†National Nursing Home Survey estimates include a significant number of residents who have an unknown vaccination status. See *Tracking Healthy People 2010* for further discussion of the data issues.

Target setting method: Better than the best.

Data sources: National Health Interview Survey (NHIS), CDC, NCHS—noninstitutionalized populations; National Nursing Home Survey (NNHS), CDC, NCHS—institutionalized populations.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Select Age Groups, 1998 (unless noted)	Annual Influenza and One-Time Pneumococcal Vaccination					
	Noninstitutionalized Adults Aged 65 Years and Older		Noninstitutionalized High-Risk Adults Aged 18 to 64 Years		Institutionalized Adults Aged 18 Years and Older	
	14-29a. Influenza	14-29b. Pneumococcal Disease	14-29c. Influenza	14-29d. Pneumococcal Disease	14-29e. Influenza (1997)	14-29f. Pneumococcal Disease (1997)
	Percent					
TOTAL	64	46	26	13	59	25
Race and ethnicity						
American Indian/ Alaska Native	DSU	DSU	29	25	DSU	DSU
Asian or Pacific Islander	68	36	30	DSU	DSU	DSU
Asian	67	36	31	DSU	DNC	DNC
Native Hawaiian and other Pacific Islander	DSU	DSU	DSU	DSU	DNC	DNC
Black or African American	46	26	23	14	DNA	DNA
White	65	48	27	13	DNA	DNA
Hispanic or Latino	51	23	24	11	61	23
Not Hispanic or Latino	64	47	26	13	DNA	DNA
Black or African American	47	26	23	14	61	22
White	66	50	27	13	62	24
Gender						
Female	63	46	28	13	DNA	DNA
Male	64	47	24	13	DNA	DNA
Education level (age 25 years and older)						
Less than high school	58	40	24	14	DNC	DNC
High school graduate	66	48	26	14	DNC	DNC
At least some college	67	52	31	14	DNC	DNC

Select Age Groups, 1998 (unless noted)	Annual Influenza and One-Time Pneumococcal Vaccination					
	Noninstitutionalized Adults Aged 65 Years and Older		Noninstitutionalized High-Risk Adults Aged 18 to 64 Years		Institutionalized Adults Aged 18 Years and Older	
	14-29a. Influenza	14-29b. Pneumococcal Disease	14-29c. Influenza	14-29d. Pneumococcal Disease	14-29e. Influenza (1997)	14-29f. Pneumococcal Disease (1997)
	Percent					
Disability status (1997)						
Persons with disabilities	66	47	28	16	DNA	DNA
Persons without disabilities	62	40	23	9	DNA	DNA
Select populations (not age adjusted)						
Age groups (1997)						
18 to 49 years	NA	NA	20	8	59	24
50 to 64 years	NA	NA	40	19	62	23
65 to 74 years	61	40	NA	NA	62	28
75 to 84 years	66	46	NA	NA	61	26
85 years and older	67	42	NA	NA	66	30
Persons with high-risk conditions (not age adjusted) (1997)						
Persons with diabetes	68	44	27	15	DNA	DNA
Persons with heart disease	71	51	25	11	DNA	DNA
Persons with lung disease	73	65	25	13	DNA	DNA
Persons with lung disease (excluding asthma)	74	66	26	14	DNA	DNA
Persons with kidney disease	71	46	21	13	DNA	DNA

Select Age Groups, 1998 (unless noted)	Annual Influenza and One-Time Pneumococcal Vaccination					
	Noninstitutionalized Adults Aged 65 Years and Older		Noninstitutionalized High-Risk Adults Aged 18 to 64 Years		Institutionalized Adults Aged 18 Years and Older	
	14-29a. Influenza	14-29b. Pneumococcal Disease	14-29c. Influenza	14-29d. Pneumococcal Disease	14-29e. Influenza (1997)	14-29f. Pneumococcal Disease (1997)
	Percent					
Persons with liver disease	71	43	26	10	DNA	DNA
Persons with cancer	71	51	25	10	DNA	DNA

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable. NA = Not applicable.

Note: Age adjusted to the year 2000 standard population.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

Federal initiatives have highlighted the need to focus vaccination resources on adults.[74] Vaccination is an effective strategy to reduce illness and deaths due to pneumococcal disease and influenza. Current levels of coverage among adults vary widely among age, risk, and racial and ethnic groups. Any new universally recommended vaccine for adults should be at a 60 percent coverage level within 5 years of recommendation. Influenza and pneumococcal vaccines are covered by Medicare; thus vaccinating greater numbers of adults aged 65 years and older is feasible. High-risk adults aged 18 to 64 years may not have insurance coverage for influenza and pneumococcal vaccines.

With the aging of the U.S. population, increasing numbers of adults will be at risk for these major causes of illness and death. Persons with high-risk conditions (that is, heart disease, diabetes, and chronic respiratory disease[75, 76]) remain at increased risk for these diseases, as do persons living in institutional settings.

Continuing education of providers and the community is needed to increase awareness of and demand for adult vaccination services. Interventions such as standing orders for vaccination, provider reminders and feedback, and patient notifications and reminders have been effective in increasing adult vaccination levels.[22, 77] Guidelines and tools for implementing these interventions are available through *Put Prevention Into Practice*, a national campaign to improve delivery of clinical preventive services.[78] Measurement and feedback about vaccination providers' performance in delivering vaccines enhance coverage rates. Providers should be given feedback on their performance in a timely manner. Measurement and feedback can result in improvements in vaccine coverage either by changing

provider knowledge, attitudes, and behavior or by stimulating changes in the vaccine delivery system—for example, reminders and standing orders—or some combination.

In addition, opportunities for vaccination outside of primary care and other traditional health care settings could be increased to reach adults who do not routinely access primary care. For example, over 90 million emergency department visits are made in the United States annually. Emergency department vaccination is likely to increase vaccination rates among select populations difficult to vaccinate through office-based programs. In any nontraditional site, a method for tracking and communicating vaccinations is needed so that vaccination information may be shared with patients' primary care providers.[79]

Vaccine Safety

14-30. Reduce vaccine-associated adverse events.

14-30a. Eliminate vaccine-associated paralytic polio (VAPP).

Target: Zero cases.

Baseline: 5 VAPP cases occurred in 1997.

Target setting method: Total elimination.

Data source: National Notifiable Disease Surveillance System (NNDSS), CDC, EPO.

14-30b. Reduce febrile seizures following pertussis vaccines.

Target: 75 febrile seizures.

Baseline: 152 febrile seizures followed pertussis vaccines in 1998.

Target setting method: 50 percent improvement.

Data sources: Vaccine Adverse Event Reporting System (VAERS) and Vaccine Safety Datalink (VSD), CDC, NIP.

Because no natural reservoirs for wild poliomyelitis exist, vaccine-associated paralytic polio (VAPP) is caused by the oral polio vaccine (OPV). With global polio eradication targeted for 2000, use of OPV should decrease and then stop, resulting in zero cases of VAPP. From 1980 to 1998, no indigenous cases of paralytic poliomyelitis caused by wild polio virus transmission have occurred in the United States. However, 141 cases of VAPP have been reported in this same period, averaging 8 or 9 cases per year. Persons with VAPP experience the full range of illness and disability as well as loss of social function associated with being partially or fully paralyzed. Due to the progress in global poliomyelitis eradication and to the reduction of the burden of VAPP in the United States, ACIP recommended that beginning in 2000, only intravenous polio vaccine (IPV) will be used

for routine immunization.[80] In general, IPV is as effective as OPV and should be sufficient at preventing polio in the United States.

Controlled clinical trials indicate that whole cell pertussis (wP) vaccines cause seizures at a frequency of 1 per 1,750 doses.[38, 81, 82] The majority of these seizures are febrile seizures without any residual deficit. Nevertheless, such seizures—frightening patients and parents alike—frequently result in emergency department or other medical visits as well as costly diagnostic evaluations to rule out possible neurologic disorders. Recently licensed acellular pertussis (aP) vaccines are less likely to cause fever or seizures; data show seizure frequency of up to 1 per 14,280 doses.[38] With the increasing use of aP vaccines, the number of pertussis vaccine-associated febrile seizures should be reduced by 50 percent.

14-31. Increase the number of persons under active surveillance for vaccine safety via large linked databases.

Target: 13 million persons.

Baseline: 6 million persons were under active surveillance for vaccine safety via large linked databases in 1999.

Target setting method: 117 percent improvement.

Data source: Vaccine Safety Datalink, CDC, NIP.

A high standard of safety is expected of vaccines since they are recommended for millions of healthy people, including infants. Vaccine safety monitoring to identify and minimize vaccine-related reactions is necessary to help ensure safety because no vaccine is completely safe. Knowledge of vaccine safety is essential to assess accurately the risks and benefits in formulating vaccine use recommendations. For example, the Institute of Medicine has reported that of 76 adverse events assessed, 66 percent had inadequate or no evidence available to accept or reject vaccine as a cause of the adverse reactions.[83, 84]

In collaboration with several health maintenance organizations, CDC has linked anonymous vaccination and medical records in a large database.[85] This system is used to study vaccine safety, especially for evaluating new concerns arising from the Vaccine Adverse Event Reporting System (VAERS) and other sources. These databases also are used for monitoring vaccine safety, conducting active surveillance of VPDs, carrying out vaccine safety and immunogenicity trials, evaluating vaccine economics, and assessing vaccine coverage.

Related Objectives From Other Focus Areas

1. Access to Quality Health Services

- 1-1. Persons with health insurance
- 1-2. Health insurance coverage for clinical preventive services
- 1-3. Counseling about health behaviors
- 1-4. Source of ongoing care
- 1-5. Usual primary care provider
- 1-6. Difficulties or delays in obtaining needed health care
- 1-7. Core competencies in health provider training
- 1-8. Racial and ethnic representation in health professions
- 1-9. Hospitalization for ambulatory-care-sensitive conditions
- 1-14. Special needs of children
- 1-15. Long-term care services

7. Educational and Community-Based Programs

- 7-2. School health education
- 7-4. School nurse-to-student ratio
- 7-5. Worksite health promotion programs
- 7-6. Participation in employer-sponsored health promotion activities
- 7-7. Patient and family education
- 7-8. Satisfaction with patient education
- 7-9. Health care organization sponsorship of community health promotion activities
- 7-10. Community health promotion programs
- 7-11. Culturally appropriate and linguistically competent community health promotion programs
- 7-12. Older adult participation in community health promotion activities

8. Environmental Health

- 8-5. Safe drinking water
- 8-6. Waterborne disease outbreaks
- 8-29. Global burden of disease
- 8-30. Water quality in the U.S.-Mexico border region

10. Food Safety

- 10-1. Foodborne infections
- 10-2. Outbreaks of foodborne infections
- 10-3. Antimicrobial resistance of *Salmonella* species
- 10-5. Consumer food safety practices
- 10-6. Safe food preparation practices in retail establishments

11. Health Communication

- 11-1. Households with Internet access
- 11-2. Health literacy
- 11-3. Research and evaluation of communication programs
- 11-4. Quality of Internet health information sources
- 11-5. Centers for excellence
- 11-6. Satisfaction with health care providers' communication skills

13. HIV

13-9. HIV/AIDS, STD, and TB education in State prisons
13-11. HIV testing in TB patients
13-12. Screening for STDs and immunization for hepatitis B

16. Maternal, Infant, and Child Health

16-22. Medical homes for children with special health care needs

23. Public Health Infrastructure

23-1. Public health employee access to the Internet
23-2. Public access to information and surveillance data
23-3. Use of geocoding in health data systems
23-4. Data for all population groups
23-5. Data for Leading Health Indicators, Health Status Indicators, and Priority Data Needs at State, Tribal, and local levels
23-6. National tracking of Healthy People 2010 objectives
23-7. Timely release of data on objectives
23-8. Competencies for public health workers
23-9. Training in essential public health services
23-10. Continuing education and training by public health agencies
23-11. Performance standards for essential public health services
23-12. Health improvement plans
23-14. Access to epidemiology services
23-15. Model statutes related to essential public health services
23-17. Population-based prevention research

25. Sexually Transmitted Diseases

25-13. Hepatitis B vaccine services in STD clinics

Terminology

(A list of abbreviations and acronyms used in this publication appears in Appendix H.)

Advisory Committee on Immunization Practices (ACIP): Federally chartered advisory committee with the goals of providing advice to the CDC Director on decreasing disease through the use of vaccines and other biological products and on improving the safety of their use.

Colonization: The establishment of a colony or growth of an organism in a patient, typically in a nonsterile anatomic site such as the skin, nasal mucosa, or colon.

Common cold: Defined based on International Classification of Disease (ICD)-9 diagnostic codes 460.0, 461.0, 465.0, 465.8, 465.9, and 472.0.

Complete curative therapy: Full course of recommended treatment.

Comprehensive primary care: All aspects of routine health care (preventive, diagnostic, and therapeutic) delivered by a trained health care provider.

Conjugate vaccine: A type of inactivated vaccine composed of fractions of bacteria linked to a protein. This linkage makes the vaccine more potent.

Distant infection: The spread of infection in a patient from one anatomic site to another site in the body, such as through the blood stream from the lungs to the liver or brain.

Emerging infectious diseases: Diseases of infectious origin whose occurrence in humans has increased within the past two decades or threatens to increase in the near future. Recognition of an emerging disease occurs because the disease is present in the

population for the first time, the disease has been detected for the first time, or links between an infectious agent and a chronic disease or syndrome have only recently been identified.

Group B *Streptococcus* (GBS): A normal germ found in the intestines and on the genitals of about one out of five pregnant women. GBS is usually not harmful to the woman carrying the germ but it can cause dangerous infections in the blood, spinal fluid, and lungs of babies born to these women.

> **Early onset of group B streptococcal disease:** Illness onset at less than 7 days of age.
>
> **Invasive group B streptococcal disease:** Isolation of group B S*treptococcus* from a normally sterile site, such as blood or cerebrospinal fluid.

Group immunity: The immunity of a group or community. Immunity based on the resistance to infection among a high proportion of individual members of the group.

Hospital-acquired infection: Any infection that a patient acquires as a result of medical treatment while in the hospital.

Invasive pneumococcal infection: Isolating the bacteria *Streptococcus pneumoniae* from a normally sterile site, including blood, cerebrospinal fluid, or pleural fluid.

Latent TB infection: The state of being infected with the organism *Mycobacterium tuberculosis* but without signs or symptoms of active TB disease.

Multiple sex partners: More than one partner in the prior 6 months.

National Notifiable Disease Surveillance System (NNDSS): Tracking system that State health departments use to report cases of selected diseases to CDC. (See Reportable disease).

Patient day: A day or part of a day for which a patient was hospitalized.

Penicillin resistant: Having a minimum inhibitory concentration (MIC) equal to or greater than 2 µg/ml. Strains with “intermediate” susceptibility are not included in this category.

Reemerging infectious diseases: Reappearance of a known infection after a decline in occurrence. Reemergence of “old” infectious agents can be the result of lapses in public health measures, changes in human behavior that increase person-to-person transmission of infectious agents, changes in food handling or eating habits, or changes in the way humans interact with their environment.

Reportable disease: A disease for which there are legal requirements for reporting and notification to public health authorities. In the United States, requirements for reporting diseases are mandated by State laws or regulations, and the list of reportable diseases in each State differs.

Surveillance regions: The nine regions of the United States used for influenza surveillance purposes.

Vaccine Adverse Event Reporting System (VAERS). A passive surveillance system that monitors vaccine safety by collecting and analyzing reports of adverse events following immunization from vaccine manufacturers, private practitioners, State and local public health clinics, parents, and individuals who receive vaccines. CDC and the Food and Drug Administration work together to implement VAERS.

Vaccines: Biological substances used to stimulate the development of antibodies and thus confer active immunity against a specific disease or number of diseases.

Vector-borne disease: Viral and bacterial diseases transmitted to humans by arthropods, primarily mosquitoes, ticks, and fleas.

Zoonotic disease: Viral and bacterial diseases transmitted to humans by arthropods, primarily mosquitoes, ticks, and fleas.

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