



# Immunization and Infectious Diseases

U.S. Department of Health & Human Services • Public Health Service

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## PROGRESS REVIEW



In the 10th session in the second series of assessments of *Healthy People 2010*, ADM John O. Agwunobi, Assistant Secretary for Health, chaired a focus area Progress Review on Immunization and Infectious Diseases. He was assisted by staff of the lead agency for this *Healthy People 2010* focus area, the Centers for Disease Control and Prevention (CDC). Also participating in the review were representatives from other U.S. Department of Health and Human Services offices and agencies. ADM Agwunobi observed that, since the first-round Progress Review earlier in the decade, events such as the emergence of the threat of pandemic influenza had underscored the need to achieve and maintain high levels of preparedness against the spread of infectious diseases. Topics selected for special attention at the Progress Review included coverage status for recommended vaccinations in young children, invasive pneumococcal infections, Lyme disease, hepatitis B in adults, the incidence of new cases of tuberculosis, and antibiotics prescribed for ear infections and for the common cold.

The complete November 2000 text for the Immunization and Infectious Diseases focus area of *Healthy People 2010* is available online at [www.healthypeople.gov/document/html/volume1/14immunization.htm](http://www.healthypeople.gov/document/html/volume1/14immunization.htm). Revisions to the focus area chapter that were made after the January 2005 Midcourse Review are at [www.healthypeople.gov/data/midcourse/html/focusareas/fa14toc.htm](http://www.healthypeople.gov/data/midcourse/html/focusareas/fa14toc.htm). Some more recent data used in the Progress Review for this focus area's objectives and their operational definitions can be accessed at [wonder.cdc.gov/data2010](http://wonder.cdc.gov/data2010). For comparison, the report on the first-round Progress Review (held on August 20, 2003) is archived at [www.healthypeople.gov/data/2010prog/focus14/2003fa14.htm](http://www.healthypeople.gov/data/2010prog/focus14/2003fa14.htm). The meeting agenda, tabulated data for all focus area objectives, charts, and other materials used in the Progress Review can be found at a companion site maintained by the CDC National Center for Health Statistics (NCHS): [www.cdc.gov/nchs/about/otheract/hpdata2010/focusareas/fa14-immun2.htm](http://www.cdc.gov/nchs/about/otheract/hpdata2010/focusareas/fa14-immun2.htm).

### Data Trends

In his overview of data for the focus area, Richard Klein of the NCHS Health Promotion Statistics Branch noted that, of the more than 80 *Healthy People 2010* objectives and subobjectives for Immunization and Infectious Diseases, by far the majority had met or were moving closer to their targets. Exceptions to this trend toward improvement include objectives and subobjectives for Lyme disease, pertussis, and penicillin-resistant pneumococcal infections in older adults. Progress in reducing morbidity and mortality from infectious diseases in the

United States is particularly impressive when the situation is viewed over a longer time span. With one exception (pertussis, by 83 percent), new cases of 10 diseases for which a vaccine was developed prior to 1990 were reduced by 98 percent or more between the period before vaccine introduction and 2005. Currently, vaccines are available to protect children against 16 diseases. (For a list of these, follow the link [www.cdc.gov/vaccines/recs/schedules/downloads/child/2007/child-schedule-colorpress.pdf](http://www.cdc.gov/vaccines/recs/schedules/downloads/child/2007/child-schedule-colorpress.pdf).) Seven of the most widely used

vaccines are estimated to have prevented more than 14 million cases of disease and more than 33,000 deaths over the lifetime of children born in any given year. Such vaccination also resulted in annual cost savings of \$9.9 billion in direct medical costs and \$33.4 billion in indirect costs. Despite these advances, infectious diseases account for 18 percent of all physician visits each year and exact a toll in treatment costs and lost productivity that exceeds \$120 billion each year. With regard to mortality, pneumonia/influenza is the eighth leading cause of death in the United States. Mr. Klein then examined in greater detail the objectives selected for highlighting during the Progress Review.

**(Obj. 14-3):** New cases of hepatitis B among adults aged 19 to 24 years decreased from a rate of 18.5 per 100,000 standard population in 1997 to 5.4 per 100,000 in 2005 (target, 1.8 per 100,000). Among adults aged 25 to 39 years, new cases decreased from 20.5 per 100,000 in 1997 to 10.2 per 100,000 in 2005 (target, 5.2 per 100,000). Among adults aged 40 years and older, new cases decreased from 14.7 per 100,000 in 1997 to 5.4 per 100,000 in 2005 (target, 3.7 per 100,000). In 2005, among five racial and ethnic populations for which data were available, non-Hispanic blacks had by far the highest rate of new cases of hepatitis B in each group: 10.2 per 100,000 among persons aged 19 to 24 years (compared with 38.3 per 100,000 in 1997); 16.6 per 100,000 among persons aged 25 to 39 years (compared with 34.2 per 100,000 in 1997); and 9.1 per 100,000 among persons aged 40 years and older (compared with 27.5 per 100,000 in 1997). The other racial and ethnic populations for which data were available are American Indians/Alaska Natives, Asians/Pacific Islanders, Hispanics, and non-Hispanic whites.

**(Obj. 14-5):** New cases of invasive pneumococcal infections among children aged less than 5 years decreased from a rate of 77 per 100,000 in 1997 to 21 per 100,000 in 2005, surpassing the target of 46 per 100,000. The 2005 rate for black children aged less

than 5 years was 38 per 100,000, compared with 18 per 100,000 for white children aged less than 5 years. The 1997 rates for those two groups were 155 per 100,000 and 63 per 100,000, respectively. New cases of invasive pneumococcal infections among adults aged 65 years and older decreased from a rate of 62 per 100,000 in 1997 to 40 per 100,000 in 2005, surpassing the target of 42 per 100,000. The 2005 rate for black adults aged 65 years and older was 51 per 100,000, compared with 39 per 100,000 for white adults aged 65 years and older. The 1997 rates for those two groups were 84 per 100,000 and 61 per 100,000, respectively.

**(Obj. 14-8):** In the 10 reference states where it is endemic, Lyme disease increased from a 5-year average annual rate of 23.0 new cases per 100,000 in 1995–1999 to 31.6 per 100,000 in 2001–2005. The target is 9.7 per 100,000.

**(Obj. 14-11):** New cases of tuberculosis (TB) decreased from a rate of 6.6 per 100,000 in 1998 to 4.8 per 100,000 in 2005. The target is 1.0 per 100,000. By race and ethnicity, the 2005 rates per 100,000 were as follows: non-Hispanic whites, 1.3; American Indians/Alaska Natives, 5.9; Hispanics, 9.5; non-Hispanic blacks, 10.9; and Asians, 25.7.

**(Obj. 14-18):** Courses of antibiotics prescribed for ear infections in children less than 5 years of age decreased from a rate of 69 per 100 in 1996–1997 to 47 per 100 in 2004–2005, surpassing the target of 56 per 100. Over that time span, decreases were registered for black, white, female, and male children less than 5 years of age, the 2004–2005 prescription rates per 100 for which were as follows: blacks, 39; whites, 51; females, 44; and males, 51.

**(Obj. 14-19):** Courses of antibiotics prescribed for the sole diagnosis of the common cold decreased from a rate of 2,535 per 100,000 in 1996–1997 to 1,376 per 100,000 in 2004–2005. The target is 1,268 per 100,000. The 2004–2005 prescription rates per 100,000 for selected population groups were as follows: blacks, 1,029; whites, 1,370; females, 1,428; and males, 1,322.

**(Obj. 14-22):** The target is 90 percent for this objective to achieve and maintain effective vaccination levels for universally recommended vaccines among children aged 19 to 35 months. In 2005, coverage levels for specific vaccines were as follows: 4 doses (4+) diphtheria-tetanus-acellular pertussis (DTaP), 86 percent; 3+ *Haemophilus influenzae* type b (Hib), 94 percent; 3+ hepatitis B (hep B), 93 percent; 1+ measles-mumps-rubella (MMR), 92 percent; 3+ polio, 92 percent; 1+ varicella, 88 percent; and 4+ pneumococcal conjugate, 54 percent.

**(Obj. 14-24a):** Among children aged 19 to 35 months, 81 percent in 2005 had received certain vaccines (DTaP, polio, MMR, Hib, hep B) at their recommended dosages. This marks an increase from 73 percent in 1998 and surpasses the target of 80 percent. By 2005, disparities in coverage for these vaccines among Hispanic, non-Hispanic white, and non-Hispanic black children in this age group had been eliminated or reduced to within a few percentage points.

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## Key Challenges and Current Strategies

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In presentations that followed the data overview, the principal themes were introduced by senior staff of CDC's Coordinating Center for Infectious Diseases—RADM Anne Schuchat, Director, National Center for Immunization and Respiratory Diseases; Rima Khabbaz, Director, National Center for Preparedness, Detection, and Control of Infectious Diseases; and Kevin Fenton, Director, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Their statements and briefing materials provided to Progress Review participants for later discussion identified a number of barriers to achieving the objectives, as well as activities under way to meet these challenges, including the following:

- Although government purchases (local, state, and Federal) account for nearly 55 percent of all childhood vaccine doses distributed, most of the Nation's children—including the hard-to-reach populations, underinsured, or poor children eligible to receive vaccine at no cost—receive their vaccine through a private physician's office. Some physicians' continued participation in the childhood immunization system is challenged by their perception of insufficient reimbursements for vaccine administration and the initial expense of stocking a sufficient inventory of vaccines needed to fully vaccinate the child patients in their practice.
- Adolescents generally do not seek out preventive health care, usually visiting a doctor only when they are sick. Many adolescents obtain episodic health care from providers in varied settings—for example, gynecologists' offices and emergency departments—that have rarely offered routine vaccination services to adolescents. Unlike young children, who receive preventive care more frequently, adolescents often do not have an identified "medical home," making it difficult for healthcare providers to promote vaccination among them.
- While infant and childhood immunization programs for hepatitis B have been successful in dramatically lowering infection rates among children less than 19 years of age, hepatitis B vaccine coverage is lowest for adults with behavioral risks. In 2005, approximately 95 percent of the cases of acute disease caused by the hepatitis B virus were among adults. Barriers to hepatitis B vaccination in adults include the cost of vaccine, some providers' time constraints and/or lack of awareness, and patient non-adherence to the three-dose schedule.
- The 13,767 new cases of TB in 2006 represent less than half of the persons who are evaluated for TB before the case count is finalized. For every 1 of the

- confirmed cases, public health workers must find approximately 14 persons who have been exposed. Data show that, of the more than 100,000 persons per year being exposed to TB in the United States, at least one-quarter have been infected with the TB bacterium. More than half of TB cases currently occur in foreign-born persons residing in the United States. Case detection and management present challenges in this population due to financial, linguistic, and cultural barriers.
- The recently emerged extensively drug-resistant TB (XDR TB) is caused by strains of bacteria resistant to the most effective first- and second-line drugs. Reports indicate that less than 30 percent of non-HIV-infected patients with XDR TB can be cured, and more than half die within 5 years of diagnosis.
  - A preliminary estimate by CDC suggests that a moderately severe influenza pandemic could cause between 89,000 and 207,000 deaths and cost \$71 to \$166 billion in the United States. Overall, less than half of persons who are at highest risk for influenza-related complications seek annual vaccination.
  - When the target for Lyme disease incidence (Obj. 14-8) was set in 2000, it was based on the availability of a vaccine against the disease. In February 2002, the only vaccine licensed by the Food and Drug Administration was removed from the market by the manufacturer, who cited poor sales. The absence of a commercially available vaccine is a significant obstacle to meeting the target of the objective.
  - Approximately 1.7 million healthcare-associated infections (HAIs) occur in the United States each year and are associated with 99,000 deaths annually. HAIs include surgical site infections, ventilator-associated pneumonia, catheter-associated urinary tract infections, and infections such as methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile*.
  - Through the Vaccines for Children Program (VFC), which has more than 45,000 sites, CDC is seeking to better define and enhance the infrastructure needed to deliver new vaccines to VFC-eligible adolescents and is establishing adolescent program coordinators in each state.
  - Because of the implementation of hepatitis A vaccination recommendations and other interventions, as of 2005, new cases of hepatitis A had decreased by approximately 88 percent nationwide since 1995 and had fallen to a rate of only 1.5 cases per 100,000, the lowest rate ever recorded. Also by 2005, the incidence of acute hepatitis C virus infection had declined approximately 80 percent since the late 1980s.
  - Efforts to reduce the number of courses of antibiotics prescribed for ear infections in children are supported by the CDC-developed “Get Smart” campaign, a national program that promotes appropriate antibiotic use in the community. CDC partners with states and plans to expand its partnerships to include pharmacists and employers.
  - Evidence shows that, through the “herd effect,” giving pneumococcal vaccine (PCV-7) to children has contributed to a decline in new cases of invasive pneumococcal disease in adults. From 1998 to 2003, for every case prevented through direct vaccination, at least two additional cases were prevented among those who were not themselves immunized. Evaluation and assessment infrastructures were essential to understanding the impact of the PCV-7 vaccine and will be important as new vaccines are introduced, not only to measure their impact but also to detect emerging strains of disease that may not be prevented by the vaccine.
  - In 2005, to provide a successor to an earlier system, CDC created the National Healthcare Safety Network, a secure, Web-based surveillance system used by 500 to 700 healthcare facilities throughout the United States to collect and analyze data on

healthcare-associated infections (about 1.7 million cases and some 99,000 deaths annually), as well as antimicrobial use and resistance patterns in their facilities. These data are analyzed and reported by CDC and are available to other organizations, such

as state agencies, with public reporting mandates. This reporting tool can be used by any healthcare facility in the country and is a critical element in CDC's patient safety agenda.

## **Approaches for Consideration**

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Participants in the Progress Review made the following suggestions for public health professionals and policymakers to consider as steps to enable further progress toward achievement of the objectives for Immunization and Infectious Diseases:

- Initiate preteen vaccination campaigns designed to reach parents of 11- to 12-year-olds and their healthcare providers to raise awareness of new vaccines available to enhance health in this age group. Encourage development of an adolescent equivalent of the well-defined regularly scheduled pediatric "well-child" visits for young children.
- Expand influenza vaccine recommendations to include additional groups at increased risk of complications from the disease.
- Promote universal vaccination of adults in high prevalence settings, such as STD clinics and HIV counseling and testing sites. To expand capacity in such settings, encourage states to use section 317 immunization funds to purchase hepatitis B vaccine. Foster the creation of a national system to track delivery of hepatitis B vaccinations in these settings.
- Strengthen the surveillance system associated with Lyme disease.

- In light of the fact that diagnosis of TB disease currently relies on the tuberculin skin test, which has been in use for 125 years, accelerate efforts to evaluate promising new diagnostic tests for TB in programmatic settings, as well as rapid tests for the detection of TB drug resistance.
- To heighten the state of preparedness to deal with any influenza pandemic, strengthen the national, state, and local infrastructure for responding to seasonal influenza outbreaks.

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[Signed November 13, 2007]

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