CDC / NCID
CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR INFECTIOUS DISEASES

Volume 7 / No. 5 / November – December 1998

FOCUS

Communicating NCID's prevention and control programs for emerging and reemerging infectious diseases

Message from the Director

Dear Colleagues:

Professional and public education are important components of CDC's plan, *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century*. Thus, reaching out to our partners and the public through the Internet continues to be an NCID communications priority.

NCID's web home page (www.cdc.gov/ncidod) has a new design, featuring four alternating infectious diseases or syndromes (recent topics were *E. coli*, hantavirus, hepatitis, and influenza). The new design allows for easier access to our disease information and division and program home pages; the "HotZone" promotes new and cross-cutting topics.

NCID's web site has several useful additions. A new page on rabies includes a "Rabies for Kids" section, NCID's first web site written just for children (see IDEA Place, p. 5). DVRD's Special Pathogens Branch page includes a variety of fact sheets. A bioterrorism web page has been created as well.

Preventing Emerging Infectious Diseases can be viewed on line or downloaded and printed. An on-line welcome video introduces people to the strategic plan.

Projects under way for the web include the continued development of health communication pages, development of a video library on the web, and interactive web pages.

James M Hughes

James M. Hughes, M.D.

Focus on AIDS, STD, and TB Laboratory Research

Rapid tests for HIV-1 infection evaluated

Recently, new rapid HIV immunoassays have been developed which can provide test results in an average of 15 minutes. In settings where such tests are being used, persons who test negative on the rapid HIV test can be given an immediate, definitive negative result. Those whose HIV rapid test is repeatedly reactive can be counseled about their initial test results but must return for results of confirmatory testing.

Although only one rapid HIV test is currently licensed for commercial use by the Food and Drug Administration (FDA), several other rapid tests have been developed and are awaiting FDA approval. At CDC, both the Division of HIV/AIDS Prevention (DHAP), National Center for HIV, STD, and TB Prevention (NCHSTP), and the Division of AIDS, STD, and TB Laboratory Research, NCID, are involved in efforts to determine the feasibility of using such rapid tests in the United States and other countries. Within DASTLR's HIV Immunology and Diagnostics Branch, Tim Granade is conducting studies to evaluate the performance of the rapid tests in comparison to current testing methods.

In most countries, the standard screening test for HIV infection is the enzyme immunoassay (EIA). Persons seeking HIV testing through their physicians or at clinic sites that offer such testing (e.g., HIV counseling and testing, STD, or family planning) provide blood specimens, which are sent to specialized laboratories that perform EIAs. Specimens that are positive on the initial EIA are retested with a second EIA. Specimens that are repeatedly reactive are tested by Western blot to confirm results. Although this testing algorithm is extremely accurate, persons occasionally must wait several weeks to receive their initial results. In addition, many clinics report low return rates for test results, particularly when the clinic visit was made for a purpose other than HIV testing.

Bernie Branson, NCHSTP/DHAP, and Tim Granade, NCID/DASTLR, perform rapid HIV tests.

Mr. Granade has evaluated the rapid HIV immunoassays in comparison to current EIAs based on their performance in both laboratory and field sites, ability to detect low-titer HIV antibody, ability to detect antibodies induced by various HIV strains, adaptability for use with

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Rapid HIV tests – continued from page 1

whole blood and oral fluids, and comparative costs when applied in various settings. He has also evaluated the use of combinations of rapid tests to obtain confirmed HIV test results. The rapid HIV tests were found to be as sensitive and specific as the EIAs in all settings, detecting all commonly occurring HIV strains and performing well with whole blood and oral fluids in addition to serum. In addition, combinations of rapid HIV tests performed comparably to the standard EIA/Western blot algorithm.

Although the rapid HIV immunoassays are more expensive than standard EIAs, studies have shown that they are cost-effective in certain settings. These tests reduce the need for outreach efforts to locate and counsel persons who test HIV-positive but do not return for test results. An article published in the March 27, 1998, *MMWR*, describes the use of these tests in several public health clinics in the United States. Although the current EIA/Western blot algorithm continues to be the recommended strategy for HIV antibody testing, the use of the rapid tests may increase as more tests are approved and may eventually enable infected persons to learn their HIV test results in 1 day. ■

Focus *is distributed bimonthly to National Center for Infectious Diseases (NCID) staff and CDC colleagues and constituents by Editorial Services, Office of Health Communication, NCID.*

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Focus on Quarantine

DQ hosts exercise to develop response to emerging infections

Patient Zero, an international passenger, lands in Atlanta, carrying with him a new and virulent strain of influenza. He is transported to the designated isolation hospital near the airport, but not before infecting others in his tour group. These passengers travel on to Miami, where they board the SS Affection for an ill-fated voyage through the Caribbean. The illness rapidly spreads to other passengers and crew members, posing many challenges for public health and quarantine officials.

This hypothetical scenario was drafted by members of an officer-in-charge working group (Margaret Becker, Mike Marty, Marty Remis, Susan Maloney, and Ava Navin) to elicit recommendations from participants in a "tabletop" exercise staged on September 14 in the International Concourse of Atlanta Hartsfield Airport. The exercise was part of efforts by the Division of Quarantine to develop a protocol for coordinated response to emerging infectious disease threats at U.S. ports of entry. Questions addressed included the following:

- What events should trigger notification of the quarantine station by a carrier?
- Under what circumstances should passengers be detained on board?
- What are the roles of the various agencies in responding to an incoming ill passenger?
- Who should be notified, and who is responsible for notification?
- What precautions are recommended for emergency response personnel?

The 70+ participants, who were invited from a wide range of agencies and organizations that would be involved in responding to such an emergency, included representatives of cruise lines; airport management, security, and fire and rescue; Delta Airlines; state and local health departments; and the Immigration and Naturalization Service. Other CDC programs represented were the Influenza Branch, Division of Viral and Rickettsial Diseases, NCID; the Office of the General Counsel, Office of the Director; Office of Health Communication, NCID; the National Immunization Program; and the Vessel Sanitation Program, National Center for Environmental Health.

L to R: Martha Remis, Margaret Becker, and Mike Marty, Officers in Charge of the Quarantine Stations in Chicago, New York, and Los Angeles (respectively), spearheaded a working group that conducted a tabletop exercise in emergency response.

Panelists' recommendations will be incorporated into an updated emergency response protocol for use by quarantine officials at ports of entry. This updated protocol is expected to be in effect in the spring of 1999. ■

Focus on Hospital Infections

Hospital Infections Program unit to conduct research into biofilms

HIP has initiated a new field of research into biofilms and their impact in public health and medicine. Biofilms are coatings (similar to tooth plaque) produced by many pathogenic microorganisms that encase the organisms and help them adhere to internal surfaces of catheters, water pipes, medical devices, and even some body tissues.

In catheters and other medical devices, these protective coatings may enable the organisms to withstand sterilization and disinfection efforts. In water systems, they can help the organisms survive harsh environmental conditions. In patients, the biofilms may provide protection against antibiotics.

"Because the biofilms make these pathogens harder to kill," said Mike Miller, acting chief of HIP's Hospital Environment Laboratory Branch (HELB), "they increase the risk of infectious disease during many medical procedures."

The HIP Biofilm Laboratory, established in HELB in September 1998, will focus on the role of biofilms in facilitating infections associated with indwelling medical devices, the effect of biofilms on the emergence of resistance, and the role of biofilms in the environmental survival of clinically relevant microorganisms.

Rod Donlan, coodinator of HIP's biofilm research.

"Because biofilms are ubiquitous within the medical and public health arena," said Dr. Miller, "we see many opportunities to collaborate with CDC units that are responsible for organisms capable of producing biofilms. Of prime interest will be examining the role biofilms may play in contributing to the emergence of resistance."

The laboratory will combine classical microbiology with the engineering sciences to develop model systems for examining biofilms in or on indwelling medical devices or from medical or recreational water sources. In addition, to enhance CDC's capability for direct imaging of biofilms, the laboratory will use the latest technology, including unique staining, cryosectioning, and organism communication within biofilms.

Rodney Donlan, an internationally known biofilm microbiologist, has joined HELB and will direct the biofilm laboratory's activities. ■

International surveillance program for antimicrobial resistance meets in Atlanta

The International Networks for the Study and Prevention of Emerging Antimicrobial Resistance (INSPEAR), an international surveillance program established in 1997 by the Hospital Infections Program in conjunction with international partners in 33 countries, held its fifth meeting, in Atlanta in September.

INSPEAR is a response to the global emergence of drug-resistant organisms. This emergence has resulted in a need for international surveillance programs and a strenghthening of the microbiologic and epidemiologic capacities of hospitals worldwide.

The main purposes of INSPEAR are 1) to serve as an early warning system for emerging antimicrobial resistance, 2) to rapidly distribute information about this resistance, and 3) to provide microbiologic and epidemiologic assistance to INSPEAR members.

Herve Richet, a visiting scientist with HIP, coordinates the activities of INSPEAR. "A major aim of the program," he said, "is to provide support and direction to the numerous existing surveillance systems. Another goal is to foster collaboration and a pooling of microbiologic and epidemiologic resources by the existing systems."

Herve Richet

At the September meeting, major agenda items included the design of an early warning system to monitor the emergence of antimicrobial resistance at both the global and local level and a proposed plan to ensure that INSPEAR members have the laboratory capacity for accurately testing for antimicrobial resistance. ■

Focus on Viral and Rickettsial Diseases

Revised guidelines for preventing human rabies published

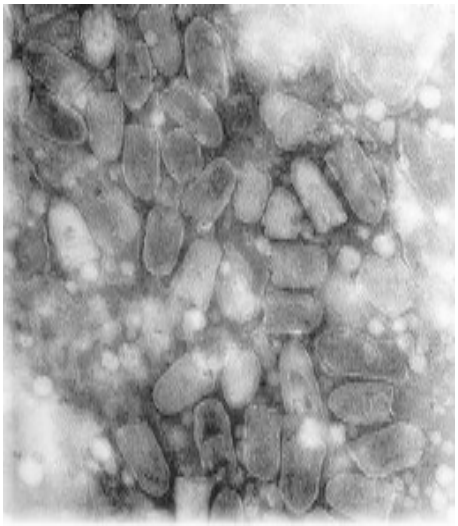
As part of its ongoing guidance for clinical practice and policy development related to the appropriate management of persons at risk for rabies, CDC recently published revised recommendations on the prevention of human rabies in the United States (*MMWR* 1999;48[RR-1]:1-21). The recommendations were developed by members of the Rabies Working Group of the Advisory Committee on Immunization Practices; CDC representatives included Paul Arguin, James Childs, Cathleen Hanlon, John Krebs, Charles Rupprecht, Jean Smith, and Tracee Treadwell, Viral and Rickettsial Zoonoses Branch, Division of Viral and Rickettsial Diseases.

According to DVRD Director Brian Mahy, "This report is crucial to our strategy for human rabies prevention. It updates previous recommendations, provides guidance regarding exposure to bats, and includes important new information about a recently licensed rabies vaccine, an observation period for domestic ferrets, and changes in the administration of rabies immune globulin."

Rabies is a viral infection that attacks the central nervous system, causing an acute encephalomyelitis that is invariably fatal. The virus is transmitted in the saliva of infected animals and is typically spread by the bite of a rabid animal. Symptoms of rabies in humans are initially nonspecific, consisting of fever, headache, and malaise. As the disease progresses, neurologic symptoms develop and may include anxiety, confusion, excitation, insomnia, hallucinations, hydrophobia (fear of water), and paralysis.

In the United States, rabies is rare among humans: 27 cases were reported to CDC from 1990 through 1998, including 6 that were presumably acquired outside the country. However, during the past 50 years, rabies has become increasingly prevalent among wildlife populations, especially bats, raccoons, and skunks, and these animals pose a continuing threat to humans and their pets. Consequently, each year in the United States as many as 40,000 people receive expensive postexposure prophylaxis (PEP), consisting of rabies immune globulin and rabies vaccine. The estimated annual cost of U.S. rabies control programs exceeds $300 million.

The prevention strategy outlined in the revised recommendations relies on immediate and thorough washing of animal bite wounds, appropriate assessment of the risk for rabies infection, and, if necessary, prompt administration of rabies immune globulin and vaccine. This treatment is uniformly effective at preventing human rabies when given correctly. Rabies-related deaths among humans usually occur because people do not recognize the risk of infection after exposure to a rabid animal and do not seek medical attention. For this reason, CDC and state and local health departments have produced materials to inform people of the risk for rabies and how to avoid exposure to potentially rabid animals (see IDEA Place, p. 5). ■



Electron micrograph of rabies virus, a rhabdovirus of the genus Lyssavirus.

DVRD investigates human rabies case in Virginia

The Division of Viral and Rickettsial Diseases recently assisted the Virginia State Health Department in investigating a case of human rabies. An inmate at a Virginia correctional facility became ill on December 14, 1997, and was hospitalized 4 days later after his condition worsened. Laboratory tests confirmed rabies virus infection and showed that the strain was associated with Eastern pipistrelle and silver-haired bats. The patient died on December 31; his illness was the only case of human rabies reported in the United States during 1998.

According to Jennifer McQuiston, EIS Officer, Viral and Rickettsial Zoonoses Branch, the patient had no apparent history of an animal bite or scratch. The most likely explanation for the infection is that the patient was bitten by a bat, but he either did not notice the bite or was unaware that it posed a risk for rabies. Forty-eight people have received rabies postexposure prophylaxis as a result of having contact with the patient. ■

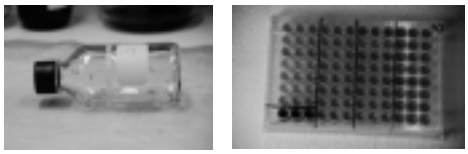
Focus on Parasitic Diseases

Insecticide-resistance surveillance critical to control of emerging mosquito-borne infectious diseases

Insecticide resistance has been found in the mosquito vectors of malaria, dengue, yellow fever, and other emerging vector-borne diseases. Particularly worrisome is the recent detection of resistance to pyrethroid insecticides in U.S. mosquito populations of *Culex quinquefasciatus*, which transmit St. Louis encephalitis, and *Aedes aegypti*, which transmit dengue. According to Bill Brogdon, director of the CDC Insecticide Resistance Surveillance Laboratory, housed at the Division of Parasitic Diseases (DPD) in Chamblee, "With widespread organophosphate resistance already in these mosquitoes throughout the country, this is a very serious problem." Small state and local surveillance programs cannot afford to monitor resistance; thus, the present resistance status of vectors in the United States to standard insecticides is largely unknown, leaving the country vulnerable to the emergence of these diseases.

In 1995, with funding from NCID's Emerging Infectious Diseases initiative, Dr. Brogdon and DPD Entomology Branch colleagues began the Domestic Insecticide Resistance Surveillance Project and later the Insecticide Resistance Laboratory. At present, 26 states and Puerto Rico submit specimens for testing and receive insecticide resistance profiles. These studies are done with support from the American Mosquito Control Association and the Department of Defense Armed Forces Pest Management Board. Thus far, widespread (but focal) insecticide resistance has been found throughout the United States.

To date, three areas of potentially dangerous resistance have been found in Louisiana, Ohio, and Florida. In Louisiana, resistance to pyrethroids has appeared in *Culex pipiens* complex mosquitoes, the primary encephalitis vector in the United States. In Ohio, oxidase-based resistance to pyrethroids has appeared not only in *C. pipiens* mosquitoes, but also in the secondary (bird-cycle) vector, *Culex restuans*. This resistance was higher in areas where active mosquito control efforts were in place. Mosquitoes in Indian River County, Florida, were found to have a resistance mechanism specific for the organophosphate fenthion, the insecticide used to control epidemics. Both the Florida county and the Louisiana parish were also index districts for encephalitis alerts in 1998. The biochemical/molecular basis for the three new forms of resistance is being studied.



Bioassays and biochemical analysis are the basis of new resistance testing.

The Domestic Insecticide Resistance Laboratory staff includes DPD Entomology Branch members Janet McAllister, Ray Beach, and Alana Corwin, and Emory University work-study students Gena Groner and Parizad Parizi-Torabi. Other participants and collaborators include the Emergency Response team, National Center for Environmental Health, CDC; Division of Vector-Borne Infectious Diseases, NCID; American Mosquito Control Association; Center for Health Promotion and Preventative Medicine, U.S. Army (headquarters and four regional laboratories); and the Department of Defense Armed Forces Pest Management Board.

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IDEA Place

DVRD Rabies Section launches health education program

The Rabies Section, Viral and Rickettsial Zoonoses Branch, Division of Viral and Rickettsial Diseases, completed two major health education projects in 1998. The first, a full-color informational brochure about bats and rabies, was developed in partnership with Bat Conservation International, Inc. (BCI) and the U.S. Fish and Wildlife Service. The brochure addresses the public health issue of bat-related rabies, particularly occult transmission of rabies. Evidence from 21 bat-related rabies cases in humans since 1980 suggests that there are situations in which a bat bite may go unnoticed. The brochure encourages readers to seek medical advice after contact with a bat, even in the absence of an obvious bite wound. It also includes practical information on how to "bat-proof" a home and how to safely capture a bat and submit it for rabies testing. The brochure will be distributed through CDC, state health departments, BCI, and the U.S. Fish and Wildlife Service.

The second project, a rabies web page, was recently completed. The site contains information about rabies virus, diagnostic methods, epidemiology, prevention and control, and resources for health professionals. Additionally, an entire site was developed to educate kids about rabies. The colorful site contains educational activities, such as a word search, a word scramble, and pages to print and color. Both sites can be accessed at http://www.cdc. gov/ncidod/dvrd/rabies. For more information, contact the Rabies Section, 404-639-1050.

Leanne Ward
Division of Viral and Rickettsial Diseases

NEWS BRIEFS

National Nosocomial Infections Surveillance (NNIS) System conference held

The 1998 NNIS Conference, held in Atlanta at the Emory Conference Center October 22-23, 1998, was attended by 220 infection control personnel from 160 NNIS hospitals in 35 states and the District of Columbia. The program presented results of recent analyses of NNIS data and discussed future directions for the NNIS system. In addition, the program included a poster abstract session entitled "Translating Data into Information: Improving Quality of Care Using NNIS Data." The posters demonstrated how NNIS data have been effectively used to improve the quality or cost of care. The biennial conference fosters communication between personnel at CDC and the hospitals participating in the NNIS system.

PHOTO: Troy Hall

HIP's NNIS team hosted representatives from160 hospitals at the 1998 NNIS Conference.

Partnership for Food Safety Education wins awards

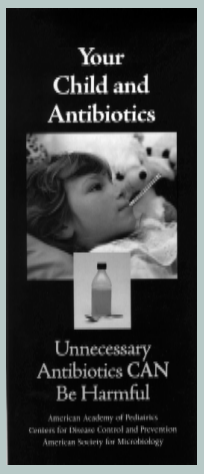
The Partnership for Food Safety Education won two 1998 National Health Information Awards: the Fight BAC!™ public service announcement won a Gold for Best Public Service Announcement and the Fight BAC!™ web site took a Bronze in the World Wide Web/ Internet category. Over 1,100 entries were submitted in the program's fifth year of recognizing the nation's best consumer health information programs and materials.

CDC's ulcer education campaign wins more awards

CDC's ulcer education campaign has received 10 national and regional awards for communications and health improvement. The awards include two International Association of Communicators Golden Flame Awards for the public service advertising and media relations components of the campaign; two Phoenix Awards from the Public Relations Society of America, Georgia Chapter, for the best integrated campaign and for TV public service announcement (PSA); the 1998 Aesculapius Award for the TV PSA from the Health Improvement Institute; and the Gold and Silver Awards from the Health Information Resource Center for best TV PSA and total health information program.

Judicious antibiotic use educational materials receive honors

Judicious antibiotic use health education materials, produced by the Respiratory Diseases Branch, DBMD, under the leadership of Ben Schwartz, have won two recent National Health Information Awards. The poster, "Sometimes a mother's care is the best medicine," won a Bronze Medal; the brochure, "Your Child and Antibiotics," won a Merit Prize in the medical communications pamphlet category.



Insecticide-resistance – continued from page 5

Among the participating state and local health officials are Linn Haramis, Illinois Department of Public Health; Vicki Taylor, St. Tammany Parish Mosquito Control District, Louisiana; Alan Curtis, Indian River County Mosquito Control District, Florida; Mike Collart, Summit County Health Department, Ohio; James Dukes, State of Florida Vector Research Laboratory, Panama City, Florida; and Mindy Walden, Alabama Department of Public Health.

Through training courses in Florida and South Carolina, workshops at national meetings, and those held at CDC, insecticide-resistance laboratory staff members have provided hands-on instruction to more than 200 public health officials in the use of new resistance detection and assessment technology developed at CDC.

The Domestic Insecticide Resistance Surveillance Laboratory also supports a World Health Organization program for detecting and assessing the significance of insecticide resistance in disease vectors worldwide. It also serves as a reference center for susceptible populations of a number of anopheline species. The most significant international finding is pyrethroid resistance in western Kenya. This information could affect the use of pyrethroid-impregnated bednets in that highly malaria-endemic area. ■

Infectious disease featured in American Museum of Natural History exhibit

The National Center for Infectious Diseases is collaborating with the American Museum of Natural History in the development of an innovative exhibition titled *Epidemic!* The exhibit will open at the museum in New York City on February 27, 1999, and run through September 6, 1999.

This exhibit will examine infectious disease from both a biological and cultural standpoint, emphasizing the delicate balance between microbes, humans, and other species and the space that they share on our planet. The exhibit will underscore the importance of understanding the global nature of infectious disease.

Epidemic! will use a wide array of three-dimensional models, video and audio programs, state-of-the-art interactive computer stations, photographs, and comprehensive wall text to lead visitors on an experimental investigation of the world of infectious diseases. Certain key diseases, including tuberculosis, AIDS, malaria, and hantavirus pulmonary syndrome, will be highlighted to illustrate the issues of outbreak, containment, treatment, and prevention in different historical and cultural contexts from around the world.

American Museum of Natural History, New York

Many of the photographs, videos, electron micrographs, and other support materials have come directly from NCID libraries and highlight the work done by NCID's EIS Officers, laboratorians, and researchers.

Following a 6-month run at the New York Museum of Natural History, the exhibit will begin a tour of museums around the country. Also, as part of the exhibit, PBS will broadcast a television special (also called *Epidemic!*) in June hosted by Professor Arthur Miller which will examine the issues of ethics, law, prevention, public health infrastructure and government as they relate to infectious diseases. Guests will include C. J. Peters, Special Pathogens Branch, Division of Viral and Rickettsial Diseases; Peggy Hamburg, Assistant Secretary for Health, Department of Health and Human Services; Joshua Lederberg, Rockefeller University; and David Kessler, Yale University School of Medicine.

For more information, see American Museum of Natural History web site: www.amnh.org. ■

News Makers

Awards/Honors

Cheryl Lackey, Office of Health Communication, NCID, was elected vice chair of the executive board, American Public Health Association.

Linda Moyer, DVRD, received an Outstanding Award for Family Practice Scientific Exhibit from the American Academy of Family Physicians at their annual meeting in San Francisco in September.

Arnie Steigerwalt, DBMD, received the Elizabeth O. King Award from the Southeastern Branch of the American Society for Microbiology in October for outstanding achievements in microbiology at the nondoctoral level.

Rob Weyant, DBMD, received the P.R. Edwards Awards from the Southeastern Branch of the American Society for Microbiology in October for outstanding achievements in microbiology at the doctoral level.

Retirements

Eddie George, biologist, SRP, retired on January 7 after 36 years of government service. He contributed to the development of unique biological reagents used throughout the public health laboratory system at both the federal and state level for the diagnosis of infectious diseases.

Gloria Johnson, administrative officer, SRP, retired on December 31 after 32 l/2 years of government service. She contributed her administrative skills to SRP's Animal Resources Branch, the Technical Services Branch, and the director's office.

Leo Kaufman, chief, Mycoses Immunodiagnostic Laboratory, Emerging Mycotic Diseases Branch, DBMD, retired in December after 39 years of government service. During his career he established and maintained a world-renowned program of mycoses immunodiagnostic testing, consultation, and research.

Stan Martin, supervisory mathematics statistician, Biostatistics and Information Management Branch, DBMD, retired in December after more than 32 years of government service. He led the branch in developing innovative methods for electronic surveillance and outbreak detection.

Bill Martin, director, SRP, retired on December 31. He served as a research microbiologist at CDC from 1965 to 1969 and returned in 1993 to the Scientific Resources Program. Under his leadership, the program established more effective and efficient services for CDC laboratorians and researchers.

Bettye Richardson retired from DPD in December after serving 33 years with the U.S. Public Health Service in Chamblee. Most recently, her research examined the ability of different *Anopheles* mosquitoes to transmit malaria.

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News Makers – continued from page 7

Wilmon Rushing, OD, NCID, retired on December 31 after 36 years of government service. He joined the AIDS Program in 1981 and since 1993 has served as NCID's associate director for management and operations. Mr. Rushing's administrative skills were invaluable during a time of transition and growth for NCID.

John Shaddock, Rabies Section, DVRD, retired October 30 after 27 years of government service. Mr. Shaddock was responsible for refining the test used in rabies diagnosis and has been the primary animal technologist for all rabies experiments at CDC.

Carol Wideman, Hematologic Diseases Branch, DASTLR, retired on January 1 after 36 years of government service. She made extensive contributions to research in both bleeding and clotting disorders, including thrombosis and von Willebrand disease.

Staff Changes

John Barnwell joined DPD's Biology and Diagnostics Branch in October as Senior Research Scientist responsible for laboratory and field research studies in the malaria program. He was formerly an associate professor in the Department of Medical and Molecular Parasitology, New York University School of Medicine.

Jean Bethune joined DPD as secretary for the Epidemiology Branch in December. She previously worked for the U.S. Air Force.

Renetta Lee is now administrative operations assistant in the Office of the Director, DPD. She comes to CDC from Martin Army Hospital, Fort Benning, Columbus, Georgia.

Brenda Lester joined DPD as secretary for the Biology and Diagnostics Branch in November. Before joining CDC, she was a civilian secretary with the U.S. Army in Mannheim, Germany.

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