1648. National Center for Health Statistics, Hyattsville, Md., 1977.
4. Council on Scientific Affairs, American Medical Association: Concepts of nutrition and health. JAMA 242: 2335–2338.
5. Tobian, L.: Dietary salt (sodium) and hypertension. Am J Clin Nutr 32: 2659–2662, December 1979.
6. Food and Nutrition Board, National Research Council: Toward healthful diets. National Academy of Sciences, Washington, D.C., 1980.
7. Federation of American Societies for Experimental Biology: Evaluation of the health aspects of sodium chloride and potassium chloride as food ingredients. Bethesda, Md., 1979.
8. Select Committee on Nutrition and Human Needs, U.S. Senate: Dietary goals for the United States. U.S. Government Printing Office, Washington, D.C., December 1977.
9. U.S. Department of Agriculture and U.S. Department of Health and Human Services: Nutrition and your health—dietary guidelines for Americans. Consumer Information Center, Pueblo, Colo., 1980.
10. Current perspectives in hypertension, a symposium on food, nutrition and health. Hypertension, pt. 2, vol. 4, No. 5, supp. 3, September-October 1982; (a) pp. III-170 to III-175.
11. National Institutes of Health: Report of the Hypertension Task Force, volume eight—current research and recommendations from the task force subgroups on renin-angiotensin-aldosterone, and salt and water. NIH Publication No. 79–1630. Bethesda, Md., 1979.
12. Tobian, L.: The relationship of salt to hypertension. Am J Clin Nutr 32: 2739–2748, December 1979.
13. Hunt, J. C., and Margie, J. D.: The influence of diet on hypertension management. *In* Hypertension update, vol. 4. Health Learning Systems, Inc., Bloomfield, N.J., 1980, pp. 37–47.
14. Parijs, J., Joosens, J. V., and Vander Linden, L.: Moderate sodium restriction and diuretics in the treatment of hypertension. Am Heart J 85: 22–34, 1973.

Surveillance and Control of Infectious Diseases: Progress Toward the 1990 Objectives

WALTER R. DOWDLE, PhD

Dr. Dowdle is Director, Center for Infectious Diseases, Centers for Disease Control, Atlanta, Ga. 30333. Contributors to this report were Dr. John Bennett, Dr. Claire Broome, Dr. Donald Francis, and Ms. Ladene Newton, Center for Infectious Diseases; Dr. Kenneth Powell. Center for Prevention Services; Dr. Philip Brachman, Global Epidemiology Program; Dr. Carl Tyler, Epidemiology Program Office; Dr. Joyce Essien, Laboratory Program Office, all of the Centers for Disease Control; Dr. Dennis McIntyre, Indian Health Service; and Dr. George Galasso, National Institute of Allergy and Infectious Diseases, National Institutes of Health.

Tearsheet requests to Dr. Dowdle.

SYNOPSIS

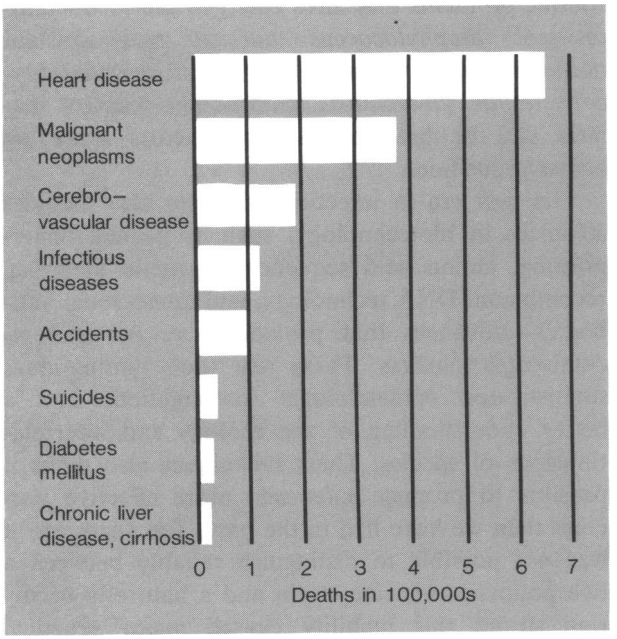
Great progress has been made in the United States in reducing infectious disease mortality. However, infectious diseases remain the greatest cause of morbidity in this country. Newer infectious diseases or agents have been recognized, but newer tools for surveillance and control have also been made available. Specific objectives for the reduction of infectious diseases by 1990 have been set by the Public Health Service. The opportunities appear to be good for achieving by 1990 objectives for nosocomial infections, Legionnaires' disease, tuberculosis, and surveillance and control of infectious diseases. Achievement of the 1990 objectives for hepatitis B, pneumococcal pneumonia, and bacterial meningitis, however, will require both scientific advances and additional resources.

GREAT PROGRESS HAS BEEN MADE in the United States in this century in reducing mortality attributable to infectious diseases. Infectious diseases were the fourth leading cause of death in the United States in 1976 (fig. 1) after heart disease, malignant neoplasms, and cerebrovascular diseases, according to data extracted from information published by the National Center for Health Statistics (*1*). Data are not available for all infectious diseases, but in 1980, influenza and pneumonia ranked seventh in years of potential life lost by the total U.S. population ages 1 to 64 years (*2*), as the following tabulation shows.

Cause	*Total years lost*
1. Accidents and adverse effects	2,684,850
2. Malignant neoplasms	1,804,120
3. Diseases of the heart	1,636,510
4. Suicides, homicides	1,401,880
5. Chronic liver disease	301,070
6. Cerebrovascular diseases	280,430
7. Pneumonia and influenza	124,830
8. Diabetes mellitus	117,340
9. Chronic obstructive pulmonary diseases and allied conditions	110,530
All causes	10,006,060

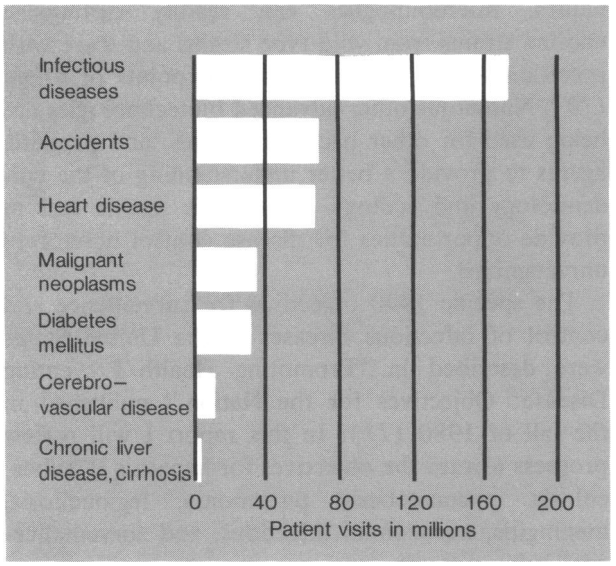
By comparison, in 1900 tuberculosis, influenza and pneumonia, and diphtheria were the three leading

Figure 1. Mortality, United States, 1976



SOURCE: 1976 data from the National Center for Health Statistics.

Figure 2. Patient visits for illness, United States, 1981



SOURCE: 1981 National Disease and Therapeutic Index.

causes of years of potential life lost before age 65 (*3*). In that year influenza and pneumonia accounted for 13 percent of years of life lost, compared with 1.25 percent in 1980.

Despite accomplishments in the control and treatment of infectious diseases, they still rank as the greatest cause of morbidity in the United States. Data from the National Disease and Therapeutic Index for 1981 (*4*) show infectious disease morbidity to be at least three times that for accidents,

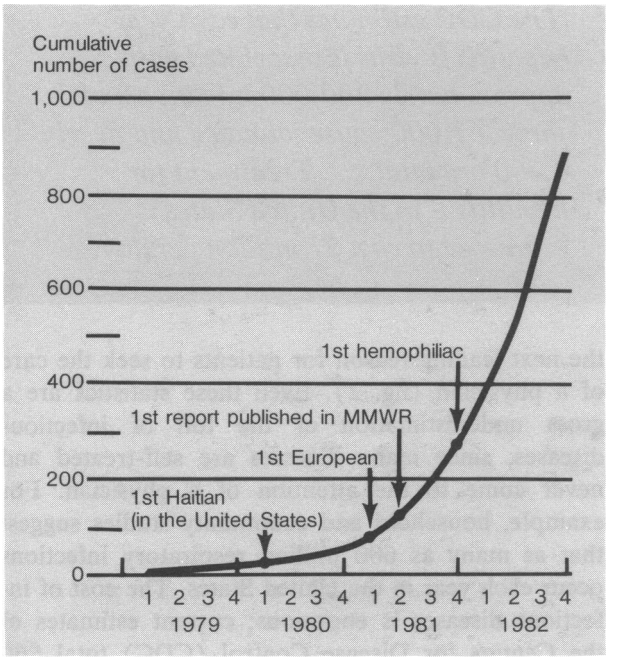
'The CDC estimates that each year hepatitis B virus is associated with approximately 200,000 infections; of these, 67,000 cause jaundice and nearly 4,000 are fatal. . . . Treatment for hepatitis B in the United States is estimated to cost $1 million per day.'

the next leading reason for patients to seek the care of a physician (fig. 2). Even these statistics are a gross underestimation of the toll of infectious diseases, since many illnesses are self-treated and never come to the attention of a physician. For example, household and community studies suggest that as many as 600 million respiratory infections occur each year in the United States. The cost of infectious diseases is enormous; current estimates of the Centers for Disease Control (CDC) total $60 billion annually.

With better sanitation, higher standards of living, and aggressive Federal and State immunization programs to prevent infectious diseases, we have entered a new era of infectious diseases. Poliomyelitis, measles, mumps, diphtheria, tetanus, and pertussis are disappearing from the offices of pediatricians and from the vocabularies of mothers. But as these diseases decrease in incidence, other diseases or infectious agents are being recognized. Mentioned frequently in recent medical and public health reports are legionellosis, acute hemorrhagic conjunctivitis, the African hemorrhagic fevers, hemorrhagic colitis, Lyme disease, toxic shock syndrome, epidemic non A/non B hepatitis, and Delta agent (a viruslike agent that co-infects with hepatitis B virus to produce a more severe disease).

Perhaps the greatest challenge is presented by the acquired immune deficiency syndrome (AIDS). This disease was first recognized in 1979. At this writing in February 1983, the cumulative number of AIDS cases in the United States has exceeded 900 (fig. 3). The overall case-fatality ratio is about 40 percent, but the fatality rate is more than 90 percent for patients with symptoms for 2 or more years. Through 1982, three-fourths of the victims were homosexual or bisexual men; most of the others were Haitians or intravenous drug users. Recent reports show AIDS affecting hemophilia type A patients, children of AIDS victims, and recipients of blood transfusions; thus AIDS is a

Figure 3. Reported cases of acquired immune deficiency syndrome, by date of diagnosis, United States, 1979–82



NOTE: 1st quarter of 1979 is cumulative total from 1975.

broader public health problem than was first thought. Officials of CDC, Food and Drug Administration, and the National Institutes of Health, as well as professional organizations, are devoting considerable resources toward defining the epidemiology and etiology of the disease and devising methods for preventing it.

In addition, in the past few years, much has been learned about the disease potential of other agents of infections, for example, *Chlamydia, Campylobacter,* and hepatitis viruses.

Also identified are new vehicles of spread for old diseases, primarily reflecting changing lifestyles. For example, a multistate salmonellosis outbreak was associated with marijuana (*5*), *Pseudomonas* infections have been transmitted through common use of whirlpool baths (*6*), yersiniosis has been contracted through ingestion of tofu (*7*), and nontuberculosis mycobacteria have been acquired through the implantation of porcine heart valves (*8*).

Resistance to antimicrobials represents a growing problem in infectious diseases that requires medical and public health officials to be constantly alert. Resistant strains of bacteria continue to contribute to morbidity and mortality and have an economic impact on public health programs. Dapsone-resistant strains of *Mycobacterium leprae* found in many tropical areas are susceptible to rifampin (*9*), but the cost of rifampin is significantly higher. Other specific problems that have emerged are methicillin-resistant *Staphylococcus aureus,* multi-resistant nosocomial gram-negative rods, multi-resistant *Mycobacterium tuberculosis,* chloroquine-resistant malaria, and the threat of resistance factors' spreading across genus lines.

The new era in infectious diseases also includes advances in biotechnology, such as genetic fingerprinting, amino acid sequencing, genetic mapping, recombinant DNA technology, and monoclonal antibodies—advances that provide more precise epidemiologic markers. These new tools permit more sophisticated epidemiologic investigations and a better understanding of the ecology and interrelationships of species. These techniques also make it possible to produce safer and more effective vaccines than we have had in the past. Ten years ago it was not possible to distinguish reliably between a live poliovirus-vaccine strain and a naturally occurring strain; this inability caused major practical problems in the laboratory diagnosis of poliomyelitis. Using oligonucleotide mapping techniques, monoclonal antibodies, and other molecular techniques, microbiologists can readily distinguish vaccine strains from wild type strains and trace with precision wild type strains to their points of origin (*10*). Numerous other advanced biotechnologies are being used for other bacteria, viruses, and parasitic agents to provide a better understanding of the epidemiology and ecology of etiologic agents and to provide opportunities for disease control heretofore unrecognized.

The specific 1990 objectives for surveillance and control of infectious diseases in the United States were described in "Promoting Health/Preventing Disease: Objectives for the Nation," published in the fall of 1980 (*11*). In this report I will review progress toward the objectives for hepatitis B, tuberculosis, pneumococcal pneumonia, legionellosis, meningitis, nosocomial infections, and surveillance-evaluation systems.

Hepatitis B

The CDC estimates that each year hepatitis B virus (HBV) is associated with approximately 200,000 infections; of these, 67,000 cause jaundice and nearly 4,000 are fatal. The major associated cause of death is cirrhosis (3,500), followed by acute hepatitis and liver cancer. Treatment for hepatitis B in the United States is estimated to cost $1 million per day.

Our objective is to reduce the occurrence of hepatitis B from a level of 45 new cases per 100,000 population in 1978 to 20 per 100,000 in 1990. Achieving this reduction of more than 50 percent will not be simple. The important new tool for preventing hepatitis B is the highly effective vaccine which was licensed in 1981 (*12,13*). Nevertheless, the vaccine's cost of nearly $100 per series and the difficulty in identifying those at greatest risk of HBV infection create obstacles to its effective use.

Current CDC data suggest that 68 percent of hepatitis B patients belong to one of four major high-risk groups: homosexual-bisexual men, heterosexual contacts of HBV patients, intravenous (IV) drug users, and health care personnel (fig. 4). At present, most vaccine requests are for health care personnel, who represent only 6 percent of those at highest risk of acute hepatitis B. This group, of course, is most likely to participate in any vaccination program. The major challenge is to vaccinate the homosexual-bisexual male population and IV-drug users before exposure, if the vaccine is to have maximum public health effect (fig. 5).

Availability of vaccine alone will not lead to achievement of the 1990 objectives. Additional information is needed on the 34 percent of hepatitis B patients who have no identified risk and on whether this group can benefit by reduction of hepatitis B among the groups with known risk. Innovative approaches are also needed for effectively controlling the spread of hepatitis B among homosexual men and IV-drug users.

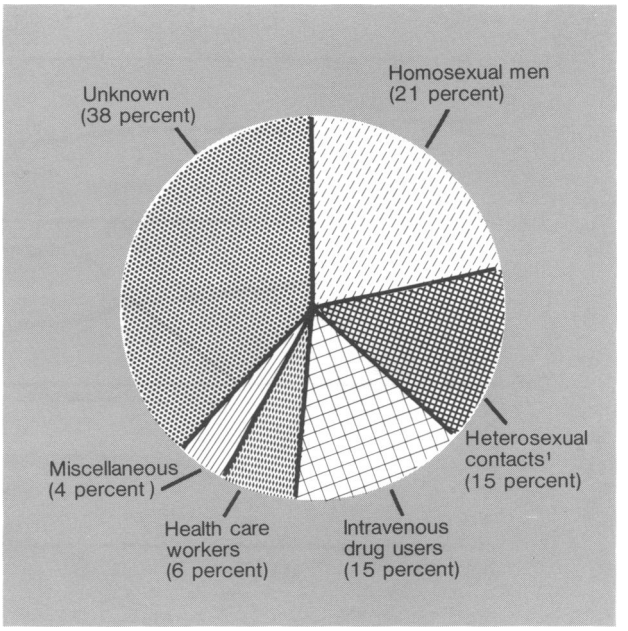
Certain ethnic groups, such as Alaska Eskimos, have rates of hepatitis B that are 5 to 10 times higher than those in the contiguous United States and more consistent with those in the Far East (*14,15*). The Indian Health Service has purchased vaccine and initiated a program in Alaska to vaccinate Eskimo family members who are at highest risk of acquiring hepatitis B infections. The Service plans to extend the program to all susceptible persons by 1986.

The vaccine is highly cost-effective in certain populations, even at present prices. However, the costs prohibit consideration of a universal HBV vaccination program. If a synthetic or less expensive vaccine becomes available, this decision may be reconsidered.

Tuberculosis

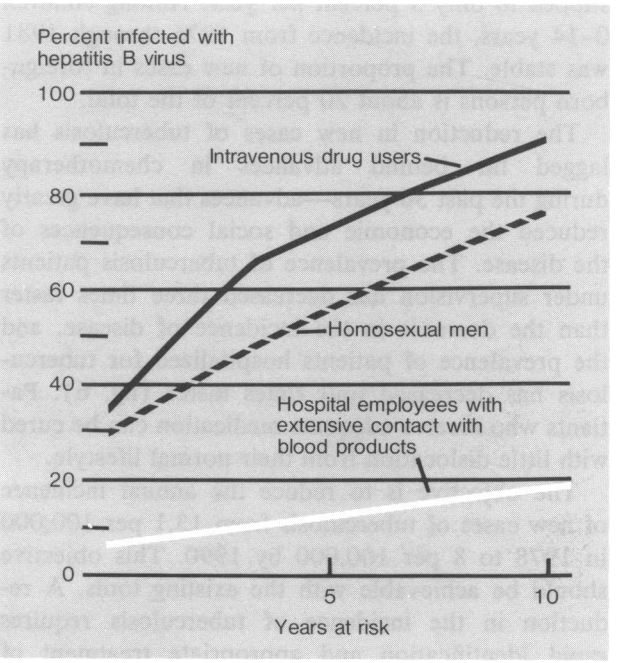
In 1981, the incidence of tuberculosis was 11.9 new cases per 100,000 population, and more than

Figure 4. Acute hepatitis B risk groups, sentinel counties, United States, 1982



[1] Includes contacts of carriers, of those with acute cases, and multiple sexual contacts.

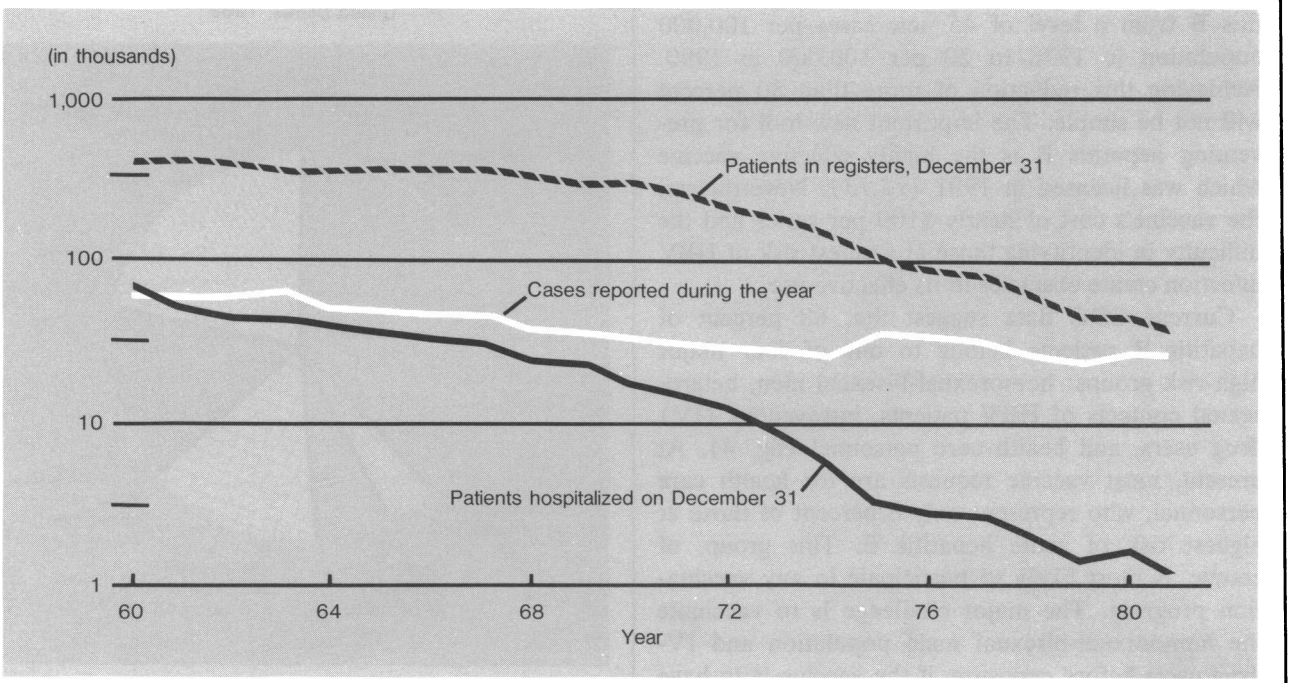
Figure 5. Hepatitis B virus infection, by years at risk



27,000 new cases were reported (*16*). Because treatment usually requires 9 to 18 months (and longer for some patients), on any single day 50,000 patients are under medical supervision for tuberculosis.

From 1968 through 1978, the incidence of tuberculosis declined about 6 percent per year (*17*).

Figure 6. Tuberculosis cases, patients hospitalized with tuberculosis, and patients in tuberculosis registers, United States, 1960–81



From 1979 through 1981, however, the decline slipped to only 3 percent per year. Among children 0–14 years, the incidence from 1976 through 1981 was stable. The proportion of new cases in foreign-born persons is about 20 percent of the total.

The reduction in new cases of tuberculosis has lagged far behind advances in chemotherapy during the past 30 years—advances that have greatly reduced the economic and social consequences of the disease. The prevalence of tuberculosis patients under supervision has decreased three times faster than the decrease in the incidence of disease, and the prevalence of patients hospitalized for tuberculosis has decreased four times faster (fig. 6). Patients who receive adequate medication can be cured with little dislocation from their normal lifestyle.

The objective is to reduce the annual incidence of new cases of tuberculosis from 13.1 per 100,000 in 1978 to 8 per 100,000 by 1990. This objective should be achievable with the existing tools. A reduction in the incidence of tuberculosis requires rapid identification and appropriate treatment of patients and identification and preventive treatment of persons who are infected but are not ill. Important problems, however, have arisen as the practice of treating patients in the hospital has shifted to treating them in the outpatient clinic. Some studies have shown that as many as 20 percent of outpatients with tuberculosis fail to complete even 6 months of therapy (*18*).

A promising approach to correcting these failures has been to use outreach workers in tuberculosis control programs. The outreach worker monitors and promotes compliance by visiting the patient regularly in the patient's own environment. The outreach worker can deliver the medication in this setting, and workers can be selected who have social, ethnic, or language characteristics similar to the patient's. This approach has been shown to be highly effective. Over a 24-month period, outreach workers in New York City were assigned 98 patients who could not be kept on therapy using traditional clinic methods. At the end of the program, more than 80 percent had been cured or were taking medication regularly (fig. 7).

In September 1982, $1 million in Federal cooperative agreement funds was awarded to health agencies in 12 high-incidence urban areas, primarily to increase the number of outreach workers available for tuberculosis control. An additional $5 million will be awarded in fiscal year 1983.

The success of the Federal-State efforts to achieve the 1990 objective will be monitored through evaluation indices such as the percentage of patients taking medication.

Pneumococcal Pneumonia

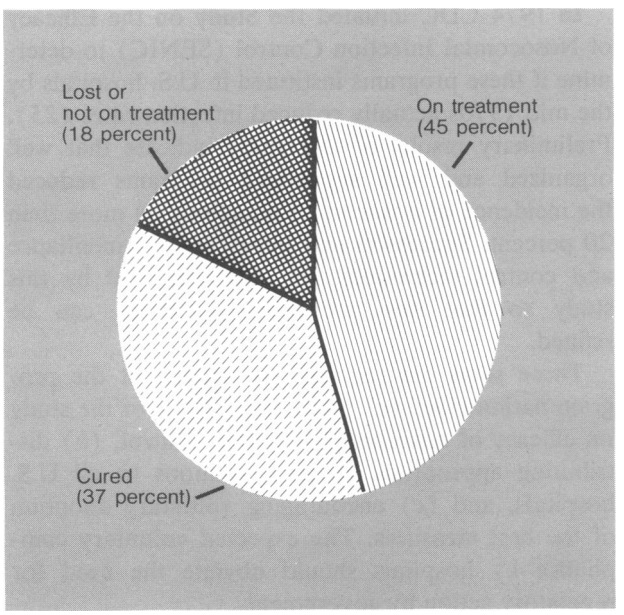
The objective is to reduce the incidence of pneumococcal pneumonia from the level of 182 cases per

100,000 population in 1978 to 115 per 100,000 in 1990. This objective was set as a multivalent vaccine was being introduced. It had been shown to be about 90 percent efficacious against strains causing pneumonia in young adults (*19*). Since then, preliminary studies on the efficacy of pneumococcal vaccine for the patients at highest risk in this country have suggested a protection level of about 60 percent against the strains in the vaccine (*20*). The vaccine is recommended by the Immunization Practices Advisory Committee of the Public Health Service for use in high-risk groups (*21*), but it has not been widely accepted by physicians or health care providers. The controversy surrounding the efficacy of the vaccine may have contributed to this poor utilization. In addition, only about 70 percent of the strains now causing invasive disease are represented in the vaccine.

The reduction of pneumococcal pneumonia does not, of course, depend entirely on the availability of an effective vaccine. Lifestyle is a major factor in morbidity and mortality caused by pneumococcal pneumonia. Reduction of alcoholism, reduction of nosocomial infection, improved general health, and wider use of influenza vaccine should contribute to reducing the incidence of pneumococcal pneumonia.

To achieve the 1990 objective will not be an easy task. Better methods of surveillance and more reliable diagnostic tests for pneumococcal infections are greatly needed, and a vaccine covering a larger number of strains with more immunogenic antigens is required. Studies by Public Health Service agencies and vaccine producers are under way in each of these areas.

Figure 7. Status in June 1982 of 98 previously "lost" tuberculosis patients enrolled in outreach program, July 1980–June 1982, New York City



Legionellosis

Legionellosis is an acute infection of human beings caused by various species of the genus *Legionella*. The disease may be manifested as bronchopneumonia or as a self-limited febrile illness, in either epidemic or sporadic form. The number of cases in the United States is estimated by the CDC to be 52,000 a year for *Legionella pneumophila* alone, with perhaps more than 100,000 cases when all *Legionella* species are included. The case-fatality ratio for the pneumonic form is 14 percent, or 7,200 deaths per year. Although the incidence of the disease is considerably lower than the incidence of pneumococcal pneumonia, Legionnaires' disease has been given a high priority by public health officials because there are potentially inexpensive steps that can be taken to reduce the incidence of disease.

The objective is to reduce the annual estimated incidence of legionellosis from the 23 cases per 100,000 population in 1979 to 17 per 100,000 in 1990. To achieve this objective, certain information is required. We must know more about the ecology of *Legionella* species. The contribution to disease of contaminated cooling systems in sporadic legionellosis and the role of contaminated potable water in both epidemic and sporadic legionellosis need to be defined. Effective, practical, and inexpensive designs for water systems and treatment programs to prevent or eradicate contamination need to be developed and evaluated. Since 1976, 10 new species of *Legionella* have been described, and an equal number of strains are under consideration as candidates. In formulating control programs, the potential of these organisms for causing disease in man must be assessed. Other factors to be considered include the development of diagnostic tests that can be performed rapidly, assessment of possible interventions aimed at preventing infection in patients at high risk of developing legionellosis when exposed, and further evaluation of antimicrobial treatment regimens in an effort to reduce the substantial case-fatality ratio associated with legionellosis.

Bacterial Meningitis

An estimated 20,000 cases a year of bacterial meningitis occur in the United States. Neonates have

'Since 1976, 10 new species of Legionella *have been described, and an equal number of strains are under consideration as candidates.'*

the highest incidence of reported disease; the next highest rate is for infants 6 to 8 months old. Nearly 70 percent of all reported cases of bacterial meningitis occur in children less than 5 years old. According to CDC data, more than half of the cases of bacterial meningitis in the United States are caused by *Haemophilus influenzae* type b, as the following estimate for the United States in 1980 shows:

Etiologic agent	*Number of cases*
Haemophilus influenzae type b	10,000
Neisseria meningitidis	3,000
Streptococcus group B	1,000
Streptococcus pneumoniae	3,000

The objective is to reduce the annual reported incidence from 8.2 cases per 100,000 in 1978 to 6 or fewer per 100,000 in 1990. Clearly, to achieve a significant reduction, efforts must be focused on *H. influenzae* b. For the U.S. population, the yearly incidence of *H. influenzae* b is about 40 cases per 100,000 children under age 5 years. For Navajo Indians, however, the rate is 5 times higher, and for Alaska Eskimos the rate is 10 times higher. Recent studies have shown that rifampin chemoprophylaxis is effective in preventing secondary cases of this disease (*22*). This use of rifampin could potentially reduce the incidence of disease by approximately 4 percent. This step is an important contribution to the control of *H. influenzae* b meningitis, but an effective vaccine against *H. influenzae* b is essential to achieve the 1990 objective.

The National Institute of Allergy and Infectious Diseases (NIAID) recently sponsored a workshop to review the status of the development of vaccines for the prevention of *H. influenzae* type b infection in infants. The workshop participants reviewed past work with pure capsular polysaccharide vaccine for *H. influenzae* b infection, which has been under evaluation for a number of years. Although this vaccine is effective in adults and children over 2 years of age, it is not effective in infants. Several commercial and academic organizations have produced experimental vaccines for use in infants. Most of these new vaccines employ a combination of capsular polysaccharide with carrier proteins or whole pertussis cells. Safety and antigenicity studies are under way with several candidate vaccines, and an efficacy trial of the most promising vaccine is planned by NIAID for early 1984. Other approaches to protecting infants by the use of passive immunization with immune gamma globulin or by the hyperimmunization of pregnant women are also under investigation. It is hoped that an effective vaccine for the prevention of *H. influenzae* b infections in infants will be available by 1990.

Nosocomial Infections

Approximately 5 percent of the 35 million patients admitted to U.S. hospitals each year acquire a nosocomial infection. The annual direct cost is estimated at more than $1 billion (*23*). The objective is to reduce the overall U.S. nosocomial infection risk by 20 percent from the level that would have pertained in the absence of systematic hospital-based control efforts. The basic prevention program, which was initiated nearly 10 years ago, includes a full-time infection control nurse for every 250 beds who conducts surveillance, an infection control physician, and in infection control committee. The function of the committee is to review surveillance data on the occurrence of nosocomial infections and to recommend control or prevention measures in accordance with the surveillance information. Virtually all U.S. hospitals adopted this approach voluntarily in the 1970s (*24*).

In 1974 CDC initiated the Study on the Efficacy of Nosocomial Infection Control (SENIC) to determine if these programs instituted in U.S. hospitals by the mid 1970s actually reduced infection rates (*25*). Preliminary results of this study indicate that well organized and well supervised programs reduced the incidence of nosocomial infections by more than 20 percent. Successful and unsuccessful surveillance and control techniques are also identified by this study so that new preventive strategies can be refined.

Three steps are required to implement the program nationwide: (*a*) publishing results of the study on efficacy of nosocomial infection control, (*b*) distributing appropriate recommendations to all U.S. hospitals, and (*c*) encouraging voluntary adoption of the best measures. The expected voluntary compliance by hospitals should obviate the need for regulatory action by government.

Improved Surveillance-Evaluation Systems

The objectives for 1990 are that State health departments and appropriate Federal health agencies should have computer-based telecommunications for routine collection, analysis, and dissemination of surveillance data and rapid communication of messages. They should have data reporting systems capable of monitoring trends of common infectious agents not now subject to traditional public health surveillance and surveillance and control systems capable of responding to and containing newly recognized diseases and infections introduced from foreign countries.

Progress is being made toward achieving these objectives. Technical assistance has been provided to the States that are purchasing micro or mini computers and software programs. Software has been developed for routine handling of disease surveillance data and has been made available to 10 State and local health departments for a pilot study during 1983. The study will be extended to an additional 10 States in 1984.

New statistical methods for analyzing surveillance data have already been devised, and others are being developed so as to place surveillance on a more scientific basis. Of particular interest is the development of a computer software package to assist in investigations of disease outbreaks. A model communications network through which data, manuscripts, and messages can be transmitted between computers is being field tested in four State health departments and CDC. The outbreak investigation package and other analytic tools can be made available through this network. During 1983, up to 10 State health departments will begin using this system.

As an interim measure, CDC has developed the rapid information transmission system, which currently involves 43 State health departments; the system enables these States to receive messages from CDC electronically by calling in during prearranged periods during the week. The Morbidity and Mortality Weekly Report is currently being transmitted this way before publication. Although more sophisticated communications software is available for the surveillance and communications network, funding limits participation to those States that can purchase their own hardware.

'Recent reports show AIDS affecting hemophilia type A patients, children of AIDS victims, and recipients of blood transfusions; thus AIDS is a broader public health problem than was first thought.'

References

1. Bennett, J. V.: Human infections: economic implications and prevention. Ann Intern Med 89: 761–763, Pt. 2 (1978).
2. National Center for Health Statistics: Annual summary of births, deaths, marriages, and divorces, United States, 1980. Monthly Vital Statistics Report, Vol. 29, No. 13, Sept. 17, 1981.
3. Bureau of Census: Special reports: mortality statistics 1900–1904 (1906).
4. National Disease and Therapeutic Index (NDTI): January–December 1981. IMS America, Ltd., Ambler, Pa., 1982.
5. Centers for Disease Control: Salmonellosis traced to marijuana—Ohio, Michigan. Morbid Mortal Weekly Rep 30: 77–78 (1981).
6. Centers for Disease Control: Otitis due to *Pseudomonas aeruginosa* serotype 0:10 associated with a mobile redwood hot tub system—North Carolina. Morbid Mortal Weekly Rep 31: 541–542 (1982).
7. Centers for Disease Control: Outbreak of *Yersinia enterocolitica*—Washington State. Morbid Mortal Weekly Rep 31: 562–564 (1982).
8. Centers for Disease Control: Followup on mycobacterial contamination of porcine heart valve prostheses—United States. Morbid Mortal Weekly Rep 27: 92, 97–98 (1978).
9. Centers for Disease Control: Increase in prevalence of leprosy caused by dapsone-resistant *Mycobacterium leprae*. Morbid Mortal Weekly Rep 30: 637–638 (1982).
10. Nottay, B. K., et al.: Molecular variation of Type 1 vaccine-related and wild polioviruses during replication in humans. Virology 108: 405–423 (1981).
11. Department of Health and Human Services, Public Health Service: Promoting health/preventing disease: objectives for the nation. U.S. Government Printing Office, Washington, D.C., fall 1980.
12. Szmuness, W., et al.: Hepatitis B vaccine: demonstration of efficacy in a controlled clinical trial in a high-risk population in the United States. N Engl J Med 303: 833–841 (1980).
13. Francis, D. P., et al.: The prevention of hepatitis B with vaccine: report of the Centers for Disease Control multi-center efficacy trial among homosexual men. Ann Intern Med 97: 362–366 (1982).
14. Barrett, D. H., et al.: Epidemiology of hepatitis B in two Alaskan communities. Am J Epidemiol 105: 118–122 (1977).
15. Heyward, W. L., et al.: Primary hepatocellular carcinoma in Alaskan Natives, 1969–1979. Int J Cancer 28: 47–50 (1981).
16. Centers for Disease Control: CDC: Tuberculosis—United States, 1981. Morbid Mortal Weekly Rep 31: 443 (1982).

17. Centers for Disease Control, Center for Prevention Services, Division of Tuberculosis Control: Tuberculosis in the United States, 1979. HHS Publication No. (CDC) 82-8322. Atlanta, Ga., November 1981.
18. Snider, D., et al.: Preliminary results of 6-month regimens studied in the United States and Poland. Chest 80: 727-729 (1981).
19. Austrian, R.: Some observations on the *Pneumococcus* and on the current status of pneumococcal disease and its prevention. Rev Infect Dis 3 (supp.): S1-S15, March-April 1981.
20. Broome, C. V.: Efficacy of pneumococcal polysaccharide vaccines. Rev Infect Dis 3 (supp.): S82-S88, March-April 1981.
21. Centers for Disease Control: Recommendation of the Immunization Practices Advisory Committee (ACIP): Pneumococcal polysaccharide vaccine. Morbid Mortal Weekly Rep 30: 410-412, 417-419 (1981).
22. Centers for Disease Control: Prevention of secondary cases of *Haemophilus influenzae* type b disease. Morbid Mortal Weekly Rep 31: 672-674, 679-680 (1982).
23. Sencer, D. J., and Axnick, N. W.: Utilization of cost/benefit analysis in planning prevention programs. Acta Medica Scandinavia 576 (supp.): 123-128 (1975).
24. Haley, R. W., and Schachtman, R. H.: The emergence of infection surveillance and control programs in U.S. hospitals: an assessment, 1976. Am J Epidemiol 111: 574-591 (1980).
25. Haley, R. W., et al.: Study on the efficacy of nosocomial infection control (SENIC project): summary of study design. Am J Epidemiol 111: 472-485 (1980).

The United States—The Netherlands Round Table Conference on Immunization. Summary Report

E. JOOST RUITENBERG, DVM, PhD
ALAN R. HINMAN, MD

Dr. Ruitenberg is Director of the Division of Immunology, Rijksinstituut, Bilthoven, The Netherlands.
Tearsheet requests to Alan R. Hinman, MD, Director, Immunization Division, Center for Prevention Services, Centers for Disease Control, Atlanta, Ga. 30333.

SYNOPSIS

A group of public health scientists from the United States and The Netherlands met at a Bicentennial Round Table Conference December 1–2, 1982, to discuss the latest developments in immunization against infectious diseases, focusing on pertussis, poliomyelitis, measles, and rubella.

The major differences in immunization practices in the two countries are: (a) In The Netherlands, inactivated polio vaccine is used exclusively; in the United States, the oral polio vaccine is used. Poliomyelitis has virtually disappeared from both countries. (b) In The Netherlands, the pertussis component of DTP (diphtheria, tetanus, pertussis) is not given to children over the age of 1 year, whereas in the United States, it is given to children up to their seventh birthday. (c) Rubella vaccine is given only to girls at ages 11–12 years in The Netherlands, but to all children at ages 12–15 months in the United States. (d) Mumps vaccine is not administered to children in The Netherlands, but in the United States it is given routinely to children at 12–15 months (in combination with measles and rubella vaccine).

The participants concluded that both the United States and The Netherlands have effective immunization programs that have significantly reduced the impact of these diseases.

As a part of the commemoration of the bicentennial of diplomatic relations between the United States and The Netherlands, the Round Table Conference on Immunization was held December 1–2, 1982, at the Rijksinstituut voor de Volksgezondheid in Bilthoven, The Netherlands. The participants are listed at the end of this report. Discussions covered all aspects of immunization, from technical issues in vaccine production through the development and implementation of vaccination policies. This article summarizes the major discussions and the conclusions reached.

The immunization schedules in use in the two countries were reviewed (see table). Major differences are that inactivated polio vaccine (IPV) is used in The Netherlands and oral polio vaccine (OPV) is used in the United States; that the pertussis component is not administered to children over the age of 1 year in The Netherlands but is given to children up to their seventh birthday in the