

INFECTIOUS DISEASES

Infectious diseases seem to lurk everywhere—in undercooked hamburgers, on unwashed hands, or carried by blood, water, ticks, or mosquitoes. Some, like the pathogens that cause influenza or syphilis, have preyed on humans for centuries. Others like West Nile virus or hantavirus are relatively new or emerging threats. Old threats like tuberculosis have adapted to the drugs we use against them, making harder to treat and more dangerous.

The combination of improved hygiene and sanitation, vaccinations, and antibiotics has helped turn the tide against infectious diseases in this country, but new diseases and the resurgence of old ones make infectious diseases a constant threat. To counter this threat, CDC has worked to increase the capacity of laboratories and surveillance systems here and abroad to detect and monitor changes in disease patterns and to serve as an early warning system (e.g., the ever-present threat of an influenza pandemic is monitored not only in the United States but in surveillance centers in Asia).

Outside of the laboratory, CDC promotes control of vectors like mosquitoes and ticks. CDC also has worked with public and private partners to change the way antibiotics are prescribed and used, and to help maintain the usefulness of existing anti-microbial drugs in hospitals and other settings. Combinations of all of these tools—epidemiology, partnerships, education of healthcare providers and patients, and vector control—are used to counter the spread of specific infectious disease threats ranging from sexually transmitted diseases like syphilis and chlamydia to bloodborne threats like hepatitis C. Together, these tools can help us control existing infectious disease threats and prepare for the new ones that we know are always emerging.

ANTIMICROBIAL RESISTANCE

WHAT IS THE PUBLIC HEALTH ISSUE?

- In the United States and around the world, many important human infections are developing resistance to the antimicrobial drugs used to treat them. Up to 35% of *Streptococcus pneumoniae*, an organism which is a common cause of ear infections, meningitis, and pneumonia, found in some areas of the United States are no longer susceptible to penicillin, and multidrug resistance is common. About 16% of *S. pneumoniae* are now resistant to “third generation” cephalosporin antimicrobials, and resistance to the newest fluoroquinolone antimicrobials has also emerged. In the 1970s, virtually all *S. pneumoniae* were susceptible to preferred drugs.
- Nearly all strains of *Staphylococcus aureus*, a common cause of skin and more serious infections, in the United States are resistant to penicillin and over 60% of *S. aureus* infections acquired in U.S. intensive care units are now resistant to the preferred methicillin class drugs (Methicillin resistant *S. aureus*, also called MRSA) and usually have multidrug resistance. In 2002, two cases of *S. aureus* resistant to the drug vancomycin, for years the only effective treatment, were reported.
- MRSA strains identified recently outside of healthcare settings often have antimicrobial susceptibility patterns that differ from healthcare associated strains and carry a virulence factor that may increase the chance for serious illness.
- Resistance to the most effective antimicrobial drugs can require treatment with less effective and more expensive alternatives, which may also be associated with a greater risk for side effects. Some infections found among hospitalized patients are resistant to virtually all effective antimicrobial drugs available, making therapy difficult.

WHAT HAS CDC ACCOMPLISHED?

- *Surveillance and Response:* CDC, in collaboration with state and local health departments, monitors and tracks drug-resistant infections. For example, pneumococcal infections are tracked in 10 geographic areas with a combined population of 20 million; healthcare-acquired infections in 300 hospitals in 15 states; and foodborne and diarrheal infections in 50 states. CDC also monitors drug-prescribing practices.
- *Applied Research:* In 2003, CDC awarded over \$4 million in grants to 11 academic institutions for applied research on antimicrobial resistance. CDC develops laboratory tests to detect drug resistance; studies the molecular basis of resistance; and evaluates interventions, such as improved prescribing and infection control practices.
- *Infrastructure/Training:* CDC improves the capacity of health departments, healthcare providers, and clinical laboratories to detect and report resistant infections and to implement prevention and control strategies. CDC’s Multilevel Antimicrobial Susceptibility Testing Educational Resource Program website provides up-to-date information on susceptibility testing, and a CD-ROM was developed to train clinical microbiology laboratory personnel on standardized susceptibility testing methods.
- *Prevention and Control:* CDC translates research findings into community-based and healthcare-based prevention programs to promote appropriate antimicrobial use, infection control, vaccine use, and detection of drug-resistant infections. CDC and an alliance of partners aim to improve antimicrobial use in the United States through the public health campaign, “Get Smart: Know When Antibiotics Work” which uses public service announcements and comprehensive outreach. CDC’s “Campaign to Prevent Antimicrobial Resistance in Healthcare Settings” focuses on providing evidence-based methods for preventing antimicrobial resistance among specific patient populations.

WHAT ARE THE NEXT STEPS?

In 1999, CDC, the Food and Drug Administration, and the National Institutes of Health co-chaired a task force to better coordinate public health efforts to address antimicrobial resistance. Since 2001, the agencies have been implementing the task force’s action plan as resources allow. Priority actions include improving monitoring of drug resistance and use; improving drug prescribing by educating the public and clinicians to reduce the development and spread of resistance in the community; and improving infection control practices to prevent the transmission of drug-resistant infections in healthcare settings and elsewhere.

For additional information on this or other CDC programs, visit www.cdc.gov/program

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EMERGING INFECTIOUS DISEASES

WHAT IS THE PUBLIC HEALTH ISSUE?

- Infectious diseases are a leading cause of death worldwide and are a continuing threat to our nation's health. The outbreaks of severe acute respiratory syndrome (SARS) and West Nile virus (WNV) are recent reminders of the ongoing threat of infectious diseases.
- Some infectious diseases, like influenza, are familiar foes that have affected humans for centuries. Others, like WNV, monkeypox, and SARS, are new or emerging threats. More than 35 newly emerging infectious diseases were identified between 1973 and 2000, and new infectious disease threats continue to be identified. The current public health challenge includes responding to the extraordinary ability of microbes to adapt, evolve, and develop drug-resistance, as well as addressing the implications of changes in demographics and human behaviors.
- SARS demonstrated that U.S. health and global health are inextricably linked and that fulfilling CDC's domestic mission—to protect the health of the U.S. population—requires global awareness and collaboration with international partners to prevent the emergence and spread of infectious diseases. Microbes constitute a global threat that puts every nation and every person at risk.

WHAT HAS CDC ACCOMPLISHED?

Since 1994, CDC strives to revitalize national capacity to protect the public from infectious disease. Safeguarding U.S. health also requires international action and cooperation, because U.S. health and global health are inextricably linked. U.S. citizens and foreign governments alike have come to rely on CDC for help and information. CDC's strategy to revitalize capacity to protect the public from infectious disease threats focuses on four goals: Surveillance and Response: to detect, investigate, and monitor emerging pathogens, the diseases they cause, and the factors influencing their emergence; Applied Research: to optimize public health practice; Infrastructure and Training: to strengthen our nation's public health capacity for outbreak detection and response; and Prevention and Control: to ensure prompt implementation of prevention strategies and enhance communication of public health information about emerging diseases.

CDC's response to the 2003 SARS outbreak demonstrates successful work toward these goals. Within a month of receiving clinical specimens for analysis, CDC scientists isolated, typed, and sequenced the genome of the SARS coronavirus, working closely with coronavirus experts around the globe. Using this collective knowledge, CDC researchers worked to develop specific diagnostic tests for SARS, and are currently refining these tests and distributing them to collaborating public health laboratories nationwide. CDC coordinated and mobilized more than 800 staff in the SARS response, and rapidly disseminated information to the public about prevention, diagnosis, treatment, and control of SARS via the Internet, CDs, press conferences, and live, worldwide satellite broadcasts. Nearly two million health professionals in China received essential SARS information this way.

WHAT ARE THE NEXT STEPS?

Emerging infectious diseases are cause for increasing concern. A 2003 Institute of Medicine report, *Microbial Threats to Health: Emergence, Detection, and Response*, recognizes that while we have made dramatic advances in the prevention and control of infectious diseases, the magnitude and urgency of the problem require renewed concern and commitment. The report emphasizes the need for CDC to further enhance global response capacity and improve global infectious disease surveillance. CDC's strategies to combat infectious diseases will focus on increasing preparedness to address the emergence of dangerous new threats by investing in and building upon the public health system that was established over a century ago.

EPIDEMIC INTELLIGENCE SERVICE

WHAT IS THE PUBLIC HEALTH ISSUE?

- There is a growing need for specially trained epidemiologists to address current public health problems, as well as emerging and re-emerging infectious diseases, throughout the nation.
- As the events of fall 2001 demonstrated, the nation requires “rapid response” capability to meet the real and ongoing threats of terrorism and bioterrorism.
- CDC needs an available cadre of trained epidemiologists to provide technical assistance requested by local, state, and national governments.

WHAT HAS CDC ACCOMPLISHED?

The Epidemic Intelligence Service (EIS) is a unique 2-year, post-graduate program that consists of service and on-the-job training for health professionals interested in epidemiology. Since 1951, about 2,500 EIS officers (CDC’s “Disease Detectives”) have graduated from the program. In addition to on-the-job training gained by investigating disease outbreaks, natural and man-made disasters, and other public health emergencies, the EIS program provides formal instruction to EIS officers through courses in epidemiology, biostatistics, public health ethics and law, evaluation of surveillance systems, scientific writing, and prevention effectiveness.

- In fall 2001, over 125 EIS officers were deployed—often multiple times—to help state and local health departments respond to the September 11th terrorist and anthrax attacks.
- The 2003 EIS conference brought together over 1,500 current EIS officers and alumni, other public health officials or researchers, and the media. Papers presented at the conference addressed a vast range of public health problems tackled by EIS officers, including the groundbreaking documentation of West Nile virus transmission through blood transfusions and organ transplants. That conference also included a special session on Sudden Acute Respiratory Syndrome.
- In 2003, EIS officers responded to 77 formal requests for epidemiological assistance in various locations (63 in the United States and 14 in other countries). Requests for assistance primarily concerned infectious disease problems. However, investigations also addressed environmental health issues, injuries, maternal and child health issues, and other problems.

Example of Program in Action

In the summer of 2003, EIS officers played leading roles in the investigation of the multi-state monkeypox outbreak. These investigations, in collaboration with the Food and Drug Administration, state and local health departments, and other organizations, documented the first-ever appearance of this human illness in the Western Hemisphere and led to banning the importation and interstate transportation of imported exotic animals.

WHAT ARE THE NEXT STEPS?

Implementing a plan to place an EIS officer or EIS-trained epidemiologist (Career Epidemiology Field Officer) in every state to help improve the public health infrastructure is a priority. Training for these officers has been expanded to include terrorism preparedness and emergency response. CDC also plans to partner with academia and state and local health departments to improve epidemiologic capacity.

FOOD SAFETY

WHAT IS THE PUBLIC HEALTH ISSUE?

- Foodborne diseases cause about 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States each year.
- Hospitalization costs for these illnesses are estimated at more than \$3 billion per year. Costs from lost productivity are estimated at \$8 billion per year.
- Known pathogens account for an estimated 14 million illnesses, 60,000 hospitalizations, and 1,800 deaths. *Salmonella*, *Listeria*, and *Toxoplasma* are responsible for 75% of these deaths each year.
- Undetermined agents account for the 62 million illnesses, 265,000 hospitalizations, and 3,200 deaths annually.

WHAT HAS CDC ACCOMPLISHED?

CDC monitors occurrences of foodborne disease illnesses in the United States. These surveillance systems provide early warning of dangers in the food supply, provide data on new or changing patterns of foodborne diseases, track progress of current prevention efforts, and provide information for development of new prevention strategies. CDC works with state and local health departments to build their epidemiology, laboratory, and environmental health capacities for foodborne disease surveillance and outbreak response. CDC also works with federal food safety regulatory agencies to identify and evaluate foodborne disease prevention strategies.

Example of Program in Action

FoodNet is a network of 10 sites around the United States that monitors more than 36 million persons (13% of the U.S. population). This network monitors the major causes of foodborne illness, conducts surveys for unreported foodborne illness, and studies risk factors associated with illness. FoodNet data provide the most comprehensive information available for foodborne illness. FoodNet data for 1996 through 2002 indicate substantial declines in the incidence of *Campylobacter*, *Listeria*, *Typhimurium*, and *Yersinia*. *Campylobacter*, and *Listeria* incidences are approaching their respective national health objectives, indicating important progress in food safety. PulseNet, winner of the Innovations in Government award, performs molecular fingerprinting of bacterial foodborne pathogens. This network facilitates the prompt recognition of large and small foodborne outbreaks so interventions can be implemented promptly and disease can be prevented. PulseNet participants include all 50 state public health laboratories, 4 local public health laboratories, 7 Food and Drug Administration laboratories and the U.S. Department of Agriculture FSIS laboratory. In 2003, PulseNet detected several large multi-state outbreaks in less than 14 days.

WHAT ARE THE NEXT STEPS?

CDC will continue to

- Detect, investigate, and monitor emerging foodborne pathogens, the diseases they cause, and the factors influencing their emergence.
- Assist state and local health departments in response to unique and multi-state foodborne disease outbreaks.
- Build state and local health department capacity to detect and respond to foodborne disease outbreaks through technology transfer, guidance, training, and providing funds to enhance infrastructure.
- Advance laboratory diagnostics and expand laboratory networks for foodborne bacteria, viruses, parasites, and other contaminants.
- Improve integration of laboratory science and epidemiology resources to optimize public health practices for the prevention and control of food-related illnesses.
- Disseminate public health information about foodborne illnesses to physicians and the public.

For additional information on this or other CDC programs, visit www.cdc.gov/program

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HEPATITIS C VIRUS

WHAT IS THE PUBLIC HEALTH ISSUE?

- Hepatitis C virus (HCV) infection is the most common chronic bloodborne viral infection in the United States.
- About 1% of the non-institutionalized people in the United States (2.7 million) is chronically infected with HCV. Many of these persons are not aware of their infections and are not clinically ill.
- Direct exposure to blood poses the highest risk for HCV transmission. Injection drug users account for the largest number of infected persons; 60% to 80% of persons who have injected drugs for 5 years or more are infected with HCV.
- Cirrhosis of the liver develops in 10% to 20% of persons with chronic hepatitis C over 20 to 30 years, and liver cancer develops in 1% to 5%.
- Chronic liver disease is the 10th leading cause of death among adults in the United States. An estimated 40% to 60% of chronic liver disease is due to hepatitis C.

WHAT HAS CDC ACCOMPLISHED?

CDC currently supports the following:

- Cooperative agreements with 50 states and large metropolitan areas to create hepatitis C coordination activities that will help lead to the integration of viral hepatitis counseling, testing, referral, and surveillance into existing public health programs.
- Cooperative agreements with 17 state and local health departments to evaluate the delivery of viral hepatitis prevention counseling and testing, referral, and education in sexually transmitted diseases, HIV, drug treatment, and correctional healthcare settings.
- 12 cooperative agreements with nongovernmental organizations to develop and disseminate hepatitis information and education materials to the general public and groups at high-risk of infection.
- 7 demonstration sites to evaluate strategies for states to implement chronic viral hepatitis infection surveillance.
- A population-based study of the etiology of and trends in chronic liver disease in the United States.

CDC also has published guidelines for collecting and reporting information about persons with chronic HCV; laboratory testing and reporting of HCV antibody results; and prevention and control of infections with hepatitis viruses in correctional settings. CDC recently distributed the *Hepatitis C Toolkit*, which contains educational material for physicians and their patients, to a test population of 140,000 physicians.

WHAT ARE THE NEXT STEPS?

CDC will continue to support state and local hepatitis C coordination activities; help translate lessons learned from the demonstration projects to state and local health programs; develop and provide training to healthcare professionals; improve and expand surveillance for HCV infection and chronic liver disease at national and state levels; evaluate the progress of notifying transfusion recipients who received blood from donors who later tested positive for HCV; determine the need for additional studies or recommendations to prevent perinatal and sexual transmission; and assist corrections health programs with ways to address the prevention and control of HCV infection in prison populations.

For additional information on this or other CDC programs, visit www.cdc.gov/program

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INFLUENZA

WHAT IS THE PUBLIC HEALTH ISSUE?

- Influenza viruses cause annual epidemics and periodically cause pandemics (sudden pervasive infections in all age groups on a global scale). Three pandemics have occurred during the past century.
- In the United States, influenza epidemics are associated with an annual average of 36,000 deaths and more than 110,000 hospitalizations. Between 50,000 to 70,000 influenza-related deaths and 200,000 hospitalizations can occur during serious epidemics.
- According to CDC mathematical models, an influenza pandemic could result in an estimated 5-fold increase in U.S. deaths (89,000 to 207,000) and hospitalizations (314,000 to 734,000) compared with an average influenza epidemic.
- Of all emerging infections, influenza has the greatest likelihood of causing widespread illness, death, and social disruption.
- Many bioterrorist threats first present as an influenza-like illness and many similarities exist between influenza pandemic preparedness and preparing for bioterrorism.

WHAT HAS CDC ACCOMPLISHED?

- CDC continues to strengthen the international network of collaborating laboratories to monitor the emergence and spread of new epidemic and pandemic strains of influenza. CDC also provides both international and domestic outbreak response.
- CDC provides support to states to improve the infrastructure needed to respond to epidemics and a possible pandemic of influenza and provides technical assistance for pandemic planning.
- CDC conducts research aimed at developing rapid molecular methods for characterizing novel influenza viruses and the human antibody response to them.
- In partnership with other government agencies, CDC continues to work on a plan for pandemic influenza response.

Example of Program in Action

Through the World Health Organization, CDC has provided support for influenza surveillance in Asia, Europe, and Latin America. This support allows long-term, year-round influenza surveillance to monitor for variant viruses that could circulate in the United States in the future. Early identification allows inclusion of new variant viruses in the annually reformulated influenza vaccine before epidemics caused by these viruses occur in the United States.

WHAT ARE THE NEXT STEPS?

With its partners, CDC will continue to develop and implement a comprehensive, practical, and action-oriented approach for both the public and private sectors to improve the prevention and control of influenza in the United States during the present inter-pandemic period. CDC and partners will also identify and implement mechanisms, policies, and procedures to improve our readiness for a future pandemic.

LYME DISEASE

WHAT IS THE PUBLIC HEALTH ISSUE?

- Lyme disease, an infection that is commonly spread through ticks, is the most prevalent vector-borne infectious disease in the United States.
- More than 23,000 cases were reported to CDC in 2002, but many more cases are unreported.
- If not diagnosed and treated in its early stages, Lyme disease can result in serious complications, such as arthritis, neurological abnormalities, and rarely, cardiac problems.
- Laboratory testing for Lyme disease has improved, but greater understanding is needed of its performance in clinical practice.
- New, environmentally safe and cost-effective approaches to control ticks are also needed.

WHAT HAS CDC ACCOMPLISHED?

CDC's Lyme disease prevention and control activity is a science-based program of education, research, and service conducted in partnership with other federal agencies, state and local health departments, and other nonfederal organizations. CDC supports national surveillance, epidemiologic response, field and laboratory research, consultation, and educational activities through intramural initiatives. CDC also funds collaborative studies on community-based prevention methods, improved diagnosis and understanding of pathogenesis, tick ecology, and development and testing of new tools and methods for tick control.

CDC has initiated several extramural and intramural efforts to develop and disseminate education materials that promote Lyme disease prevention. With funding from a CDC cooperative agreement for Lyme disease education, Connecticut Public Television produced an award-winning 1999 documentary on Lyme disease. CDC funds also enabled the Massachusetts Department of Public Health to create a physician's reference manual on tick-borne diseases in 2003.

CDC has mapped the national distribution and risk for Lyme disease and has defined environments, activities, and behaviors that place people at high risk of infection. CDC has developed new and effective devices and methods for preventing infection and safely reducing vector ticks in the environment, such as insecticide-treated rodent bait boxes.

WHAT ARE THE NEXT STEPS?

Lyme disease and other emerging tick-borne infectious diseases are cause for increasing concern with regard to public health and safety in the outdoor environment. CDC's program for 2004 and beyond emphasizes the goal of working with Lyme disease endemic communities to develop a wide assortment of practical, integrated tick control strategies for their use in preventing Lyme disease. Such strategies include environmental management, biological and chemical control of ticks, and enhanced personal protection through tick avoidance and other measures. Areas of research include the development of natural forest products for use as environmentally acceptable alternatives in pest control, deer- and rodent-targeted methods of insecticide application, further efforts to predict Lyme disease risk on a national scale, and further understanding of host immune responses to infection with the Lyme disease bacterium.

PATIENT SAFETY

WHAT IS THE PUBLIC HEALTH ISSUE?

According to a sentinel 2000 Institute of Medicine (IOM) report on patient safety, about 44,000 to 98,000 Americans die each year from preventable medical errors, and wound infections are the second leading type of preventable adverse events. The report also estimates that costs associated with medical errors are estimated to be as much as \$29 billion annually; adverse events affecting medical care occur in about 3% to 4% of all patients; and existing technology and knowledge can prevent many errors, but prevention strategies have not been widely implemented. Healthcare-associated infections cost the U.S. healthcare system an estimated \$4.5 billion and, according to CDC estimates, contribute to about 90,000 deaths annually, or one death every 6 minutes.

WHAT HAS CDC ACCOMPLISHED?

CDC has expanded the infection control and prevention public health program to prevent other types of healthcare-associated medical injuries. In 2003, CDC continued existing collaborations with state and local health agencies, private-sector consortia and academic medical centers and healthcare providers to develop, implement, and evaluate cutting-edge research and demonstration programs.

Examples of Program in Action

- In the past decade, hospitals participating in CDC's National Nosocomial Infections Surveillance (NNIS) system for monitoring and preventing adverse healthcare events have had a 30% to 50% decline in targeted infections.
- A study conducted in collaboration with investigators in the NNIS system has demonstrated an association between an increased incidence of preventable complications, specifically catheter-associated bloodstream infections in intensive care units and declines in full-time nurses.
- Demonstration projects in collaboration with healthcare providers in Chicago have shown the feasibility and utility of using improved information systems and targeted educational interventions to help providers improve healthcare quality and reduce process variation that can lead to errors and poor outcomes of care, including healthcare-associated infections.
- CDC is collaborating with healthcare providers and sponsoring organizations in Southwestern Pennsylvania in demonstrating the feasibility and potential long-term advantages of both a regional approach to quality improvement and the applicability of industrial process improvement technology to improving patient safety by preventing Methicillin Resistant *Staphylococcus aureus*.
- A state-wide survey in Iowa to assess clinician perceptions of and barriers and facilitators to patient safety was completed and a demonstration project focusing on patient-provider communication and comprehension is underway.
- CDC collaborates with University of Iowa to assess the incidence of and to prevent microbiology laboratory errors, especially errors in antimicrobial susceptibility testing.
- CDC and other federal and private partners are developing a new activity targeting surgical adverse events, including surgical site infections, with a goal of a 50% reduction over 5 years. The project is proposed as a national rollout in 2005.

WHAT ARE THE NEXT STEPS?

Federal agencies and state and local health departments can facilitate widespread adoption and implementation of strategies to prevent and control healthcare-associated harm. CDC plans to evaluate improved information systems that allow healthcare providers to efficiently identify and monitor errors and adverse events to enhance the healthcare system's capacity to respond to the greatest risks and needs.

For additional information on this or other CDC programs, visit www.cdc.gov/program

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PREVENTING INFERTILITY IN WOMEN

WHAT IS THE PUBLIC HEALTH ISSUE?

- Chlamydia and gonorrhea are the most important preventable causes of infertility and potentially fatal tubal pregnancy. If not adequately treated, up to 40% of women infected with chlamydia or gonorrhea will develop infection in the uterus or fallopian tubes. Known as pelvic inflammatory disease (PID), this infection can lead to infertility or ectopic pregnancy.
- Chlamydia is the most commonly reported notifiable disease in the United States. In 2002, a total of 834,555 chlamydial infections were reported to CDC from 50 states and the District of Columbia. An estimated 2.8 million cases of chlamydia occur annually. The number of reported cases is lower than the estimated total number because infected people are often unaware of, and do not seek treatment for, their infections.
- Each year about 718,000 people in the United States are infected with gonorrhea.
- Chlamydia and gonorrhea rates are highest among adolescent girls. In 2002, 41% of chlamydia infections in females were reported among 10- to 19-year-old girls, and 39% of gonorrhea infections were reported in this age group.
- Chlamydia increases the risk of HIV infection at least 3-fold to 5-fold.

WHAT HAS CDC ACCOMPLISHED?

CDC, in collaboration with the Office of Population Affairs (OPA), supports a national Infertility Prevention Program that funds chlamydia screening and treatment services for low-income, sexually active women attending family planning, Sexually transmitted diseases, and other women's healthcare clinics. This program has shown that routine screening of women can reduce chlamydia prevalence and PID incidence in women. Data from the Health Plan Employer Data and Information Set indicate that chlamydia screening of young, sexually active women in commercial-managed care settings is inadequate (less than 27%). CDC is conducting infertility prevention research that focuses on performance of diagnostic tests, factors associated with recurrent chlamydia infections, and effectiveness and feasibility of chlamydia screening in males to reduce infection in women.

Example of Program in Action

Since the start of a chlamydia screening program in 1988, chlamydia positivity in the Pacific Northwest has dropped 55% (from 13% in 1988 to 5.8% in 2002) among women attending family planning clinics. A randomized controlled trial conducted in a managed-care setting in this area also showed that screening programs can reduce cases of PID by almost 60%.

WHAT ARE THE NEXT STEPS?

Increases in program funding have helped expand this project to all 50 states. In 2002, program funding expanded to screen and treat about 59% of young, sexually active, and low-income women in the 20 states where screening was first initiated and 36% in the remaining 30 states. CDC aims to reduce this inequitable distribution of services and expand chlamydia screening and treatment to low-income women through the network of public service providers in each state. CDC also plans to examine reasons for recent increases in gonorrhea and re-evaluate gonorrhea screening criteria to help programs better target scarce resources and improve disease prevention strategies.

SYPHILIS ELIMINATION

WHAT IS THE PUBLIC HEALTH ISSUE?

Syphilis is a sexually transmitted disease (STD) caused by the bacterium *Treponema pallidum*. Syphilis is curable if detected. However, there is an estimated 2-fold to 5-fold increased risk of acquiring HIV infection if a syphilis sore is present. Syphilis can also be transmitted from a pregnant woman to her unborn child. CDC launched the National Plan to Eliminate Syphilis in 1999. At that time the number of cases of infectious syphilis was low, and the geographical areas in which they were occurring were limited, making identification and treatment of cases feasible. Syphilis was mainly found in communities of color where poverty and access to healthcare were key factors allowing it to persist. In 1998 the infectious syphilis rate for non-Hispanic blacks was 34 times greater than the rate for non-Hispanic whites. The Syphilis Elimination program improved access to high-quality, culturally-sensitive preventive and care services, provided education about prevention of syphilis among minority communities, and strengthened outbreak response preparedness. CDC also strengthened partnerships with other public health organizations, the private medical community, and other partners in STD and HIV prevention.

WHAT HAS CDC ACCOMPLISHED?

Syphilis elimination accomplishments from 1997 to 2002 include the following:

- Infectious syphilis rates in women decreased by 59%.
- The rate of congenital cases fell by 62%.
- Overall rate of infectious syphilis fell by 20%.
- The number of counties responsible for half of all U.S. cases declined 48%, from 31 counties in 1997 to 17 counties in 2002.

Success of the Syphilis Elimination program in reducing racial disparity and rates in women has been offset by a rise in cases of infectious syphilis among men. Following a decade-long decline and an all-time low in 2000, new cases of infectious syphilis began to rise in 2001. Between 2001 and 2002, the rate of infectious syphilis increased 9.2% overall, and 26.7% among men. This increase is predominantly among a sub-group of men who have sex with men (MSM) who have increased unprotected sexual practices. Data collected from 29 states showed a 17% increase in HIV diagnoses among MSM between 1999 and 2002. These findings raise concerns about a resurgence of HIV in this population. Some MSM report a reduction in safer sex practices, partly resulting from better physical health and well-being, and belief that advances in AIDS drugs have made HIV a chronic, but not deadly disease.

Example of Program in Action

In 2002 a pilot program was implemented in eight cities with the greatest number of MSM syphilis cases. This program is working with community organizations and local health departments to increase syphilis screening, symptom recognition, and outreach efforts.

WHAT ARE THE NEXT STEPS?

CDC and its partners are stepping up efforts to address increases in MSM syphilis. This includes collecting data on behavior and other risk factors to better understand factors associated with the spread of syphilis, and developing strategies for identifying and contacting sex partners met anonymously to ensure potentially infected individuals are tested.

TUBERCULOSIS ELIMINATION

WHAT IS THE PUBLIC HEALTH ISSUE?

- Tuberculosis (TB) is a leading infectious killer of young adults worldwide, claiming the lives of more than 3 million people each year. About one third of the world's population is latently infected with the bacterium that causes TB.
- An estimated 10 to 15 million U.S. citizens have latent TB infection, and about 10% of these individuals will develop TB at some point in their lives. Those who are infected with HIV have a greater chance of developing TB.
- Persons born outside the United States now account for half of all U.S. TB cases.

WHAT HAS CDC ACCOMPLISHED?

CDC works to eliminate TB in the United States and to control the spread of the disease globally. Within the United States, CDC provides financial and technical assistance to local, state, and territorial TB control programs to monitor TB, sustain decreases in new cases, and support directly observed therapy and investigation of contacts to active TB cases. CDC also supports the TB Trial Consortium to develop and test new therapies, the TB Epidemiological Studies Consortium to evaluate new approaches to controlling TB, and the Model TB Centers to provide training and education in TB prevention and control.

We are making progress in efforts to eliminate TB in the United States. Since 1992, the most recent peak of the epidemic, reported cases has declined 43.5%. From 2001 to 2002, reported cases of TB in the United States declined 5.7% (from 15,989 to 15,075). This represents the 10th consecutive year that TB cases have declined nationally. Internationally, CDC collaborates with the U.S. Agency for International Development, the World Health Organization, and others through efforts such as the *Stop TB Initiative* (see www.stoptb.org) and through assistance to specific countries.

Example of Program in Action

New York City's TB control program has been one of the most dramatic public health successes in recent decades. In the early 1990s, the city was the epicenter of the TB and multidrug-resistant TB epidemic in the country. Funding from federal, state, and local sources enabled the city's program to implement new TB control initiatives, such as

- Case management of all TB patients and directly observed therapy.
- Cohort reviews by program staff on all TB cases.
- Improved delivery of clinical care by health department chest clinics.
- Targeted testing of high-risk populations.
- New regulations on detaining noncompliant TB patients.

The result was a decline in the number of TB cases to 1,084 cases in 2002, a 72% decrease from 1992, the peak year of the recent epidemic. Multi-drug resistant TB declined by nearly 95% from the 1992 peak of 441 cases to 25 cases in 2002.

WHAT ARE THE NEXT STEPS?

CDC will work in concert with state, national, and international partners to continue to address the Institute of Medicine's recommendations released in their report *Ending Neglect: The Elimination of Tuberculosis in the United States*. As incidence declines, new challenges in controlling TB emerge. In 2003, CDC will continue a pilot project to increase the capacity of low incidence states to respond to outbreaks and intensively manage and review TB cases to determine the barriers to elimination. CDC continues to support state and local TB programs to maintain control of TB in low incidence areas; to implement directly observed therapy and contact investigation; to disseminate new tools to aid in TB control, including diagnostics and treatments; and to help control TB globally.

For additional information on this or other CDC programs, visit www.cdc.gov/program

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WEST NILE VIRUS

WHAT IS THE PUBLIC HEALTH ISSUE?

The human and animal epidemic of West Nile encephalitis, which began in the northeastern United States in the summer and fall of 1999 and has since spread coast-to-coast, underscores the ease with which emerging infectious pathogens can be introduced into new areas. The persistence of virus activity in the United States over the past 5 years indicates that West Nile virus (WNV) has become established in North America. In 2002, WNV caused the largest ever human flaviviral epidemic in recent U.S. history, reinforcing the need to rebuild the public health infrastructure to deal with vectorborne diseases in this country. Extensive severe disease activity continued in 2003, expanding significantly westward, and increased availability of commercial testing lead to the identification of far greater number of West Nile Fever (less severe disease) and the total of human cases nearing 9,000.

WHAT HAS CDC ACCOMPLISHED?

- *Surveillance and Response:* CDC evaluates, revises, and publishes national guidelines for surveillance, prevention, and control of WNV on a continuing basis, issuing the third update during 2003. Using a national electronic surveillance system (ArboNet), CDC works with local and state health departments to track WNV infections in humans, birds, mosquitoes, horses, and other animals. Data from ArboNet guided prevention and control activities at the state and local level during 2003. Continually updated information on WNV surveillance is available at www.cdc.gov/westnile and at www.westnilemaps.usgs.gov.
- *Applied Research:* CDC developed/implemented new laboratory tests to detect the presence of WNV antigen in human, avian, veterinary, and mosquito specimens. CDC continued to monitor the genetic evolution of WNV worldwide and identified novel routes of WNV infection, including tissue transplantation and blood transfusion. CDC continued funding 13 universities and health facilities for applied research to better understand WNV biology. CDC scientists continued work to further characterize the behavior of the *Culex* vector mosquito and identify the most effective mosquito control measures.
- *Infrastructure and Training:* CDC provided funding to 56 state and local health departments to enhance epidemiologic and laboratory capacity for surveillance of and response to WNV infection and other arboviral diseases. This funding improves the overall readiness to response to vector-borne diseases. CDC also funds cooperative agreements for training in medical arbovirology at four universities. Formal training courses have been held in laboratory diagnosis of WNV infection and in medical entomology. CDC has sponsored 5 national meetings on WNV.
- *Prevention and Control:* CDC has promoted an integrated strategy for prevention and control of WNV, including large-scale emergency plans for mosquito control to be used by states in response to a large human outbreak. CDC funded and collaborated in the development of informational and educational materials for the public, specific audiences, and healthcare workers. Testing of all blood donations in the United States began in July 2003 to respond to the risk of WNV transmission through blood transfusion and organ donation identified in 2002. CDC worked with the Food and Drug Administration, the Health Resources and Services Administration, blood collection agencies, state and local health departments, and the pharmaceutical industry to implement this testing, which has reduced the risk of transfusion-associated WNV infection substantially by removing hundreds of units of potentially infectious blood products donated by asymptomatic donors.

WHAT ARE THE NEXT STEPS?

WNV is now established in North America, with a geographic range now stretching from coast-to-coast and into Latin America, the Caribbean, and Canada. Effective systems are needed to ensure expanded monitoring for WNV and other arboviral diseases in North America and further development of prevention and control measures, including integrated pest management, public education, optimal mosquito control measures, vaccines, and antiviral therapy. Further research on the basic biology of the virus and its natural ecology is also being pursued.

For additional information on this or other CDC programs, visit www.cdc.gov/program

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